

**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, 2020

OR

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

FOR THE TRANSITION PERIOD FROM \_\_\_\_\_ TO \_\_\_\_\_  
COMMISSION FILE NUMBER 000-52008



**LUNA INNOVATIONS INCORPORATED**

*(Exact name of Registrant as Specified in its Charter)*

**Delaware**

*(State or Other Jurisdiction of Incorporation or Organization)*

**54-1560050**

*(I.R.S. Employer Identification Number)*

**301 1st St SW, Suite 200**

**Roanoke, VA 24011**

*(Address of Principal Executive Offices)*

**(540) 769-8400**

*(Registrant's Telephone Number, Including Area Code)*

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

<u>Title of each class</u>	<u>Trading Symbol</u>	<u>Name of each exchange on which registered</u>
Common Stock, \$0.001 par value per share	LUNA	The Nasdaq Stock Market LLC

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

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined 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 during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes  No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See 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	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant on June 30, 2020 based upon the closing price of Common Stock on such date as reported by the Nasdaq Capital Market, was approximately \$176.8 million.

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date: As of March 10, 2021 there were 31,397,642 shares of the registrant's common stock outstanding.

**DOCUMENTS INCORPORATED BY REFERENCE**

Specified portions of the registrant's Proxy Statement with respect to its 2021 Annual Meeting of stockholders, anticipated to be filed within 120 days after the end of its fiscal year ended December 31, 2020, are incorporated by reference into Part III of this annual report on Form 10-K.



**LUNA INNOVATIONS INCORPORATED**  
**ANNUAL REPORT ON FORM 10-K**  
**FOR THE YEAR ENDED DECEMBER 31, 2020**

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## CAUTIONARY NOTE REGARDING FORWARD LOOKING STATEMENTS

*This Annual Report on Form 10-K, including the “Management’s Discussion and Analysis of Financial Condition and Results of Operation” section in Item 7 of this report, and other materials accompanying this Annual Report on Form 10-K contain forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended, and Section 27A of the Securities Act of 1933, as amended. All statements other than statements of historical facts are “forward-looking statements” for purposes of these provisions, including those relating to future events or our future financial performance. In some cases, you can identify these forward- looking statements by words such as “intends,” “will,” “plans,” “anticipates,” “expects,” “may,” “might,” “estimates,” “believes,” “should,” “projects,” “predicts,” “potential” or “continue,” or the negative of those words and other comparable words, and other words or terms of similar meaning in connection with any discussion of future operating or financial performance. Similarly, statements that describe our business strategy, goals, prospects, opportunities, outlook, objectives, plans or intentions are also forward-looking statements. These statements are only predictions and may relate to, but are not limited to, expectations of future operating results or financial performance, capital expenditures, introduction of new products, regulatory compliance, plans for growth and future operations, the potential impacts of the COVID-19 pandemic on our business, operations and financial results, the potential benefits of our acquisition of OptaSense, as well as assumptions relating to the foregoing.*

*These statements are based on current expectations and assumptions regarding future events and business performance and involve known and unknown risks, uncertainties and other factors that may cause actual events or results to be materially different from any future events or results expressed or implied by these statements. These factors include those set forth in the following discussion and within Item 1A “Risk Factors” of this Annual Report on Form 10-K and elsewhere within this report.*

*You should not place undue reliance on these forward-looking statements, which apply only as of the filing date of this Annual Report on Form 10-K. You should carefully review the risk factors described in other documents that we file from time to time with the U.S. Securities and Exchange Commission (“SEC”). Except as required by applicable law, including the rules and regulations of the SEC, we do not plan to publicly update or revise any forward-looking statements, whether as a result of any new information, future events or otherwise, other than through the filing of periodic reports in accordance with the Securities Exchange Act of 1934, as amended.*

*We have proprietary rights to a number of trademarks used in this Annual Report which are important to our business. Solely for convenience, the trademarks and trade names in this prospectus are referred to without the ® and TM symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto. All other trademarks, trade names and service marks appearing in this Annual Report are the property of their respective owners.*

## RISK FACTORS SUMMARY

Our business is subject to a number of risks and uncertainties, including those risks discussed at-length below. These risks include, among others, the following:

- Risks Relating to our Business
  - Our technology is subject to a license from Intuitive Surgical, Inc., which is revocable in certain circumstances. Without this license, we cannot continue to market, manufacture or sell our fiber-optic products.
  - We depend on third-party vendors for specialized components in our manufacturing operations, making us vulnerable to supply shortages and price fluctuations that could harm our business.
  - As a provider of contract research to the U.S. government, we are subject to federal rules, regulations, audits and investigations, the violation or failure of which could adversely affect our business.
  - We rely and will continue to rely on contracts and grants awarded under the Small Business Innovation Research program for a significant portion of our revenues. A finding by the SBA that we no longer qualify to receive Small Business Innovation Research awards could adversely affect our business.
  - Our products must meet exacting specifications, and defects and failures may occur, which may cause customers to return or stop buying our products.
  - The markets for many of our products are characterized by changing technology which could cause obsolescence of our products, and we may incur substantial costs in delivering new products.
- Risks Relating to our Operations and Business Strategy
  - If we fail to properly evaluate and execute our strategic initiatives, it could have an adverse effect on our future results and the market price of our common stock.

- Health epidemics, including the COVID-19 pandemic, have had, and could in the future have, an adverse impact on our business, operations, and the markets and communities in which we and our customers and suppliers operate.
- Risks Relating to our Regulatory Environment
  - Our operations are subject to domestic and foreign laws, regulations and restrictions, and noncompliance with these laws, regulations and restrictions could expose us to fines, penalties, suspension or debarment, which could have a material adverse effect on our profitability and overall financial position.
  - We are or may become subject to a variety of privacy and data security laws, and our failure to comply with them could harm our business.
- Risks Relating to our Intellectual Property
  - Our proprietary rights may not adequately protect our technologies.
  - Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.
- Risks Relating to our Common Stock
  - Our common stock price has been volatile and we expect that the price of our common stock will fluctuate substantially in the future, which could cause you to lose all or a substantial part of your investment.
  - Anti-takeover provisions in our amended and restated certificate of incorporation and bylaws and Delaware law could discourage or prevent a change in control, even if an acquisition would be beneficial to our stockholders, which could affect our stock price adversely and prevent attempts by our stockholders to replace or remove our current management.

## PART I

### ITEM 1. BUSINESS

#### Company Overview and Business Model

Luna Innovations Incorporated ("we" or the "Company") is a leader in advanced optical technology, providing high performance fiber optic test, measurement and control products for the telecommunications and photonics industries; and distributed fiber optic sensing solutions that measure, or "sense," the structures for industries ranging from aerospace, automotive, energy, oil and gas, security and infrastructure.

Our communications test and control products help customers test their fiber optic networks and assemblies with speed and precision in both lab and production environments, accelerating the development of fiber optic products and assuring accurate testing of optical components like photonic integrated circuits ("PICs") and coherent receivers, which are both critical elements of meeting the world's exponentially growing demand for bandwidth. Our distributed fiber optic sensing products help designers and manufacturers more efficiently develop new and innovative products by measuring stress, strain, and temperature at a high resolution for new designs or manufacturing processes. In addition, our distributed fiber optic sensing products ensure the safety and structural integrity or operational health of critical assets in the field, by monitoring stress, strain, and vibration in large civil and industrial infrastructure such as bridges, roads, pipelines and borders. We also provide applied research services, typically under research programs funded by the U.S. government, in areas of sensing and instrumentation, advanced materials, optical technologies and health sciences.

We are organized into two main reporting segments, our Lightwave segment and our Luna Labs segment. Our Lightwave segment consists of our fiber optics testing, measurement and sensing solutions. Our Lightwave segment revenues represented approximately 71% and 70% of our total revenues for the years ended December 31, 2020 and 2019, respectively.

Our Luna Labs segment performs applied research principally in the areas of sensing and instrumentation, advanced materials, optical technologies and health sciences. Our Luna Labs segment comprised approximately 29% and 30% of our total revenues for the years ended December 31, 2020 and 2019, respectively. Most of the government funding for our Luna Labs segment is derived from the Small Business Innovation Research ("SBIR") program coordinated by the U.S. Small Business Administration ("SBA").

Our SBIR research is focused on technological areas with commercial potential and we strive to commercialize any resulting scientific advancements. For the year ended December 31, 2020, approximately 32% of our total revenues were generated under the SBIR program, compared to 35% for the year ended December 31, 2019.

For the years ended December 31, 2020 and 2019, 35% and 40%, respectively, of our total revenues were derived from the U.S. government.

#### Acquisitions

##### *OptaSense Holdings Limited*

On December 3, 2020, we acquired OptaSense Holdings Limited ("OptaSense") for \$38.9 million, or £29.0 million, in cash. OptaSense, based in Farnborough, United Kingdom ("UK") and formerly owned by QinetiQ Holdings Limited, is a market leader in fiber optic distributed monitoring solutions for pipelines, oilfield services, security, highways and railways, and in power and utilities monitoring systems. The acquisition of OptaSense provided us with important distributed acoustic sensing ("DAS") intellectual property and products. OptaSense's technology and products and geographic footprint are highly complementary to our Lightwave segment which we believe will accelerate our technology roadmap and overall growth.

##### *General Photonics Corporation*

On March 1, 2019, we acquired all of the outstanding stock of General Photonics Corporation ("GP"), a leading provider of innovative components, modules and test equipment focused on the generation, measurement and control of polarized light critical in fiber optic-based applications for aggregate consideration of \$20.0 million, inclusive of \$19.0 million paid at closing and \$1.0 million of contingent consideration paid in 2020 related to certain earn-out provisions.

## **Lightwave**

Our Lightwave segment develops, manufactures and markets distributed fiber optic sensing products and fiber optic communications test and control products. We develop and commercialize our fiber optic technology for sensing applications for aerospace, automotive, energy and infrastructure as well as for test and measurement applications in the telecommunications and data communications industries. Our Lightwave segment also performs applied research principally in the areas of optical and terahertz technologies.

Our key initiative for long term growth is to become a leading provider of fiber optic test, measurement, control and sensing equipment. The acquisition of OptaSense added distributed acoustic sensing technology to our existing suite of sensing products and provided for expansion into high-growth markets such as security and perimeter detection, smart infrastructure monitoring and oil and gas. Our products have historically been strong in long-range, discrete sensing and short range, fully distributed sensing which are best when specific, known locations needed to be monitored. OptaSense's product offering has helped us fill a gap for long range, fully distributed measurement, which is best for applications where signals can occur anywhere along the length of the sensor.

Our primary product lines in our Lightwave segment are described in more detail below.

### ***Communications Test and Photonic Controls Products***

#### *Test and Measurement Equipment for Fiber Optic Components and Sub-Assemblies*

Our product lines in the optical test and measurement domain include our Optical Vector Analyzer, our Optical Backscatter Reflectometer, and our Phoenix family of tunable lasers.

Our optical test and measurement products primarily serve the telecommunications industry, as well as provide valuable applications in other fields. Our test and measurement products test and monitor the integrity of fiber optic network components and sub-assemblies. These products are designed for manufacturers and suppliers of optical components and sub-assemblies allowing them to reduce development, test and production costs and improve the quality of their products. Our products are particularly useful for characterizing and testing photonic integrated circuits, such as silicon photonics components, which are a critical technology enabling the growing worldwide demand for internet connectivity. Most manufacturers and suppliers of optical components and modules currently use a combination of different types of optical test equipment to measure performance and identify failures in optical networks, such as bad splices, bends, crimps and other reflective and non-reflective events that can cause defects and negatively impact product performance. Our optical test equipment products eliminate the need to employ multiple test products by addressing all stages of the end user's product development lifecycle, including design verification, component qualification, assembly process verification and failure analysis.

#### *Polarization Control*

Our polarization control products include components, modules and instruments to measure, manage and control polarization and group delay in fiber optic networks. Our proprietary fiber optic squeezing technology enables a high- performance polarization control and measurement system for the accurate measurement of polarization properties of light sources and optical materials. We also manufacture and sell fiber optic coils for use in gyroscopes.

#### *Tunable Lasers*

Our swept tunable lasers are integrated into current and new products to help customers build faster, more flexible and cost-effective test and measurement products. Our laser has desirable properties in the quality of the laser light produced, the speed at which it can operate, the small size of the package, and the environmental conditions in which it can operate, making it possible to bring these capabilities out of the laboratory, and into more demanding environments such as aircraft structural health monitoring, automotive manufacturing, green energy and industrial applications.

### ***Sensing and Non-Destructive Test Products***

#### *ODiSI Sensing Solution*

Our ODiSI products provide fully distributed strain and temperature measurements delivering an extraordinary amount of data by using an optical fiber as a continuous sensor to produce measurements every millimeter for a sensor up to 50 meters in length. Compared to traditional sensing methods, such as electrical strain gages, this technology provides greater insight into the performance, tolerances and failure mechanisms of composite structures and vehicles and can be integrated into locations and environments not accessible with traditional sensors. We believe our ODiSI products provide exceptional value to the

aerospace and automotive industries as they continue to adopt electrification and move to lighter weight systems made of composite structures.

ODiSI incorporates multiple channels of fiber optic sensors whose inputs are integrated through an advanced measurement system and software using fiber optic sensing technology with our innovative monitoring system that allows several thousand sensors to be networked along a single optical fiber.

### *Hyperion Sensing Solution*

Our Hyperion sensing products expand our capabilities in fiber optic sensing by providing distributed sensing using hundreds of Fiber-Bragg Grating ("FBG") or Extrinsic Fabry-Perot ("FP") sensors integrated into long-range sensors of up to 40km in length, measured at sampling rates up to 5KHz. Hyperion enables rapid full-spectrum data acquisition and flexible peak detect algorithms of FBGs, Long Period FBGs and FP sensors with low-latency access to data for closed-loop feedback applications. Our Hyperion products target fiber optic sensing applications that require more dynamic measurement capabilities or longer distances than provided by our ODiSI platform, like monitoring of large, civil and industrial infrastructure.

### *Terahertz Sensing Systems*

Our Terametrix terahertz ("THz") gauging and imaging product line uses pulsed THz waves to provide precise single- and multi-layer thickness, density, basis weight and caliper thickness measurements to serve the industrial, non-destructive testing, and research markets. Similar to x-ray images, THz wavelengths penetrate through most non-conductive materials and can easily reveal imperfections such as voids, cracks, and density variations. THz offers a significant advantage over x-rays because the radiation is non-ionizing and thus is completely safe. THz technology, unlike other traditional methods, is non-contact, works with both opaque and translucent materials, and works well for multilayer structures. The ability to accurately measure layer thickness is critical for ensuring consistent quality, minimizing defects and reducing material usage for products such as tubing, tires, plastic bottles, adhesives and coatings. Handheld THz sensors can measure and scan specialty coatings and multilayer structures to check thickness consistency and locate subsurface defects. THz systems can be used to inspect the high-performance coatings used on military aircraft, verifying thickness of applied coatings with submicron accuracy.

### ***Distributed Acoustic Sensing Products***

#### *OptaSense*

Our line of advanced DAS interrogator units deliver superior measurements for a wide range of applications from advanced industrial monitoring through high performance geophysical measurements. Applications of these units include real-time pipeline monitoring preventing disruption flow, advance monitoring and evaluation of reservoir and wellbore to reduce risk and optimize recovery, real-time information detection on highways and railways for traffic management and ensuring safety, cost-effective surveillance of borders and national assets and the precise detection of faults in power and utility infrastructure. Our DAS operations include a market leading laser technology company that supports and vertically integrates the most critical element of the DAS system, its internal laser.

### ***Sales and Marketing***

We primarily market our fiber optic test, measurement and control products to telecommunications companies, defense agencies, government system integrators, researchers, original equipment manufacturers, distributors, testing labs and strategic partners worldwide. We have a regional sales force that markets and sells our products directly as well as through manufacturer representative organizations to customers in North America and through partner and distribution channels for sales outside of North America, including the EMEA, LATAM and APAC regions. We have a dedicated sales force for direct marketing of our distributed sensing products, with an initial focus on customers in the automotive, aerospace, and energy industries.

We sell and market our THz instruments primarily to original equipment manufacturers through a mix of technical sales engineers, value added resellers and independent sales representatives. We market these products and capabilities through industry specific channels, including the internet, industry trade shows and through trade journals.

We believe that we provide a high level of support in developing and maintaining our long-term relationships with our customers. Customer service and support are provided through our offices and those of our partners that are located throughout the world.



## **Luna Labs**

We provide applied research for customers in our primary areas of focus, including sensing and materials such as coatings, adhesives, composites and bio-engineered materials. We generally compete to win contracts in these areas on a fee-for-service basis. Our Luna Labs segment has a successful track record of evaluating innovative technologies to address the needs of our customers.

We seek to maximize the benefits of our contract research business by generating revenue and identifying promising technologies to develop. We focus primarily on opportunities in which we develop intellectual property rights in areas that we believe we can commercialize. We take a disciplined approach to contract research to ensure the costs of contracts we undertake will be fully reimbursed. We believe this model is cost-efficient and significantly reduces our development risk by enabling us to defray the development costs of higher risk technology with third-party funding.

While we conduct our applied research on a fee-for-service basis for third parties, we seek to retain full or partial rights to the technologies and patents we develop under these contracts to continuously enlarge and strengthen our intellectual property portfolio. New technology that we develop may complement our existing technologies and enable us to develop applications and products that were previously not possible. In addition, the new technologies we develop may have commercial markets beyond the scope of the applications originally contemplated in the contract research stage, and we endeavor to capture the value of those opportunities. Funded research and development within this business segment was \$23.6 million and \$21.4 million for the years ended December 31, 2020 and 2019, respectively.

Each year, U.S. government federal agencies and departments are required to allocate a portion of their grant awards for SBIR-qualified organizations. SBIR contracts include Phase I feasibility contracts of up to \$225,000 and Phase II proof-of-concept contracts, which can be as high as \$1,500,000. We have won three National TIBBETTS Awards from the SBA for outstanding SBIR performance. We have also won research contracts outside the SBIR program from corporations and government entities. These contracts typically have a longer duration and higher value than SBIR grants. In the future, we seek to derive a larger portion of our contract research revenues from contracts outside of the SBIR program.

## **Materials**

We are actively developing a wide variety of materials. For example, we have developed a range of coatings, including both hydrophobic and superoleophobic coatings. These coatings are being evaluated for use in a number of applications. Other coatings under development include anti-corrosion and damage-indicating coatings.

We are also working on a variety of bioengineered materials for homeostatic agents and wound healing. These materials must be approved by the FDA or similar foreign regulatory agencies before they can be marketed, which we do not expect to occur for at least several years, if at all.

## **Sensing**

Our Luna Labs segment also performs a significant amount of applied research towards developing new sensors. This includes sensors for the purpose of corrosion, temperature, strain, pressure, structural health and chemical detection. Much of the work is directed to harsh environments and uses optics. Examples include measuring temperature and neutron flux in nuclear reactors, pressure and temperature in gas turbines and temperatures of cryogenic lines. The effort utilizes both discrete and distributed sensors. Our technology development work in this area is closely aligned with our Lightwave segment and is directed at advancing the technology and the development of new applications.

## **Intellectual Property**

We seek patent protection on inventions that we consider important to the operations of our business. We rely on a combination of patent, trademark, copyright and trade secret laws in the United States and other jurisdictions, as well as confidentiality procedures and contractual provisions to protect our proprietary technology and our brand. We control access to our proprietary technology and enter into confidentiality and invention assignment agreements with our employees and consultants and confidentiality agreements with other third parties.

Our success depends in part on our ability to develop patentable products and obtain, maintain and enforce patent and trade secret protection for our products, including successfully defending our patents against third-party challenges both in the United States and in other countries. We will only be able to protect our technologies from unauthorized use by third parties to the extent that we own or have licensed valid and enforceable patents or trade secrets that cover them. Furthermore, the degree of future protection of our proprietary rights is uncertain because we may not be able to obtain patent protection on some or all

of our technology and because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage.

Currently, we own or license approximately 527 U.S. and international patents and approximately 122 U.S. and international patent applications. Our issued patents generally have terms that are scheduled to expire between 2021 and 2037. The patents scheduled to expire in 2021 are not expected to have a significant impact on our revenues or results of operations. Patents may not be issued for any pending or future pending patent applications owned by or licensed to us. Claims allowed under any issued patent or future issued patent owned or licensed by us may not be valid or sufficiently broad to protect our technologies. Any issued patents owned by or licensed to us now or in the future may be challenged, invalidated or circumvented, and, in addition, the rights under such patents may not provide us with competitive advantages. In addition, competitors may design around our technology or develop competing technologies. To the extent we elect to pursue, intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture or increase their market share with respect to related technologies.

A discussion of our material in-licensed patents is set forth below.

#### *Shape Sensing Patents*

As a part of our sale of assets associated with our fiber optic shape sensing technology in the medical field to Intuitive Surgical, Inc. ("Intuitive") in 2014, we transferred our related patents to Intuitive. Also, as a part of this transaction, we entered into a revocable license agreement with Intuitive pursuant to which we have the right to use all of our transferred technology outside the field of medicine and in respect of our existing non-shape sensing products in certain non-robotic medical fields. Two U.S. patents that we now license back from Intuitive cover the use of optical frequency domain reflectometry and multiple, closely spaced Bragg gratings for shape sensing, and the use of the inherent scatter as a strain sensor for shape sensing. These two patents expire in July 2025. We also license back from Intuitive patents and patent applications that cover certain refinements to the measurements covered in the foregoing two patents and related technologies, which are necessary in order to achieve the necessary accuracies for medical and other applications. These patent applications were filed in the United States, the European Patent Office, China, India, Russia, Brazil, Japan, Indonesia and elsewhere. These patents and patent applications can support other nonmedical applications of our fiber optic shape sensing technology.

#### *Coherent*

In December 2006, we entered into an asset transfer and license agreement with Coherent, Inc. Under the agreement, we acquired the rights to manufacture Coherent's "Iolon" brand of swept tunable lasers as well as certain manufacturing equipment and inventory previously used by Coherent to manufacture the lasers. We continue to enhance, produce and market these lasers under our "Phoenix" brand. Under this agreement, Coherent granted non-exclusive licenses to us for certain U.S. patents and other intellectual property rights owned or controlled by Coherent for making, having made, using, importing, selling and offering for sale the lasers. This agreement expired in 2016. However, the patent licenses became fully paid and perpetual, as we fulfilled our royalty obligations during the 10-year period and the license to the other intellectual property rights is perpetual. These U.S. patents expire between 2020 and 2022. As consideration, we paid Coherent a total of \$1.3 million in addition to paying royalties on net sales of products sold by us that incorporate the lasers or that are manufactured using the intellectual property covered by the licenses.

The Phoenix laser is a miniaturized, external-cavity laser offering high performance in a compact footprint and is applicable to a range of fiber optic test and measurement, instrumentation, and sensing applications. These products employ frequency-tuned lasers to measure various aspects of the transmission properties of telecommunications fiber optic components and systems. Lasers are also used in fiber optic sensing applications such as distributed strain and temperature mapping, and distributed measurement of shape. We currently use these lasers within our ODISI platform of products, our fiber optic shape sensing products and certain of our backscatter reflectometer products, and we also sell variations of the Phoenix laser as standalone products. Under our agreements related to our sale of assets to Intuitive, we have certain obligations to supply Intuitive with these lasers.

#### **Divestitures**

##### *Sale of High-Speed Optical Receiver ("HSOR") Business*

On August 9, 2017, we completed the sale of our HSOR business, which was part of our Lightwave segment, to Macom Technology Solutions Inc. ("Macom") for an initial purchase price of \$33.5 million, of which \$29.5 million in cash has been received, and \$4.0 million was placed into escrow until December 15, 2018 for possible working capital adjustments to the purchase price and potential satisfaction of certain post-closing indemnification obligations. The HSOR business was a

component of the operations of Advanced Photonix, Inc., which we acquired in May 2015. In December 2018, we received \$1.5 million of the escrow amount. In March 2020, we settled a dispute regarding the remaining \$2.5 million in escrow resulting in us receiving \$0.6 million and Macom receiving \$1.9 million. For the year ended December 31, 2020, we have recorded a loss from discontinued operations of \$1.4 million, net of income tax benefit, to reflect the settlement of the dispute.

#### *Sale of Luna Optoelectronics*

In July 2018 we sold substantially all of the assets associated with our custom optoelectronic components and sub-assemblies business for total cash consideration of \$17.5 million, paid at closing, in addition to contingent consideration of up to \$1.0 million. The contingent consideration is subject to the optoelectronic business achieving specified revenue targets for the 18-month period following the closing date. We did not receive any of the additional \$1.0 million of consideration because the minimum revenue targets were not achieved.

### **Corporate History**

We were incorporated in the Commonwealth of Virginia in 1990 and reincorporated in the State of Delaware in April 2003. We completed our initial public offering in June 2006. Our executive offices are located at 301 1st St SW, Suite 200, Roanoke, Virginia 24011 and our main telephone number is (540) 769-8400.

### **Competition**

We compete with a variety of companies in several different product markets. The products that we have developed or are currently developing will compete with other technologically innovative products, as well as products incorporating conventional materials and technologies. We expect that we will compete with companies that manufacture test and measurement equipment for a wide range of industries, including aerospace, defense, healthcare, telecommunications, energy (including oil and gas and green energy), industrial measurement, and security applications. Although there can be no assurance that we will continue to do so, we believe that we compete favorably in these areas because our products leverage advanced technologies to offer superior performance. If we are unable to effectively compete in these areas in the future, we could lose business to our competitors, which could harm our operating results.

We also compete, or will compete, for government, university and corporate research contracts relating to a broad range of technologies. Competition for contract research is intense and the industry has few barriers to entry. We compete against a number of in-house research and development departments of major corporations, as well as a number of small, limited-service contract research providers and companies backed by large venture capital firms. The contract research industry continues to experience consolidation, which has resulted in greater competition for clients. Increased competition might lead to price and other forms of competition that could harm our operating results. We compete for contract research on the basis of a number of factors, including reliability, past performance, expertise and experience in specific areas, scope of service offerings, technological capabilities and price.

### **Government Regulation**

#### *Qualification for Small Business Innovation Research Grants*

SBIR is a highly competitive program that encourages small businesses to explore their technological potential and provides them with incentives to commercialize their technologies by funding research that might otherwise be prohibitively expensive or risky for companies like us. As noted above, we presently derive a significant portion of our revenue from this program, but we must continue to qualify for the SBIR program in order to be eligible to receive future SBIR awards. The eligibility requirements are:

- Ownership. The company must be more than 50 percent owned and controlled by U.S. citizens or permanent resident aliens, or owned by an entity that is itself more than 50 percent owned and controlled by U.S. citizens or permanent resident aliens; and
- Size. The company, including its affiliates, cannot have more than 500 employees.

These requirements are set forth in the SBA's regulations and are interpreted by the SBA's Office of Hearings and Appeals. In determining whether we satisfy the more than 50% ownership requirement, agreements to merge, stock options, convertible debt and other similar instruments are given "present effect" by the SBA as though the underlying security were actually issued unless the exercisability or conversion of such securities is speculative, remote or beyond the control of the security holder. We therefore believe our outstanding options and warrants held by eligible individuals may be counted as outstanding equity for purposes of meeting the more than 50% equity ownership requirement. We believe that we are in compliance with the SBA ownership requirements.

In addition, to be eligible for SBIR contracts, the number of our employees, including those of any entities that are considered to be affiliated with us, cannot exceed 500. As of December 31, 2020, we, including all of our divisions, had 426 full- and part-time employees. In determining whether we have 500 or fewer employees, the SBA may count the number of employees of entities that are large stockholders who are “affiliated” or have the power to control us. In determining whether firms are affiliated, the SBA evaluates factors such as stock ownership and common management, but it ultimately may make its determination based on the totality of the circumstances. Eligibility protests can be raised to the SBA by a competitor or by the awarding contracting agency. If we grow larger, and if our ownership becomes more diversified, we may no longer qualify for the SBIR program, and we may be required to seek alternative sources and partnerships to fund some of our research and development costs. Additional information regarding these risks may be found below in “Risk Factors.”

### *Environmental, Health and Safety Regulation*

Our facilities and current and proposed activities involve the use of a broad range of materials that are considered hazardous under applicable laws and regulations. Accordingly, we are subject to a number of domestic and foreign laws and regulations and other requirements relating to employee health and safety, protection of the environment, product labeling and product take back. Regulated activities include the storage, use, transportation and disposal of, and exposure to, hazardous or potentially hazardous materials and wastes. Our current and proposed activities also include potential exposure to physical hazards associated with work environment and equipment. We could incur costs, fines, civil and criminal penalties, personal injury and third-party property damage claims, or we could be required to incur substantial investigation or remediation costs, if we were to violate or become liable under environmental, health and safety laws and regulations or requirements. Liability under environmental, health and safety laws can be joint and several and without regard to fault. There can be no assurance that violations of environmental, health and safety laws will not occur in the future as a result of the inability to obtain permits in a timely manner, human error, equipment failure or other causes. Environmental, health and safety laws could also become more stringent over time, imposing greater compliance costs and increasing risks and penalties associated with violations, which could harm our business. Further, violations of present and future environmental, health and safety laws could restrict our ability to expand facilities and pursue certain technologies, as well as require us to acquire costly equipment or to incur potentially significant costs to comply with environmental, health and safety regulations and other requirements.

We have made, and will continue to make, expenditures to comply with current and future environmental, health and safety laws. We anticipate that we could incur additional capital and operating costs in the future to comply with existing environmental, health and safety laws and new requirements arising from new or amended statutes and regulations. In addition, because the applicable regulatory agencies have not yet promulgated final standards for some existing environmental, health and safety programs, we cannot at this time reasonably estimate the cost for compliance with these additional requirements. The amount of any such compliance costs could be material. We cannot predict the impact that future regulations will impose upon our business.

### **Employees**

As of December 31, 2020, we had approximately 411 full-time employees and 15 part-time employees, including approximately 179 in research, development and engineering positions, approximately 140 in operations, approximately 56 in sales and marketing, and approximately 51 in administrative positions. None of our employees are covered by a collective bargaining agreement, and we consider our relationship with our employees to be good.

### **Backlog**

Our backlog of purchase orders received for which the related goods have not been shipped or recognized as revenue, primarily within our Lightwave segment, was \$28.2 million and \$16.1 million at December 31, 2020 and 2019, respectively.

We have historically had a backlog of contracts, primarily within our Luna Labs segment, for which work has been scheduled, but for which a specified portion of work has not yet been completed. The approximate value of our backlog was \$26.8 million and \$31.3 million at December 31, 2020 and 2019, respectively.

We define backlog as the dollar amount of obligations payable to us under negotiated contracts upon completion of a specified portion of work that has not yet been completed, exclusive of revenues previously recognized for work already performed under these contracts, if any. Total backlog includes funded backlog, which is the amount for which money has been directly authorized by the U.S. government or for which a purchase order has been received from a commercial customer, and unfunded backlog, which represents firm orders for which funding has not yet been appropriated. Unfunded backlog was \$5.0 million and \$2.2 million as of December 31, 2020 and 2019, respectively. Indefinite delivery and quantity contracts and unexercised options are not reported in total backlog. Our backlog is subject to delays or program cancellations that may be beyond our control.

## Website Access to Reports

Our website address is [www.lunainc.com](http://www.lunainc.com). We make available, free of charge under “SEC Filings” on the Investor Relations portion of our website, access to our annual report on Form 10-K, our quarterly reports on Form 10-Q and our current reports on Form 8-K, as well as amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, as soon as reasonably practicable after such material is electronically filed with or furnished to the SEC. Information appearing on our website is not incorporated by reference in and is not a part of this annual report. The SEC maintains an internet site that contains reports, proxy and information statements, and other information regarding our filings at [www.sec.gov](http://www.sec.gov).

## ITEM 1A. RISK FACTORS

*You should carefully consider the risks described below before deciding whether to invest in our common stock. The risks described below are not the only ones we face. Additional risks not presently known to us or that we currently believe are immaterial may also impair our business operations and financial results. If any of the following risks actually occurs, our business, financial condition or results of operations could be adversely affected. In such case, the trading price of our common stock could decline and you could lose all or part of your investment. Our filings with the Securities and Exchange Commission also contain forward-looking statements that involve risks or uncertainties. Our actual results could differ materially from those anticipated or contemplated by these forward-looking statements as a result of a number of factors, including the risks we face described below, as well as other variables that could affect our operating results. Past financial performance should not be considered to be a reliable indicator of future performance, and investors should not use historical trends to anticipate results or trends in future periods.*

### RISKS RELATING TO OUR BUSINESS

***Our technology is subject to a license from Intuitive Surgical, Inc., which is revocable in certain circumstances. Without this license, we cannot continue to market, manufacture or sell our fiber-optic products.***

As a part of the sale of certain assets to Intuitive Surgical, Inc. ("Intuitive") in 2014, we entered into a license agreement with Intuitive pursuant to which we received rights to use all of our transferred technology outside the field of medicine and in respect of our existing non-shape sensing products in certain non-robotic medical fields. This license back to us is revocable if after notice and certain time periods, we were to (i) challenge the validity or enforceability of the transferred patents and patent applications, (ii) commercialize our fiber optical shape sensing and localization technology in the field of medicine (except to perform on a development and supply project for Hansen Medical, Inc.), (iii) violate our obligations related to our ability to sublicense in the field of medicine or (iv) violate our confidentiality obligations in a manner that advantages a competitor in the field of medicine and not cure such violation. Maintaining this license is necessary for us to conduct our fiber-optic products business, both for our telecom products and our ODISI sensing products. If this license were to be revoked by Intuitive, we would no longer be able to market, manufacture or sell these products which could have a material adverse effect on our operations.

***We depend on third-party vendors for specialized components in our manufacturing operations, making us vulnerable to supply shortages and price fluctuations that could harm our business.***

We primarily rely on third-party vendors for the manufacture of the specialized components used in our products. The highly specialized nature of our supply requirements poses risks that we may not be able to locate additional sources of the specialized components required in our business. For example, there are few manufacturers who produce the special lasers used in our optical test equipment. Our reliance on these vendors subjects us to a number of risks that could negatively affect our ability to manufacture our products and harm our business, including interruption of supply, including as a result of the COVID-19 pandemic. Although we are now manufacturing tunable lasers in low-rate initial production, we expect our overall reliance on third-party vendors to continue. Any significant delay or interruption in the supply of components, or our inability to obtain substitute components or materials from alternate sources at acceptable prices and in a timely manner could impair our ability to meet the demand of our customers and could harm our business.

***We depend upon outside contract manufacturers for a portion of the manufacturing process for some of our products. Our operations and revenue related to these products could be adversely affected if we encounter problems with these contract manufacturers.***

Many of our products are manufactured internally. However, we also rely upon contract manufacturers to produce the finished portion of certain lasers. Our reliance on contract manufacturers for these products makes us vulnerable to possible capacity constraints and reduced control over delivery schedules, manufacturing yields, manufacturing quality control and costs. If the contract manufacturer for our products were unable or unwilling to manufacture our products in required volumes and at high quality levels or to continue our existing supply arrangement, we would have to identify, qualify and select an acceptable alternative contract manufacturer or move these manufacturing operations to internal manufacturing facilities. An alternative contract manufacturer may not be available to us when needed or may not be in a position to satisfy our quality or production requirements on commercially reasonable terms, including price. Any significant interruption in manufacturing our products, including as a result of the COVID-19 pandemic, would require us to reduce the supply of products to our customers, which in turn would reduce our revenue, harm our relationships with the customers of these products and cause us to forego potential revenue opportunities.

***As a provider of contract research to the U.S. government, we are subject to federal rules, regulations, audits and investigations, the violation or failure of which could adversely affect our business.***

We must comply with and are affected by laws and regulations relating to the award, administration and performance of U.S. government contracts. Government contract laws and regulations affect how we do business with our government customers and, in some instances, impose added costs on our business. A violation of a specific law or regulation could result in the imposition of fines and penalties, termination of our contracts or debarment from bidding on contracts. In some instances, these laws and regulations impose terms or rights that are more favorable to the government than those typically available to commercial parties in negotiated transactions. For example, the U.S. government may terminate any of our government contracts and, in general, subcontracts, at their convenience, as well as for default based on performance.

In addition, U.S. government agencies, including the Defense Contract Audit Agency and the Department of Labor, routinely audit and investigate government contractors. These agencies review a contractor's performance under its contracts, cost structure and compliance with applicable laws, regulations and standards. The U.S. government also may review the adequacy of, and a contractor's compliance with, its internal control systems and policies, including the contractor's purchasing, property, estimating, compensation and management information systems. Any costs found to be improperly allocated to a specific contract will not be reimbursed, while such costs already reimbursed must be refunded. If an audit uncovers the inclusion of certain claimed costs deemed to be expressly unallowable, or improper or illegal activities, we may be subject to civil and criminal penalties and administrative sanctions, including termination of contracts, forfeiture of profits, suspension of payments, fines and suspension or prohibition from doing business with the U.S. government. In addition, our reputation could suffer serious harm if allegations of impropriety were made against us.

In addition to the risk of government audits and investigations, U.S. government contracts and grants impose requirements on contractors and grantees relating to ethics and business practices, which carry civil and criminal penalties including monetary fines, assessments, loss of the ability to do business with the U.S. government and certain other criminal penalties.

We may also be prohibited from commercially selling certain products that we develop under our Lightwave and Luna Labs segments or related products based on the same core technologies if the U.S. government determines that the commercial availability of those products could pose a risk to national security. For example, certain of our wireless technologies have been classified as secret by the U.S. government and as a result we cannot sell them commercially. Any of these determinations would limit our ability to generate product sales and license revenues.

***We rely and will continue to rely on contracts and grants awarded under the SBIR program for a significant portion of our revenues. A finding by the SBA that we no longer qualify to receive SBIR awards could adversely affect our business.***

We compete as a small business for some of our government contracts. Our revenues derived from the SBIR program account for a significant portion of our consolidated total revenues, and contract research, including SBIR contracts, will remain a significant portion of our consolidated total revenues for the foreseeable future. For the years ended December 31, 2020 and 2019, revenues generated under the SBIR program represented 32% and 35%, respectively, of our total revenues.

We may not continue to qualify to participate in the SBIR program or to receive new SBIR awards from federal agencies. In order to qualify for SBIR contracts and grants, we must meet certain size and ownership eligibility criteria. These eligibility criteria are applied as of the time of the award of a contract or grant. A company can be declared ineligible for a contract award as a result of a size challenge filed with the SBA by a competitor or a federal agency.

In order to be eligible for SBIR contracts and grants, under current SBA rules we must be more than 50% owned and controlled by individuals who are U.S. citizens or permanent resident aliens, and/or other small business concerns (each of which is more than 50% owned and controlled by individuals who are U.S. citizens or permanent resident aliens) or certain

qualified investment companies. In the event our institutional ownership significantly increases, either because of increased buying by institutions or selling by individuals, we could lose eligibility for new SBIR contracts and grants.

Also, in order to be eligible for SBIR contracts and grants, the number of our employees, including those of any entities that are considered to be affiliated with us, cannot exceed 500. As of December 31, 2020, we had approximately 426 full-time and part-time employees. In determining whether we are affiliated with any other entity, the SBA may analyze whether another entity controls or has the power to control us. Carilion Clinic is our largest institutional stockholder.

Since early 2011, a formal size determination by the SBA that focused on whether or not Carilion is or was our affiliate has been outstanding. Although we do not believe that Carilion has or had the power to control our company, we cannot assure you that the SBA will interpret its regulations in our favor on this question. If the SBA were to make a determination that we are or were affiliated with Carilion, we would exceed the size limitations, as Carilion has over 500 employees. In that case, we would lose eligibility for new SBIR contracts and grants and other awards that are set aside for small businesses based on the criterion of number of employees, and the relevant government agency would have the discretion to suspend performance on existing SBIR grants. The loss of our eligibility to receive SBIR awards would have a material adverse impact on our revenues, cash flows and our ability to fund our growth.

Moreover, as our business grows, it is foreseeable that we will eventually exceed the SBIR size limitations, in which case we may be required to seek alternative sources of revenues or capital.

***A decline in government research contract awards or government funding for existing or future government research contracts, including SBIR contracts, could adversely affect our revenues, cash flows and ability to fund our growth.***

Contract research revenue within the Lightwave and Luna Labs segment revenues, which consists primarily of government-funded research, accounted for 35% and 37% of our consolidated total revenues for the years ended December 31, 2020 and 2019, respectively. As a result, we are vulnerable to adverse changes in our revenues and cash flows if a significant number of our research contracts and subcontracts were to be simultaneously delayed or canceled for budgetary, performance or other reasons. For example, the U.S. government may cancel these contracts at any time without cause and without penalty or may change its requirements, programs or contract budget, any of which could reduce our revenues and cash flows from U.S. government research contracts. Our revenues and cash flows from U.S. government research contracts and subcontracts could also be reduced by declines or other changes in U.S. defense, homeland security and other federal agency budgets. In addition, we compete as a small business for some of these contracts, and in order to maintain our eligibility to compete as a small business, we, together with any affiliates, must continue to meet size and revenue limitations established by the U.S. government.

Our contract research customer base includes government agencies, corporations and academic institutions. Our customers are not obligated to extend their agreements with us and may elect not to do so. Also, our customers' priorities regarding funding for certain projects may change and funding resources may no longer be available at previous levels.

In addition to contract cancellations and changes in agency budgets, our future financial results may be adversely affected by curtailment of or restrictions on the U.S. government's use of contract research providers, including curtailment due to government budget reductions and related fiscal matters or any legislation or resolution limiting the number or amount of awards we may receive. These or other factors could cause U.S. defense and other federal agencies to conduct research internally rather than through commercial research organizations or direct awards to other organizations, to reduce their overall contract research requirements or to exercise their rights to terminate contracts. Alternatively, the U.S. government may discontinue the SBIR program or its funding altogether. Also, SBIR regulations permit increased competition for SBIR awards from companies that may not have previously been eligible, such as those backed by venture capital operating companies, hedge funds and private equity firms. Any of these developments could limit our ability to obtain new contract awards and adversely affect our revenues, cash flows and ability to fund our growth.

***Our failure to attract, train and retain skilled employees or members of our senior management and to obtain necessary security clearances for such persons or maintain a facility security clearance would adversely affect our business and operating results.***

The availability of highly trained and skilled technical and professional personnel is critical to our future growth and profitability. Competition for scientists, engineers, technicians and professional personnel is intense and our competitors aggressively recruit key employees. In the past, we have experienced difficulties in recruiting and hiring these personnel as a result of the tight labor market in certain fields. Any difficulty in hiring or retaining qualified employees, combined with our growth strategy and future needs for additional experienced personnel, particularly in highly specialized areas such as nanomaterial manufacturing and fiber optic sensing technologies, may make it more difficult to meet all of our needs for these employees in a timely manner. Although we intend to continue to devote significant resources to recruit, train and retain

qualified employees, we may not be able to attract and retain these employees, especially in technical fields in which the supply of experienced qualified candidates is limited, or at the senior management level. Any failure to do so would have an adverse effect on our business. Any loss of key personnel could have a material adverse effect on our ability to meet key operational objectives, such as timely and effective project milestones and product introductions, which in turn could adversely affect our business, results of operations and financial condition.

We provide certain services to the U.S. government that require us to maintain a facility security clearance and for certain of our employees and our board chairman to hold security clearances. In general, the failure for necessary persons to obtain or retain sufficient security clearances, any loss by us of a facility security clearance or any public reprimand related to security matters could result in a U.S. government customer terminating an existing contract or choosing not to renew a contract or prevent us from bidding on or winning certain new government contracts.

In addition, our future success depends in a large part upon the continued service of key members of our senior management team. We do not maintain any key-person life insurance policies on our officers. The loss of any members of our management team or other key personnel could seriously harm our business.

***Our business is subject to the cyclical nature of the markets in which we compete and any future downturn may reduce demand for our products and revenue.***

Many factors beyond our control affect our business, including consumer confidence in the economy, interest rates, fuel prices, health crises, such as the COVID-19 pandemic, and the general availability of credit. The overall economic climate and changes in Gross National Product growth have a direct impact on some of our customers and the demand for our products. We cannot be sure that our business will not be adversely affected as a result of an industry or general economic downturn.

Our customers may reduce capital expenditures and have difficulty satisfying liquidity needs because of continued turbulence in the U.S. and global economies, resulting in reduced sales of our products and harm to our financial condition and results of operations.

In particular, our historical results of operations have been subject to substantial fluctuations, and we may experience substantial period-to-period fluctuations in future results of operations. Any future downturn in the markets in which we compete could significantly reduce the demand for our products and therefore may result in a significant reduction in revenue or increase the volatility of the price of our common stock. Our revenue and results of operations may be adversely affected in the future due to changes in demand from customers or cyclical changes in the markets utilizing our products.

In addition, the telecommunications industry has, from time to time, experienced, and may again experience, a pronounced downturn. To respond to a downturn, many service providers may slow their capital expenditures, cancel or delay new developments, reduce their workforces and inventories and take a cautious approach to acquiring new equipment and technologies from original equipment manufacturers, which would have a negative impact on our business. Weakness in the global economy or a future downturn in the telecommunications industry may cause our results of operations to fluctuate from quarter-to-quarter and year-to-year, harm our business, and may increase the volatility of the price of our common stock.

***Customer acceptance of our products is dependent on our ability to meet changing requirements, and any decrease in acceptance could adversely affect our revenue.***

Customer acceptance of our products is significantly dependent on our ability to offer products that meet the changing requirements of our customers, including telecommunication, military, medical and industrial corporations, as well as government agencies. Any decrease in the level of customer acceptance of our products could harm our business.

***Our products must meet exacting specifications, and defects and failures may occur, which may cause customers to return or stop buying our products.***

Our customers generally establish demanding specifications for quality, performance and reliability that our products must meet. However, our products are highly complex and may contain defects and failures when they are first introduced or as new versions are released. Our products are also subject to rough environments as they are integrated into our customer products for use by the end customers. If defects and failures occur in our products, we could experience lost revenue, increased costs, including warranty expense and costs associated with customer support, delays in or cancellations or rescheduling of orders or shipments, product returns or discounts, diversion of management resources or damage to our reputation and brand equity, and in some cases consequential damages, any of which would harm our operating results. In addition, delays in our ability to fill product orders as a result of quality control issues may negatively impact our relationship with our customers. We cannot assure you that we will have sufficient resources, including any available insurance, to satisfy any asserted claims.



***The markets for many of our products are characterized by changing technology which could cause obsolescence of our products, and we may incur substantial costs in delivering new products.***

The markets for many of our products are characterized by changing technology, new product introductions and product enhancements, and evolving industry standards. The introduction or enhancement of products embodying new technology or the emergence of new industry standards could render existing products obsolete, and result in a write down to the value of our inventory, or result in shortened product life cycles. Accordingly, our ability to compete is in part dependent on our ability to continually offer enhanced and improved products.

The success of our new product offerings will depend upon several factors, including our ability to:

- accurately anticipate customer needs;
- innovate and develop new technologies and applications;
- successfully commercialize new technologies in a timely manner;
- price products competitively and manufacture and deliver products in sufficient volumes and on time; and
- differentiate our product offerings from those of our competitors.

***Our inability to find new customers or retain existing customers could harm our business.***

Our business is reliant on our ability to find new customers and retain existing customers. In particular, customers normally purchase certain of our products and incorporate them into products that they, in turn, sell in their own markets on an ongoing basis. As a result, the historical sales of these products have been dependent upon the success of our customers' products and our future performance is dependent upon our success in finding new customers and receiving new orders from existing customers.

In several markets, the quality and reliability of our products are a major concern for our customers, not only upon the initial manufacture of the product, but for the life of the product. Many of our products are used in remote locations for higher value assembly, making servicing of our products unfeasible. Any failure of the quality or reliability of our products could harm our business.

***Customer demand for our products is difficult to accurately forecast and, as a result, we may be unable to optimally match production with customer demand, which could adversely affect our business and financial results.***

We make planning and spending decisions, including determining the levels of business that we will seek and accept, production schedules, inventory levels, component procurement commitments, personnel needs and other resource requirements, based on our estimates of customer requirements. The short-term nature of commitments by many of our customers and the possibility of unexpected changes in demand for their products reduce our ability to accurately estimate future customer requirements. On occasion, customers may require rapid increases in production, which can strain our resources, cause our manufacturing to be negatively impacted by materials shortages, necessitate higher or more restrictive procurement commitments, increase our manufacturing yield loss and scrapping of excess materials, and reduce our gross margin. We may not have sufficient capacity at any given time to meet the volume demands of our customers, or one or more of our suppliers may not have sufficient capacity at any given time to meet our volume demands. Conversely, a downturn in the markets in which our customers compete can cause, and in the past have caused, our customers to significantly reduce or delay the amount of products ordered or to cancel existing orders, leading to lower utilization of our facilities. Because many of our costs and operating expenses are relatively fixed, reduction in customer demand due to market downturns or other reasons would have a negative effect on our gross margin, operating income and cash flow.

***Rapidly changing standards and regulations could make our products obsolete, which would cause our revenue and results of operations to suffer.***

We design products to conform to our customers' requirements and our customers' systems may be subject to regulations established by governments or industry standards bodies worldwide. Because some of our products are designed to conform to current specific industry standards, if competing or new standards emerge that are preferred by our customers, we would have to make significant expenditures to develop new products. If our customers adopt new or competing industry standards with which our products are not compatible, or the industry groups adopt standards or governments issue regulations with which our products are not compatible, our existing products would become less desirable to our customers and our revenue and results of operations would suffer.

***The results of our operations could be adversely affected by economic and political conditions and the effects of these conditions on our customers' businesses and levels of business activity.***

Global economic and political conditions affect our customers' businesses and the markets they serve. A severe or prolonged economic downturn, including during and following the COVID-19 pandemic, or a negative or uncertain political climate could adversely affect our customers' financial conditions and the timing or levels of business activity of our customers and the industries we serve. This may reduce the demand for our products or depress pricing for our products and have a material adverse effect on our results of operations. Changes in global economic conditions could also shift demand to products or services for which we do not have competitive advantages, and this could negatively affect the amount of business we are able to obtain. In addition, if we are unable to successfully anticipate changing economic and political conditions, we may be unable to effectively plan for and respond to those changes, and our business could be negatively affected as a result.

***We have experienced net losses in the past, and because our strategy for expansion may be costly to implement, we may experience losses and may not maintain profitability or positive cash flow.***

We have experienced net losses in the past. We expect to continue to incur significant expenses as we pursue our strategic initiatives, including increased expenses for research and development, sales and marketing and manufacturing. We may also grow our business in part through acquisitions of additional companies and complementary technologies which could cause us to incur greater than anticipated transaction expenses, amortization or write-offs of intangible assets and other acquisition-related expenses. As a result, we may incur net losses in the future, and these losses could be substantial. At a certain level, continued net losses could impair our ability to comply with Nasdaq continued listing standards, as described further below.

Our ability to generate additional revenues and remain profitable will depend on our ability to execute our key growth initiative regarding the development, marketing and sale of sensing products, develop and commercialize innovative technologies, expand our contract research capabilities and sell the products that result from those development initiatives. We may not be able to sustain or increase our profitability on a quarterly or annual basis.

***We have obtained capital by borrowing money under a term loan and revolving line of credit and we might require additional capital to support and expand our business; our term loan and revolving line of credit have various covenants with which we must comply.***

We intend to continue to make investments to support our business growth, including developing new products, enhancing our existing products, obtaining important regulatory approvals, enhancing our operating infrastructure, completing our development activities and building our commercial scale manufacturing facilities. To the extent that we are unable to remain profitable and to finance our activities from continuing operations, we may require additional funds to support these initiatives and to grow our business.

If we are successful in raising additional funds through issuances of equity or convertible debt securities, our existing stockholders could suffer significant dilution, including as the result of the issuance of warrants in connection with the financing, and any new equity securities we issue could have rights, preferences and privileges superior to those of our existing common stock. Furthermore, such financings may jeopardize our ability to apply for SBIR grants or qualify for SBIR contracts or grants, and our dependence on SBIR grants may restrict our ability to raise additional outside capital. If we raise additional funds through debt financings, these financings may involve significant cash payment obligations and covenants that restrict our ability to operate our business and make distributions to our stockholders.

We have a term loan and borrowings under a revolving line of credit with PNC Bank, National Association ("PNC"), which require us to comply with a number of affirmative and restrictive covenants including, among others, financial covenants regarding minimum net leverage and fixed charge coverage, affirmative covenants regarding delivery of financial statements, payment of taxes, and maintenance of government compliance, and restrictive covenants regarding dispositions of property, acquisitions, incurrence of additional indebtedness or liens, investments and transactions with affiliates. We are also restricted from paying dividends or making other distributions or payments on our capital stock, subject to limited exceptions. Upon the occurrence of certain events, including our failure to satisfy its payment obligations, failure to adhere to the financial covenants, the breach of certain of our other covenants, cross defaults to other indebtedness or material agreements, judgment defaults and defaults related to failure to maintain governmental approvals, PNC will have the right, among other remedies, to declare all principal and interest immediately due and payable, and to exercise secured party remedies.

If we are unable to obtain adequate financing or financing terms satisfactory to us when we require it, our ability to continue to support our business growth and to respond to business challenges could be significantly limited.

***We face and will face substantial competition in several different markets that may adversely affect our results of operations.***

We face and will face substantial competition from a variety of companies in several different markets. As we focus on developing marketing and selling fiber optic sensing products, we may also face substantial and entrenched competition in that market.

Many of our competitors have longer operating histories, greater name recognition, larger customer bases and significantly greater financial, sales and marketing, manufacturing, distribution, technical and other resources than we do. These competitors may be able to adapt more quickly to new or emerging technologies and changes in customer requirements. In addition, current and potential competitors have established or may establish financial or strategic relationships among themselves or with existing or potential customers or other third parties. Accordingly, new competitors or alliances among competitors could emerge and rapidly acquire significant market share. We cannot assure you that we will be able to compete successfully against current or new competitors, in which case our revenues may fail to increase or may decline.

Intense competition in our markets could result in aggressive business tactics by our competitors, including aggressively pricing their products or selling older inventory at a discount. If our current or future competitors utilize aggressive business tactics, including those described above, demand for our products could decline, we could experience delays or cancellations of customer orders, or we could be required to reduce our sales prices.

***Shifts in product mix may result in declines in gross profit.***

Our gross profit margins vary among our product platforms and are generally highest on our test and measurement instruments. Our overall gross profit may fluctuate from period to period as a result of a variety of factors including shifts in product mix, the introduction of new products, and decreases in average selling prices for older products. If our customers decide to buy more of our products with low gross profit margins or fewer of our products with high gross profit margins, our total gross profits could be harmed.

**RISKS RELATING TO OUR OPERATIONS AND BUSINESS STRATEGY**

***If we fail to properly evaluate and execute our strategic initiatives, including the integration of acquired businesses, it could have an adverse effect on our future results and the market price of our common stock.***

We evaluate strategic opportunities related to products, technology and business transactions, including acquisitions and divestitures. In the past, we have acquired businesses to support our growth strategy, including the acquisition of OptaSense in December 2020, General Photonics Corporation in March 2019 and Micron Optics, Inc. in October 2018. If we choose to enter into such transactions in the future, we face certain risks including:

- the failure of the acquired business to meet our performance and financial expectations;
- difficulty integrating an acquired business's operations, personnel and financial and reporting systems into our current business
- potential unknown liabilities associated with the acquisition;
- lost sales and customers as a result of customers deciding not to do business with us;
- complexities associated with managing the larger combined company with distant business locations;
- integrating personnel while maintaining focus on providing consistent, high quality products;
- loss of key employees; and
- performance shortfalls as a result of the division of management's attention caused by completing the acquisition and integrating operations.

If any of these events were to occur, our ability to maintain relationships with the customers, suppliers and employees or our ability to achieve the anticipated benefits of the acquisition could be adversely affected, or could reduce our future earnings or otherwise adversely affect our business and financial results and, as a result, adversely affect the market price of our common stock.

***If we cannot successfully transition our revenue mix from contract research revenues to product sales and license revenues, we may not be able to fully execute our business model or grow our business.***

Our business model and future growth depend on our ability to transition to a revenue mix that contains significantly larger product sales and revenues from the provision of services or from licensing. Product sales and these revenues potentially offer greater scalability than contract research revenues. Our current plan is to increase our sales of commercial products, our licensing revenues and our provision of non-research services to customers so as to represent a larger percentage of our total revenues. If we are unable to develop and grow our product sales and revenues from the provision of services or from licensing to augment our contract research revenues, however, our ability to execute our business model or grow our business could suffer. There can be no assurance that we will be able to achieve increased revenues in this manner.

***Failure to develop, introduce and sell new products or failure to develop and implement new technologies, could adversely impact our financial results.***

Our success will depend on our ability to develop and introduce new products that customers choose to buy. The new products the market requires tend to be increasingly complex, incorporating more functions and operating at faster speeds than old products. If we fail to introduce new product designs or technologies in a timely manner or if customers do not successfully introduce new systems or products incorporating our products, our business, financial condition and results of operations could be materially harmed.

***If we are unable to manage growth effectively, our revenues and net loss could be adversely affected.***

We may need to expand our personnel resources to grow our business effectively. We believe that sustained growth at a higher rate will place a strain on our management as well as on our other human resources. To manage this growth, we must continue to attract and retain qualified management, professional, scientific and technical and operating personnel. If we are unable to recruit a sufficient number of qualified personnel, we may be unable to staff and manage projects adequately, which in turn may slow the rate of growth of our contract research revenues or our product development efforts.

***We may not be successful in identifying market needs for new technologies or in developing new products.***

Part of our business model depends on our ability to correctly identify market needs for new technologies. We intend to identify new market needs, but we may not always have success in doing so in part because our contract research largely centers on identification and development of unproven technologies, often for new or emerging markets. Furthermore, we must identify the most promising technologies from a sizable pool of projects. If our commercialization strategy process fails to identify projects with commercial potential or if management does not ensure that such projects advance to the commercialization stage, we may not successfully commercialize new products and grow our revenues.

Our growth strategy requires that we also develop successful commercial products to address market needs. We face several challenges in developing successful new products. Many of our existing products and those currently under development are technologically innovative and require significant and lengthy product development efforts. These efforts include planning, designing, developing and testing at the technological, product and manufacturing-process levels. These activities require us to make significant investments. Although there are many potential applications for our technologies, our resource constraints require us to focus on specific products and to forgo other opportunities. We expect that one or more of the potential products we choose to develop will not be technologically feasible or will not achieve commercial acceptance, and we cannot predict which, if any, of our products we will successfully develop or commercialize. The technologies we research and develop are new and steadily changing and advancing. The products that are derived from these technologies may not be applicable or compatible with the state of technology or demands in existing markets. Our existing products and technologies may become uncompetitive or obsolete if our competitors adapt more quickly than we do to new technologies and changes in customers' requirements. Furthermore, we may not be able to identify if and when new markets will open for our products given that future applications of any given product may not be readily determinable, and we cannot reasonably estimate the size of any markets that may develop. If we are not able to successfully develop new products, we may be unable to increase our product revenues.

***We face risks associated with our international business.***

We currently conduct business internationally and we might considerably expand our international activities in the future. Our international business operations are subject to a variety of risks associated with conducting business internationally, including:

- having to comply with U.S. export control regulations and policies that restrict our ability to communicate with non-U.S. employees and supply foreign affiliates and customers;
- changes in or interpretations of foreign regulations that may adversely affect our ability to sell our products, perform services or repatriate profits to the United States;
- the imposition of tariffs;
- hyperinflation or economic or political instability in foreign countries;
- imposition of limitations on, or increase of withholding and other taxes on remittances and other payments by foreign subsidiaries or joint ventures;
- conducting business in places where business practices and customs are unfamiliar and unknown;
- the imposition of restrictive trade policies;
- the imposition of inconsistent laws or regulations;
- the imposition or increase of investment and other restrictions or requirements by foreign governments;
- uncertainties relating to foreign laws and legal proceedings;
- having to comply with a variety of U.S. laws, including the Foreign Corrupt Practices Act ("FCPA"); and
- having to comply with licensing requirements.

We do not know the impact that these regulatory, geopolitical and other factors may have on our international business in the future. Further, the COVID-19 pandemic has prompted precautionary government-imposed closures of certain travel and business. It is unknown whether and how global supply chains, may be affected if such an epidemic persists for an extended period of time. We may incur expenses or delays relating to such events outside of our control or experience potential disruption of our ability to travel to customer sites and industry conferences important to the marketing and support of our products, any of which could have an adverse impact on our business, operating results and financial condition.

***We may dispose of or discontinue existing product lines and technology developments, which may adversely impact our future results.***

On an ongoing basis, we evaluate our various product offerings and technology developments in order to determine whether any should be discontinued or, to the extent possible, divested. In addition, if we are unable to generate the amount of cash needed to fund the future operations of our business, we may be forced to sell one or more of our product lines or technology developments.

We cannot guarantee that we have correctly forecasted, or that we will correctly forecast in the future, the right product lines and technology developments to dispose or discontinue or that our decision to dispose of or discontinue various investments, product lines and technology developments is prudent if market conditions change. In addition, there are no assurances that the discontinuance of various product lines will reduce operating expenses or will not cause us to incur material charges associated with such decision. Furthermore, the discontinuance of existing product lines entails various risks, including the risk that we will not be able to find a purchaser for a product line or the purchase price obtained will not be equal to at least the book value of the net assets for the product line. Other risks include managing the expectations of, and maintaining good relations with, our historical customers who previously purchased products from a disposed or discontinued product line, which could prevent us from selling other products to them in the future. We may also incur other significant liabilities and costs associated with disposal or discontinuance of product lines, including employee severance costs and excess facilities costs.

***Health epidemics, including the COVID-19 pandemic, have had, and could in the future have, an adverse impact on our business, operations, and the markets and communities in which we and our customers and suppliers operate.***

In December 2019, a disease referred to as COVID-19 was reported and has spread to many countries worldwide, including the United States.

The ongoing global COVID-19 pandemic has impacted, and will likely continue to impact, the way we conduct our business, including the way in which we interface with customers, suppliers and our employees. Although to date we have not experienced any material changes in our customers' purchasing patterns during the COVID-19 pandemic, it is possible that the pandemic could result in customers delaying purchasing decisions, deferring the ordering of our products or experiencing reductions in capital expenditure budgets that could otherwise impact the near term demand for our products. Similarly, while we have not experienced any material changes in our supply chain, it is possible that suppliers could experience difficulty in

providing us with necessary components for our products. If the demand for our products, or our access to critical components were to be interrupted, it could have a material adverse impact on our results of operations.

The COVID-19 pandemic has been declared a national emergency. In response to the COVID-19 pandemic, many state, local, and foreign governments have put in place, and others in the future may put in place, quarantines, executive orders, shelter-in-place orders, and similar government orders and restrictions in order to control the spread of the disease. Such orders or restrictions, or the perception that such orders or restrictions could occur, have resulted in business closures, work stoppages, slowdowns and delays, work-from-home policies, travel restrictions, and cancellation or postponement of events, among other effects that could negatively impact productivity and disrupt our operations and those of our customers and suppliers. We have implemented alternate work arrangements, including staggered schedules and shifts, distancing within our offices and working from home for most of our employees, and we may take further actions that alter our operations as may be required by federal, state, or local authorities, or which we determine are in our best interests. While most of our operations can be performed under these alternate work arrangements, there is no guarantee that we will be as effective while working under them because our team is dispersed, many employees may have additional personal needs to attend to (such as looking after children as a result of school closures or family who become sick), and employees may become sick themselves and be unable to work. Decreased effectiveness of our team could adversely affect our results due to our inability to meet in person with potential customers, longer time periods for supply, longer time periods for manufacturing and other decreases in productivity that could seriously harm our business. Furthermore, we may decide to postpone or cancel planned investments in our business in response to changes in our business as a result of the spread of COVID-19, which could seriously harm our business.

In addition, while the potential impact and duration of the COVID-19 pandemic on the global economy and our business in particular may be difficult to assess or predict, the pandemic has resulted in, and may continue to result in, significant disruption of global financial markets, reducing our ability to access capital, which could negatively affect our liquidity in the future.

The global impact of COVID-19 continues to rapidly evolve, and we will continue to monitor the situation closely. The ultimate impact of the COVID-19 pandemic or a similar health epidemic is highly uncertain and subject to change. We do not yet know the full extent of potential delays or impacts on our business, operations, or the global economy as a whole. While the spread of COVID-19 may eventually be contained or mitigated, there is no guarantee that a future outbreak of this or any other widespread epidemics will not occur, or that the global economy will recover, either of which could seriously harm our business.

## **RISKS RELATING TO OUR REGULATORY ENVIRONMENT**

***Our operations are subject to domestic and foreign laws, regulations and restrictions, and noncompliance with these laws, regulations and restrictions could expose us to fines, penalties, suspension or debarment, which could have a material adverse effect on our profitability and overall financial position.***

Our operations, particularly our international sales, subject us to numerous U.S. and foreign laws and regulations, including, without limitation, regulations relating to imports, exports (including the Export Administration Regulations and the International Traffic in Arms Regulations), technology transfer restrictions, anti-boycott provisions, economic sanctions and anti-corruption laws including the FCPA and the UK Bribery Act of 2010 in the United Kingdom. The number of our various emerging technologies, the development of many of which has been funded by the Department of Defense, presents us with many regulatory challenges. Failure by us or our sales representatives or consultants to comply with these laws and regulations could result in administrative, civil, or criminal liabilities and could result in suspension of our export privileges, which could have a material adverse effect on our business. Changes in regulation or political environment may affect our ability to conduct business in foreign markets including investment, procurement and repatriation of earnings.

***Environmental regulations could increase operating costs and additional capital expenditures and delay or interrupt operations.***

The photonics industry, as well as the semiconductor industry, are subject to governmental regulations for the protection of the environment, including those relating to air and water quality, solid and hazardous waste handling, and the promotion of occupational safety. Various federal, state and local laws and regulations require that we maintain certain environmental permits. While we believe that we have obtained all necessary environmental permits required to conduct our manufacturing processes, if we are found to be in violation of these laws, we could be subject to governmental fines and liability for damages resulting from such violations.

Changes in the aforementioned laws and regulations or the enactment of new laws, regulations or policies could require increases in operating costs and additional capital expenditures and could possibly entail delays or interruptions of our operations.

***If our manufacturing facilities do not meet Federal, state or foreign country manufacturing standards, we may be required to temporarily cease all or part of our manufacturing operations, which would result in product delivery delays and negatively impact revenues.***

Our manufacturing facilities are subject to periodic inspection by regulatory authorities and our operations will continue to be regulated by the FDA for compliance with Good Manufacturing Practice requirements contained in the quality systems regulations. We are also required to comply with International Organization for Standardization ("ISO"), quality system standards in order to produce certain of our products for sale in Europe. If we fail to continue to comply with Good Manufacturing Practice requirements or ISO standards, we may be required to cease all or part of our operations until we comply with these regulations. Obtaining and maintaining such compliance is difficult and costly. We cannot be certain that our facilities will be found to comply with Good Manufacturing Practice requirements or ISO standards in future inspections and audits by regulatory authorities. In addition, if we cannot maintain or establish manufacturing facilities or operations that comply with such standards or do not meet the expectations of our customers, we may not be able to realize certain economic opportunities in our current or future supply arrangements.

***We are subject to additional significant foreign and domestic government regulations, including environmental and health and safety regulations, and failure to comply with these regulations could harm our business.***

Our facilities and current and proposed activities involve the use of a broad range of materials that are considered hazardous under applicable laws and regulations. Accordingly, we are subject to a number of foreign, federal, state and local laws and regulations relating to health and safety, protection of the environment and the storage, use, disposal of, and exposure to, hazardous materials and wastes. We could incur costs, fines and civil and criminal penalties, personal injury and third-party property damage claims, or could be required to incur substantial investigation or remediation costs, if we were to violate or become liable under environmental, health and safety laws. Moreover, a failure to comply with environmental laws could result in fines and the revocation of environmental permits, which could prevent us from conducting our business. Liability under environmental laws can be joint and several and without regard to fault. There can be no assurance that violations of environmental and health and safety laws will not occur in the future as a result of the inability to obtain permits, human error, equipment failure or other causes. Environmental laws could become more stringent over time, imposing greater compliance costs and increasing risks and penalties associated with violations, which could harm our business. Accordingly, violations of present and future environmental laws could restrict our ability to expand facilities, pursue certain technologies, and could require us to acquire costly equipment or incur potentially significant costs to comply with environmental regulations.

Compliance with foreign, federal, state and local environmental laws and regulations represents a small part of our present budget. If we fail to comply with any such laws or regulations, however, a government entity may levy a fine on us or require us to take costly measures to ensure compliance. Any such fine or expenditure may adversely affect our development. We cannot predict the extent to which future legislation and regulation could cause us to incur additional operating expenses, capital expenditures or restrictions and delays in the development of our products and properties.

***We are or may become subject to a variety of privacy and data security laws, and our failure to comply with them could harm our business.***

We maintain sensitive information, including confidential business and personal information in connection with our business customers and our employees, and may be subject to laws and regulations governing the privacy and security of such information. In the United States, there are numerous federal and state privacy and data security laws and regulations governing the collection, use, disclosure and protection of personal information. Each of these constantly evolving laws can be subject to varying interpretations.

In addition, states are constantly adopting new laws or amending existing laws, requiring attention to frequently changing regulatory requirements. For example, the California Consumer Privacy Act, or the CCPA, took effect on January 1, 2020 and has been dubbed the first "GDPR-like" law in the United States. The CCPA gives California residents expanded rights to access and delete their personal information, opt out of certain personal information sharing and receive detailed information about how their personal information is used by requiring covered companies to provide new disclosures to California consumers (as that term is broadly defined and can include any of our current or future employees who may be California residents) and provide such residents new ways to opt-out of certain sales of personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for data breaches that is expected to increase data breach litigation. The CCPA

may increase our compliance costs and potential liability. Some observers have noted that the CCPA could mark the beginning of a trend toward more stringent privacy legislation in the United States. Other states are beginning to pass similar laws.

Additionally, California voters approved a new privacy law, the California Privacy Rights Act, or CPRA, in the November 3, 2020 election. Effective starting on January 1, 2023, the CPRA will significantly modify the CCPA, including by expanding consumers' rights with respect to certain sensitive personal information. The CPRA also creates a new state agency that will be vested with authority to implement and enforce the CCPA and the CPRA.

New legislation proposed or enacted in Illinois, Massachusetts, Nevada, New Jersey, New York, Rhode Island, Virginia, Washington and other states, and a proposed right to privacy amendment to the Vermont Constitution, imposes, or has the potential to impose, additional obligations on companies that collect, store, use, retain, disclose, transfer and otherwise process confidential, sensitive and personal information, and will continue to shape the data privacy environment nationally. State laws are changing rapidly and there is discussion in Congress of a new federal data protection and privacy law to which we would become subject if it is enacted. All of these evolving compliance and operational requirements impose significant costs that are likely to increase over time, may require us to modify our data processing practices and policies, divert resources from other initiatives and projects, and could restrict the way products and services involving data are offered, all of which could significantly harm our business, financial condition, results of operations and prospects. Further, certain state laws may be more stringent or broader in scope, or offer greater individual rights, with respect to confidential, sensitive and personal information than federal, international or other state laws, and such laws may differ from each other, which may complicate compliance efforts.

A similar situation exists in the EU, where the General Data Protection Regulation, the GDPR, took effect in 2018 in the European Economic Area, the EEA. The GDPR governs the collection, use, disclosure, transfer or other processing of personal data of European data subjects. Among other things, the GDPR imposes requirements regarding the security of personal data and notification of data processing obligations to the competent national data processing authorities, changes the lawful bases on which personal data can be processed, and expands the definition of personal data. In addition, the GDPR increases the scrutiny of transfers of personal data from the EEA to the United States and other jurisdictions that the European Commission does not recognize as having "adequate" data protection laws, and imposes substantial fines for breaches and violations (up to the greater of €20 million or 4% of our consolidated annual worldwide gross revenue). The GDPR also confers a private right of action on data subjects and consumer associations to lodge complaints with supervisory authorities, seek judicial remedies and obtain compensation for damages resulting from violations of the GDPR. Compliance with these and any other applicable privacy and data security laws and regulations is a rigorous and time-intensive process, and we may be required to put in place additional mechanisms ensuring compliance with the new data protection rules. If we fail to comply with any such laws or regulations, we may face significant fines and penalties that could adversely affect our business, financial condition and results of operations. Furthermore, the laws are not consistent, and compliance in the event of a widespread data breach could be costly.

More recently, the Court of Justice of the European Union ruled in July 2020 that the Privacy Shield, used by thousands of companies to transfer data between the European Union and United States, was invalid and could no longer be used. In September 2020, Switzerland concluded that the Swiss-U.S. Privacy Shield Framework does not provide an adequate level of protection for data transfers from Switzerland to the United States. Alternative transfer mechanisms may be used, including the standard contractual clauses ("SCCs"), while the authorities interpret the decisions and scope of the invalidated Privacy Shield, but the SCCs have also been called into question in the same ruling that invalidated Privacy Shield. At present, there are few if any viable alternatives to the SCCs, so future developments may necessitate further expenditures on local infrastructure, changes to internal business processes, or may otherwise affect or restrict sales and operations.

Further, the vote in the United Kingdom in favor of exiting the European Union, referred to as Brexit, has complicated data protection regulation in the United Kingdom. In particular, as of January 1, 2021, the GDPR has been converted into United Kingdom law and the United Kingdom is now a "third country" under the GDPR. Pursuant to the Trade and Cooperation Agreement, which went into effect on January 1, 2021, the United Kingdom and European Union agreed to a specified period during which the United Kingdom will be treated like a European Union member state in relation to transfers of personal data to the United Kingdom for four months from January 1, 2021. This period may be extended by two further months. Unless the European Commission makes an 'adequacy finding' in respect of the United Kingdom before the expiration of such specified period, the United Kingdom will become an 'inadequate third country' under the GDPR and transfers of data from the EEA to the United Kingdom will require an 'transfer mechanism,' such as the standard contractual clauses. Furthermore, following the expiration of the specified period, there will be increasing scope for divergence in application, interpretation and enforcement of the data protection law as between the United Kingdom and EEA.

In addition to the foregoing, any breach of privacy laws or data security laws, particularly resulting in a significant security incident or breach involving the misappropriation, loss or other unauthorized use or disclosure of sensitive or confidential personal information, could have a material adverse effect on our business, reputation and financial condition. In any circumstances where we are a data controller, we will be accountable for any third-party service providers we engage to



process personal data on our behalf. We attempt to mitigate the associated risks but there is no assurance that privacy and security-related safeguards will protect us from all risks associated with the third-party processing, storage and transmission of such information.

## RISKS RELATING TO OUR INTELLECTUAL PROPERTY

### *Our proprietary rights may not adequately protect our technologies.*

Our commercial success will depend in part on our obtaining and maintaining patent, trade secret, copyright and trademark protection of our technologies in the United States and other jurisdictions as well as successfully enforcing this intellectual property and defending it against third-party challenges. We will only be able to protect our technologies from unauthorized use by third parties to the extent that valid and enforceable intellectual property protections, such as patents or trade secrets, cover them. In particular, we place considerable emphasis on obtaining patent and trade secret protection for significant new technologies, products and processes. The degree of future protection of our proprietary rights is uncertain because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage. The degree of future protection of our proprietary rights is also uncertain for products that are currently in the early stages of development because we cannot predict which of these products will ultimately reach the commercial market or whether the commercial versions of these products will incorporate proprietary technologies.

Our patent position is highly uncertain and involves complex legal and factual questions. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents. For example:

- we or our licensors might not have been the first to make the inventions covered by each of our pending patent applications and issued patents;
- we or our licensors might not have been the first to file patent applications for these inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies;
- it is possible that none of our pending patent applications or the pending patent applications of our licensors will result in issued patents;
- patents may issue to third parties that cover how we might practice our technology;
- our issued patents and issued patents of our licensors may not provide a basis for commercially viable technologies, may not provide us with any competitive advantages, or may be challenged and invalidated by third parties; and
- we may not develop additional proprietary technologies that are patentable.

Patents may not be issued for any pending or future pending patent applications owned by or licensed to us, and claims allowed under any issued patent or future issued patent owned or licensed by us may not be valid or sufficiently broad to protect our technologies. Moreover, protection of certain of our intellectual property may be unavailable or limited in the United States or in foreign countries, and we have not sought to obtain foreign patent protection for certain of our products or technologies due to cost, concerns about enforceability or other reasons. Any issued patents owned by or licensed to us now or in the future may be challenged, invalidated, or circumvented, and the rights under such patents may not provide us with competitive advantages. In addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, and in the case of certain products no foreign patents were filed or can be filed. This could make it easier for competitors to capture or increase their market share with respect to related technologies. We could incur substantial costs to bring suits in which we may assert our patent rights against others or defend ourselves in suits brought against us. An unfavorable outcome of any litigation could have a material adverse effect on our business and results of operations.

We also rely on trade secrets to protect our technology, especially where we believe patent protection is not appropriate or obtainable. However, trade secrets are difficult to protect. We regularly attempt to obtain confidentiality agreements and contractual provisions with our collaborators, employees and consultants to protect our trade secrets and proprietary know-how. These agreements may be breached or may not have adequate remedies for such breach. While we use reasonable efforts to protect our trade secrets, our employees, consultants, contractors or scientific and other advisors, or those of our strategic partners, may unintentionally or willfully disclose our information to competitors. If we were to enforce a claim that a third party had illegally obtained and was using our trade secrets, our enforcement efforts would be expensive and time consuming, and the outcome would be unpredictable. In addition, courts outside the United States are sometimes unwilling to protect trade secrets. Moreover, if our competitors independently develop equivalent knowledge, methods and know-how, it will be more difficult for us to enforce our rights and our business could be harmed.

If we are not able to defend the patent or trade secret protection position of our technologies, then we will not be able to exclude competitors from developing or marketing competing technologies and we may not generate enough revenues from product sales to justify the cost of developing our technologies and to achieve or maintain profitability.

We also rely on trademarks to establish a market identity for our company and our products. To maintain the value of our trademarks, we might have to file lawsuits against third parties to prevent them from using trademarks confusingly similar to or dilutive of our registered or unregistered trademarks. Also, we might not obtain registrations for our pending trademark applications, and we might have to defend our registered trademark and pending trademark applications from challenge by third parties. Enforcing or defending our registered and unregistered trademarks might result in significant litigation costs and damages, including the inability to continue using certain trademarks.

***Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.***

Various U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in our technology areas. Such third parties may claim that we infringe their patents. Because patent applications can take several years to result in a patent issuance, there may be currently pending applications, unknown to us, which may later result in issued patents that our technologies may infringe. For example, we are aware of competitors with patents in technology areas applicable to our optical test equipment products. Such competitors may allege that we infringe these patents. There could also be existing patents of which we are not aware that our technologies may inadvertently infringe. We have from time to time been, and may in the future be, contacted by third parties, including patent assertion entities or intellectual property advisors, about licensing opportunities that also contain claims that we are infringing on third party patent rights. If third parties assert these claims against us, we could incur extremely substantial costs and diversion of management resources in defending these claims, and the defense of these claims could have a material adverse effect on our business, financial condition and results of operations. Even if we believe we have not infringed on a third party's patent rights, we may have to settle a claim on unfavorable terms because we cannot afford to litigate the claim. In addition, if third parties assert claims against us and we are unsuccessful in defending against these claims, these third parties may be awarded substantial damages as well as injunctive or other equitable relief against us, which could effectively block our ability to make, use, sell, distribute or market our products and services in the United States or abroad.

Commercial application of nanotechnologies in particular, or technologies involving nanomaterials, is new and the scope and breadth of patent protection is uncertain. Consequently, the patent positions of companies involved in nanotechnologies have not been tested, and there are complex legal and factual questions for which important legal principles will be developed or may remain unresolved. In addition, it is not clear whether such patents will be subject to interpretations or legal doctrines that differ from conventional patent law principles. Changes in either the patent laws or in interpretations of patent laws in the United States and other countries may diminish the value of our nanotechnology-related intellectual property. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our nanotechnology-related patents or in third party patents. In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

***A substantial portion of our technology is subject to retained rights of our licensors, and we may not be able to prevent the loss of those rights or the grant of similar rights to third parties.***

A substantial portion of our technology is licensed from academic institutions, corporations and government agencies. Under these licensing arrangements, a licensor may obtain rights over the technology, including the right to require us to grant a license to one or more third parties selected by the licensor or that we provide licensed technology or material to third parties for non-commercial research. The grant of a license for any of our core technologies to a third party could have a material and adverse effect on our business. In addition, some of our licensors retain certain rights under the licenses, including the right to grant additional licenses to a substantial portion of our core technology to third parties for non-commercial academic and research use. It is difficult to monitor and enforce such non-commercial academic and research uses, and we cannot predict whether the third-party licensees would comply with the use restrictions of such licenses. We have incurred and could incur substantial expenses to enforce our rights against them. We also may not fully control the ability to assert or defend those patents or other intellectual property which we have licensed from other entities, or which we have licensed to other entities.

In addition, some of our licenses with academic institutions give us the right to use certain technology previously developed by researchers at these institutions. In certain cases, we also have the right to practice improvements on the licensed technology to the extent they are encompassed by the licensed patents and are within our field of use. Our licensors may currently own and may in the future obtain additional patents and patent applications that are necessary for the development, manufacture and commercial sale of our anticipated products. We may be unable to agree with one or more academic institutions from which we have obtained licenses whether certain intellectual property developed by researchers at these

academic institutions is covered by our existing licenses. In the event that the new intellectual property is not covered by our existing licenses, we would be required to negotiate a new license agreement. We may not be able to reach agreement with current or future licensors on commercially reasonable terms, if at all, or the terms may not permit us to sell our products at a profit after payment of royalties, which could harm our business.

Some of our patents may cover inventions that were conceived or first reduced to practice under, or in connection with, U.S. government contracts or other federal funding agreements. With respect to inventions conceived or first reduced to practice under a federal funding agreement, the U.S. government may retain a non-exclusive, non-transferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the invention throughout the world. We may not succeed in our efforts to retain title in patents, maintain ownership of intellectual property or in limiting the U.S. government's rights in our proprietary technologies and intellectual property when an issue exists as to whether such intellectual property was developed in the performance of a federal funding agreement or developed at private expense.

***If we fail to obtain the right to use the intellectual property rights of others which are necessary to operate our business, and to protect their intellectual property, our business and results of operations will be adversely affected.***

In the past, we have licensed certain technologies for use in our products. In the future, we may choose, or be required, to license technology or intellectual property from third parties in connection with the development of our products. We cannot assure you that third-party licenses will be available on commercially reasonable terms, if at all. Our competitors may be able to obtain licenses, or cross-license their technology, on better terms than we can, which could put us at a competitive disadvantage. Also, we often enter into confidentiality agreements with such third parties in which we agree to protect and maintain their proprietary and confidential information, including at times requiring our employees to enter into agreements protecting such information. There can be no assurance that the confidentiality agreements will not be breached by any of our employees or that such third parties will not make claims that their proprietary information has been disclosed.

## **RISKS RELATING TO OUR COMMON STOCK**

***Our common stock price has been volatile and we expect that the price of our common stock will fluctuate substantially in the future, which could cause you to lose all or a substantial part of your investment.***

The public trading price for our common stock is volatile and may fluctuate significantly. Since January 1, 2009, our common stock has traded between a high of \$12.85 per share and a low of \$0.26 per share. Among the factors, many of which we cannot control, that could cause material fluctuations in the market price for our common stock are:

- sales of our common stock by our significant stockholders, or the perception that such sales may occur;
- changes in earnings estimates, investors' perceptions, recommendations by securities analysts or our failure to achieve analysts' earnings estimates;
- changes in our status as an entity eligible to receive SBIR contracts and grants;
- quarterly variations in our or our competitors' results of operations;
- challenges integrating our recent or future acquisitions, including the inability to realize any expected synergies;
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors;
- announcements by us, or by our competitors, of acquisitions, new products, significant contracts, commercial relationships or capital commitments;
- pending or threatened litigation;
- any major change in our board of directors or management or any competing proxy solicitations for director nominees;
- changes in governmental regulations or in the status of our regulatory approvals;
- announcements related to patents issued to us or our competitors;
- a lack of, limited or negative industry or securities analyst coverage;
- health epidemics, including the COVID-19 pandemic;
- discussions of our company or our stock price by the financial and scientific press and online investor communities; and
- general developments in our industry.

In addition, the stock prices of many technology companies have experienced wide fluctuations that have often been unrelated to the operating performance of those companies. These factors may materially and adversely affect the market price of our common stock.

***If our estimates relating to our critical accounting policies are based on assumptions or judgments that change or prove to be incorrect, our operating results could fall below expectations of financial analysts and investors, resulting in a decline in our stock price.***

The preparation of financial statements in conformity with U.S. GAAP requires our management to make estimates, assumptions and judgments that affect the amounts reported in the consolidated financial statements and accompanying notes. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets, liabilities, equity, revenue and expenses that are not readily apparent from other sources. Our operating results may be adversely affected if our assumptions change or if actual circumstances differ from those in our assumptions, which could cause our operating results to fall below the expectations of financial analysts and investors, resulting in a decline in our stock price. Significant assumptions and estimates used in preparing our consolidated financial statements include those related to revenue recognition, stock-based compensation and income taxes. Moreover, the revenue recognition guidance, ASC Topic 606, *Revenue from Contracts with Customers*, requires more judgment than did the prior guidance.

***Our financial results may be adversely affected by changes in accounting principles applicable to us.***

U.S. GAAP is subject to interpretation by the FASB, the SEC, and other bodies formed to promulgate and interpret appropriate accounting principles. For example, in May 2014, the FASB issued ASC Topic 606, *Revenue from Contracts with Customers*, which supersedes nearly all existing revenue recognition guidance under U.S. GAAP. We adopted this guidance as of January 1, 2018. The most significant impact relates to changing the revenue recognition for custom optoelectronics to an over time method. Before the adoption of this standard, we deferred the recognition of revenue until products were shipped to the customer. Any difficulties in implementing these pronouncements or adequately accounting after adoption could cause us to fail to meet our financial reporting obligations, which could result in regulatory discipline and harm investors' confidence in us.

***Anti-takeover provisions in our amended and restated certificate of incorporation and bylaws and Delaware law could discourage or prevent a change in control, even if an acquisition would be beneficial to our stockholders, which could affect our stock price adversely and prevent attempts by our stockholders to replace or remove our current management.***

Our amended and restated certificate of incorporation and bylaws and Delaware law contain provisions that might delay or prevent a change in control, discourage bids at a premium over the market price of our common stock and adversely affect the market price of our common stock and the voting and other rights of the holders of our common stock. These provisions include:

- a classified board of directors serving staggered terms;
- advance notice requirements to stockholders for matters to be brought at stockholder meetings;
- a supermajority stockholder vote requirement for amending certain provisions of our amended and restated certificate of incorporation and bylaws; and
- the right to issue preferred stock without stockholder approval, which could be used to dilute the stock ownership of a potential hostile acquirer.

We are also subject to provisions of the Delaware General Corporation law that, in general, prohibit any business combination with a beneficial owner of 15% or more of our common stock for three years unless the holder's acquisition of our stock was approved in advance by our board of directors or certain other conditions are satisfied.

The existence of these provisions could adversely affect the voting power of holders of common stock and limit the price that investors might be willing to pay in the future for shares of our common stock.

## **GENERAL RISK FACTORS**

***We could be negatively affected by a security breach or other compromise, either through cyber-attack, cyber-intrusion or other significant disruption of our IT networks and related systems.***

We face the risk, as does any company, of a security breach or other compromise, whether through cyber-attack or cyber-intrusion over the internet, malware, computer viruses, attachments to e-mails, persons inside our organization or persons with access to systems inside our organization, or other significant disruption of our IT networks and related systems. The risk of a security breach or disruption, particularly through cyber-attack or cyber-intrusion, including by computer hackers, foreign governments and cyber terrorists, has increased as the number, intensity and sophistication of attempted attacks and intrusions

from around the world have increased. We may also experience security breaches or compromises from unintentional or accidental actions by our employees, contractors, consultants, business partners, and/or other third parties. To the extent that any security breach or disruption were to result in a loss, destruction, unavailability, alteration or dissemination of, or damage to, our data or applications, or for it to be believed or reported that any of these occurred, we could incur liability and reputational damage.

As a technology company, and particularly as a government contractor, we may face a heightened risk of a security breach, compromise or disruption from attempts to gain unauthorized access to our proprietary, confidential or classified information on our IT networks and related systems via cyber-attacks or cyber-intrusions. These types of information and IT networks and related systems are critical to the operation of our business and essential to our ability to perform day-to-day operations, and, in some cases, are critical to our operations or those of our customers. Such critical information includes our proprietary software code, which we protect as a trade secret and is critical to the competitive advantage of many of our products, which could be adversely affected if this code were stolen in a cyber-intrusion or otherwise compromised. In addition, as certain of our technological capabilities become widely known, it is possible that we may be subjected to cyber-attack or cyber-intrusion as third parties seek to gain improper access to information regarding these capabilities and cyber-attacks or cyber-intrusion could compromise our confidential information or our IT networks and systems generally, as it is not practical as a business matter to isolate all of our confidential information and trade secrets from email and internet access. A security breach, compromise or other significant disruption involving these types of information and IT networks and related systems could disrupt the proper functioning of these networks and systems and therefore our operations, compromise our confidential information and trade secrets, or damage our reputation among our customers and the public generally. We have not identified any significant security breaches or experienced other significant disruptions of these types to date. To date, we have not experienced a significant cyber-intrusion, cyber-attack or other similar disruption. There can be no assurance that our security efforts and measures will be effective or that attempted security breaches or disruptions would not be successful or damaging. Any of these developments in the future could have a negative impact on our results of operations, financial condition and cash flows.

***If there are substantial sales of our common stock, or the perception that such sales may occur, our stock price could decline.***

If any of our stockholders were to sell substantial amounts of our common stock, the market price of our common stock may decline, which might make it more difficult for us to sell equity or equity-related securities in the future at a time and price that we deem appropriate. Substantial sales of our common stock, or the perception that such sales may occur, may have a material adverse effect on the prevailing market price of our common stock.

***We may become involved in securities class action litigation that could divert management's attention and harm our business and our insurance coverage may not be sufficient to cover all costs and damages.***

The stock market has from time to time experienced significant price and volume fluctuations that have affected the market prices for the common stock of technology companies. These broad market fluctuations may cause the market price of our common stock to decline. In the past, following periods of volatility in the market price of a particular company's securities, securities class action litigation has often been brought against that company. Securities class litigation also often follows certain significant business transactions, such as the sale of a business division or a change in control transaction. We may become involved in this type of litigation in the future. Litigation often is expensive and diverts management's attention and resources, which could adversely affect our business.

***We are obligated to develop and maintain proper and effective internal controls over financial reporting and any failure to maintain the adequacy of these internal controls may adversely affect investor confidence in our company and, as a result, the value of our common stock.***

We are required, pursuant to Section 404 of the Sarbanes-Oxley Act to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting on an annual basis. This assessment includes disclosure of any material weaknesses identified by our management in our internal control over financial reporting.

During the evaluation and testing process of our internal controls, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal control over financial reporting is effective. While we have established certain procedures and controls over our financial reporting processes, we cannot assure you that these efforts will prevent restatements of our financial statements in the future. We may not be able to remediate any future material weaknesses, or to complete our evaluation, testing and any required remediation in a timely fashion.

Any failure to maintain internal control over financial reporting could severely inhibit our ability to accurately report our financial condition or results of operations. If we are unable to conclude that our internal control over financial reporting is effective, we could lose investor confidence in the accuracy and completeness of our financial reports, the market price of our common stock could decline, and we could be subject to sanctions or investigations by the Nasdaq Stock Market, the SEC or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting, or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

**ITEM 1B. UNRESOLVED STAFF COMMENTS**

Not applicable.

**ITEM 2. PROPERTIES**

The following table summarizes the location, ownership status and total square footage of space utilized for our operations and principal corporate offices as of December 31, 2020:

	Location	Square Footage
Operations facilities	12 locations in 5 US states, 2 UK counties, 1 CN province and 1 UAE city	199,000
Principal corporate offices:		
Corporate headquarters	Roanoke, Virginia (US)	4,400
OptaSense headquarters	Farnborough, Hampshire (UK)	7,500

All of our properties are leased with various end dates through 2030. We believe that our existing facilities are adequate for our current needs and suitable additional or substitute space will be available as needed to accommodate expansion of our operations.

**ITEM 3. LEGAL PROCEEDINGS**

From time to time, we may become involved in litigation or claims arising out of our operations in the normal course of business. Management currently believes the amount of ultimate liability, if any, with respect to these actions will not materially affect our financial position, results of operations, or liquidity.

Refer to Note 14, *Commitments and Contingencies*, of the Notes to the Consolidated Financial Statements included herein for information relating to certain legal proceedings.

**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

#### STOCKHOLDERS

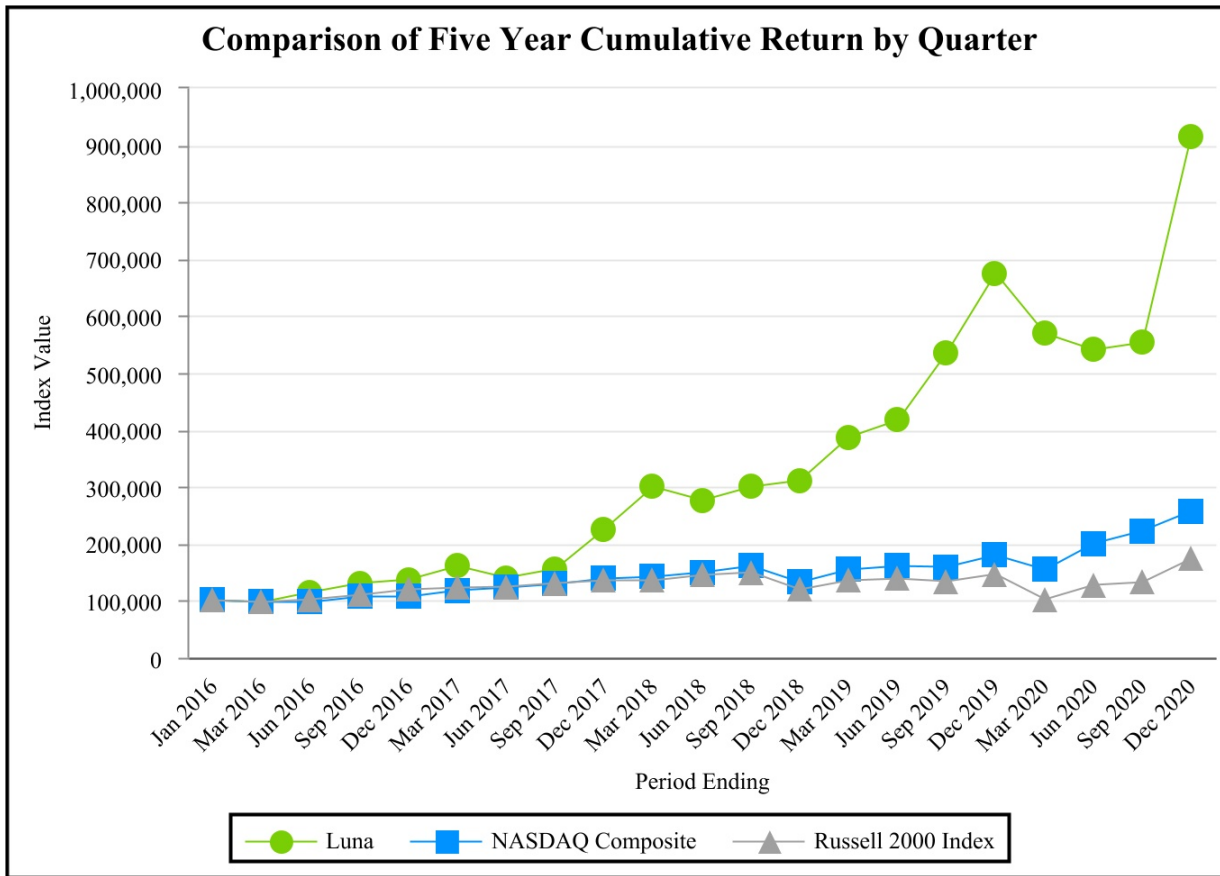
Our common stock is listed on the Nasdaq Capital Market under the symbol "LUNA." As of March 10, 2021, we had 31,397,642 shares of common stock outstanding held by 94 holders of record. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

#### STOCK PERFORMANCE GRAPH

The graph set forth below compares the cumulative total stockholder return on our common stock for the previous five years, during which our common stock was traded on the Nasdaq Capital Market, as compared to the cumulative total return of the Nasdaq Composite Index and the Russell 2000 Index over the same period. This graph assumes the investment of \$100,000 in our common stock at the closing price on January 1, 2016, and an equivalent amount in the Nasdaq Composite Index and the Russell 2000 Index on that date, and assumes the reinvestment of dividends, if any. We have never paid dividends on our common stock and have no present plans to do so.

Since there is no published industry or line-of-business index for our business reflective of our performance, nor do we believe we can reasonably identify a peer group, we measure our performance against issuers with similar market capitalizations. We selected the Russell 2000 Index because it measures the performance of a broad range of companies with lower market capitalizations than those companies included in the S&P 500 Index.

The comparisons shown in the graph below are based upon historical data. We caution that the stock price performance shown in the graph below is not necessarily indicative of, nor is it intended to forecast, the potential future performance of our common stock.



The preceding Stock Performance Graph is not deemed filed with the Securities and Exchange Commission and shall not be incorporated by reference in any of our filings under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

**DIVIDEND POLICY**

Since our inception, we have never declared or paid any cash dividends on our common stock. We currently expect to retain any future earnings for use in the operation and expansion of our business, and therefore do not anticipate paying any cash dividends in the foreseeable future. In addition, our debt facility with PNC Bank restricts us from paying cash dividends on our capital stock without the bank’s prior written consent.

**Unregistered Sales of Equity Securities**

Not applicable.



**Purchases of Equity Securities by the Issuer and Affiliated Parties-**

The following table summarizes repurchases of our common stock during December 2020. There were no purchases during October 2020 or November 2020.

<b>Period</b>	<b>Total Number of Shares Purchased</b>	<b>Average Price Paid per Share</b>	<b>Total Number of Shares Purchased as Part of a Publicly Announced Program</b>	<b>Approximate Dollar Value of Shares that May Yet be Purchased Under the Program</b>
12/1/2020 - 12/31/2020	12,534 (1) \$	9.87	— \$	—

(1) These shares of common stock were repurchased from employees to satisfy tax withholding obligations triggered upon vesting of restricted stock awards.

**ITEM 6. SELECTED FINANCIAL DATA**

The consolidated statement of operations data for each of the years ended December 31, 2020 and 2019 and the consolidated balance sheet data as of December 31, 2020 and 2019 have been derived from our audited consolidated financial statements appearing elsewhere in this report. The consolidated statement of operations data for the years ended December 31, 2018, 2017 and 2016 and the consolidated balance sheet data as of December 31, 2018, 2017 and 2016 have been derived from our audited consolidated financial statements that do not appear in this report. The following selected consolidated financial data should be read in conjunction with our consolidated financial statements and the accompanying notes and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included at Part II, Item 7 in this Annual Report on Form 10-K. The selected data in this section is not intended to replace the consolidated financial statements, and the historical results are not necessarily indicative of the results to be expected in any future period.

	Years ended December 31,				
(in thousands, except share and per share data)	2020	2019	2018	2017	2016
<b>Consolidated Statement of Operations Data:</b>					
Revenues:					
Lightwave	\$ 59,115	\$ 49,117	\$ 24,409	\$ 16,846	\$ 15,552
Luna Labs	23,566	21,399	18,508	16,236	14,052
Total revenues (1)	82,681	70,516	42,917	33,082	29,604
Cost of revenues:					
Lightwave	23,306	20,157	10,136	7,362	7,124
Luna Labs	17,187	15,176	13,343	12,351	10,766
Total cost of revenues	40,493	35,333	23,479	19,713	17,890
Gross profit	42,188	35,183	19,438	13,369	11,714
Operating expense	37,205	31,867	18,560	15,577	15,840
Operating income/(loss)	4,983	3,316	878	(2,208)	(4,126)
Other income/(expense), net	50	(5)	(17)	26	28
Interest income	67	394	549	—	—
Interest expense, net	(25)	(16)	(124)	(218)	(317)
Income/(loss) from continuing operations before income taxes	5,075	3,689	1,286	(2,400)	(4,415)
Income tax (expense)/benefit	(348)	1,654	(48)	1,149	136
Net income/(loss) from continuing operations	4,727	5,343	1,238	(1,251)	(4,279)
(Loss)/income from discontinued operations, net of income taxes	(1,436)	—	9,766	15,866	1,909
Net income/(loss)	3,291	5,343	11,004	14,615	(2,370)
Less: Preferred stock dividend	—	286	257	147	105
Net income/(loss) attributable to common stockholders	\$ 3,291	\$ 5,057	\$ 10,747	\$ 14,468	\$ (2,475)
Net income/(loss) per share from continuing operations:					
Basic	\$ 0.15	\$ 0.19	\$ 0.04	\$ (0.05)	\$ (0.16)
Diluted	\$ 0.15	\$ 0.17	\$ 0.04	\$ (0.05)	\$ (0.16)
Net (loss)/income per share from discontinued operations:					
Basic	\$ (0.05)	\$ —	\$ 0.35	\$ 0.58	\$ 0.07
Diluted	\$ (0.04)	\$ —	\$ 0.30	\$ 0.58	\$ 0.07
Net income/(loss) per share attributable to common stockholders:					
Basic	\$ 0.11	\$ 0.18	\$ 0.39	\$ 0.52	\$ (0.09)
Diluted	\$ 0.10	\$ 0.16	\$ 0.33	\$ 0.52	\$ (0.09)
Weighted-average shares:					
Basic	30,669,874	28,688,867	27,596,401	27,579,988	27,547,217
Diluted	32,578,757	31,840,584	32,452,228	27,579,988	27,547,217

(1) The consolidated statement of operations for years ended December 31, 2018 and beyond were recognized in accordance with ASC 606. The years prior to December 31, 2018 were recognized under ASC 605.

	As of December 31,				
(in thousands)	2020	2019	2018	2017	2016
<b>Consolidated Balance Sheet Data:</b>					
Cash and cash equivalents	\$ 15,366	\$ 25,006	\$ 42,460	\$ 36,982	\$ 12,802
Working capital (2)	45,384	41,072	56,089	43,975	21,129
Total assets (2)	131,002	86,524	75,599	66,223	54,997
Total current liabilities (2)	30,085	17,044	12,139	14,826	15,968
Total debt	19,984	—	619	2,436	4,253

(2) ROU assets and corresponding lease liabilities were recognized in the year ended December 31, 2019, in accordance with ASC 842. Years ended December 31, 2018 and prior were recognized under ASC 840.

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

*The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes to those statements included elsewhere in this report. In addition to historical financial information, the following discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions. Our actual results and timing of selected events may differ materially from those anticipated in these forward-looking statements as a result of many factors, including those discussed under "Risk Factors" and elsewhere in this report.*

### Business Overview

We are a leader in advanced optical technology, providing high performance fiber optic test, measurement and control products for the telecommunications and photonics industries; and distributed fiber optic sensing solutions that measure, or "sense," the structures for industries ranging from aerospace, automotive, energy, oil and gas, security and infrastructure.

Our communications test and control products help customers test their fiber optic networks and assemblies with speed and precision in both lab and production environments, accelerating the development of fiber optic products and assuring accurate testing of optical components like photonic integrated circuits (PICs) and coherent receivers, which are both critical elements of meeting the world's exponentially growing demand for bandwidth. Our distributed fiber optic sensing products help designers and manufacturers more efficiently develop new and innovative products by measuring stress, strain, and temperature at a high resolution for new designs or manufacturing processes. In addition, our distributed fiber optic sensing products ensure the safety and structural integrity or operational health of critical assets in the field, by monitoring stress, strain, and vibration in large civil and industrial infrastructure such as bridges, roads, pipelines and borders. We also provide applied research services, typically under research programs funded by the U.S. government, in areas of sensing and instrumentation, advanced materials, optical technologies and health sciences.

We are organized into two reporting segments, our Lightwave segment and our Luna Labs segment. Our Lightwave segment consists of our fiber optics testing, measurement and sensing solutions. Our Lightwave segment revenues represented approximately 71% and 70% of our total revenues for the years ended December 31, 2020 and 2019, respectively.

Our Luna Labs segment performs applied research principally in the areas of sensing and instrumentation, advanced materials and health sciences. Our Luna Labs segment comprised approximately 29% and 30% of our total revenues for the years ended December 31, 2020 and 2019, respectively. Most of the government funding for our Luna Labs segment is derived from the Small Business Innovation Research ("SBIR"), program coordinated by the U.S. Small Business Administration. Within the Luna Labs segment, we have historically had a backlog of contracts for which work has been scheduled, but for which a specified portion of work has not yet been completed. We define backlog as the dollar amount of obligations payable to us under negotiated contracts upon completion of a specified portion of work that has not yet been completed, exclusive of revenues previously recognized for work already performed under these contracts, if any. Total backlog includes funded backlog, which is the amount for which money has been directly authorized by the U.S. government and for which a purchase order has been received by a commercial customer, and unfunded backlog, representing firm orders for which funding has not yet been appropriated. Indefinite delivery and quantity contracts and unexercised options are not reported in total backlog. The approximate value of our Lightwave segment backlog was \$35.9 million and \$16.1 million at December 31, 2020 and 2019, respectively. The approximate value of our Luna Labs segment backlog was \$19.0 million and \$21.8 million at December 31, 2020 and 2019, respectively.

Revenues from product sales are mostly derived from the sales of our communications test, measurement, control and sensing products that make use of light-transmitting optical fibers, or fiber optics. We continue to invest in product development and commercialization, which we anticipate will lead to increased product sales growth. Although we have been successful in licensing certain technologies in past years, we do not expect license revenues to represent a significant portion of future revenues. Over time we intend to gradually increase such revenues. In the near term, we expect revenues from product sales to continue to be primarily in areas associated with our communications test, measurement, control and sensing fiber optic test platforms. In the long term, we expect that revenues from product sales will represent a larger portion of our total revenues. As we develop and commercialize new products, our revenues will reflect a broader and more diversified mix of products.

We realized net income attributable to common stockholders of approximately \$3.3 million for the year ended December 31, 2020 and net income attributable to common stockholders of approximately \$5.1 million for the year ended December 31, 2019. We realized net income from continuing operations of \$4.7 million for the year ended December 31, 2020 and net income from continuing operations of \$5.3 million for the year ended December 31, 2019.

We may incur increasing expenses as we seek to expand our business, including expenses for research and development, sales and marketing and manufacturing capabilities. We may continue to grow our business in part through acquisitions of

additional companies and complementary technologies, which could cause us to incur transaction expenses, amortization or write-offs of intangible assets and goodwill and other acquisition-related expenses. As a result, we may incur net losses in future periods, and these losses could be substantial.

## Acquisitions

### *OptaSense Holdings Limited*

On December 3, 2020, we acquired OptaSense Holdings Limited ("OptaSense") for \$38.9 million (£29.0 million) in cash. OptaSense, formerly owned by QinetiQ Holdings Limited, is a market leader in fiber optic distributed monitoring solutions for pipelines, oilfield services, security, highways and railways, and in power and utilities monitoring systems. The acquisition of OptaSense provided us with important distributed acoustic sensing ("DAS") intellectual property and products. OptaSense's technology and products and geographic footprint are highly complementary to our Lightwave segment which we believe will accelerate our technology and overall growth roadmap.

### *General Photonics Corporation*

On March 1, 2019, we acquired all of the outstanding stock of General Photonics Corporation ("GP"), a leading provider of innovative components, modules and test equipment focused on the generation, measurement and control of polarized light critical in fiber optic-based applications for aggregate consideration of \$20.0 million, inclusive of \$19.0 million paid at closing and \$1.0 million of contingent consideration in 2020 related to certain earn-out provisions.

## Description of Our Revenues, Costs and Expenses

### *Impact of COVID-19 Pandemic*

The broader impact of the COVID-19 pandemic on our results of operations and overall financial performance remains uncertain. The COVID-19 pandemic has affected how we interact with our customers by reducing face-to-face meetings and increasing our on-line and virtual presence. While increasing our on-line and virtual presence has proven effective, we are unsure of the impact if these conditions continue for an extended period. In addition, we have experienced minor impacts on our supply chain that we have managed. For example, in cases where there were delays we relied on our inventory of components to continue production. There is no guarantee we will be able to manage through future delays in our supply chain. See "Risk Factors" for further discussion of the potential adverse impacts of the COVID-19 pandemic on our business.

### *Revenues*

We generate revenues from product sales, commercial product development and licensing and technology development activities. Our Lightwave segment revenues reflect amounts that we receive from sales of our products or development of products for third parties and, to a lesser extent, fees paid to us in connection with licenses or sub-licenses of certain patents and other intellectual property.

We derive Luna Labs segment revenues from providing research and development services to third parties, including government entities, academic institutions and corporations, and from achieving milestones established by some of these contracts. In general, we complete contracted research over periods ranging from six months to three years and recognize these revenues over the life of the contract as costs are incurred.

### *Cost of Revenues*

Cost of revenues associated with Lightwave segment revenues consists of license fees for use of certain technologies, product manufacturing costs including all direct material and direct labor costs, amounts paid to our contract manufacturers, manufacturing, shipping and handling, provisions for product warranties and inventory obsolescence, as well as overhead allocated to each of these activities.

Cost of revenues associated with Luna Labs segment revenues consists of costs associated with performing the related research activities including direct labor, amounts paid to subcontractors and overhead allocated to Luna Labs segment activities.

### *Operating Expense*

Operating expense consists of selling, general and administrative expense, as well as expenses related to research, development and engineering, depreciation of fixed assets and amortization of intangible assets. These expenses also include compensation for employees in executive and operational functions including certain non-cash charges related to expenses from

equity awards, facilities costs, professional fees, salaries, commissions, travel expense and related benefits of personnel engaged in sales, marketing, and administrative activities; costs of marketing programs and promotional materials; salaries, bonuses and related benefits of personnel engaged in our own research and development beyond the scope and activities of our Luna Labs segment; product development activities not provided under contracts with third parties; and overhead costs related to these activities.

#### *Investment Income*

Investment income consists of amounts earned on our cash equivalents. We sweep on a daily basis a portion of our cash on hand into a fund invested in U.S. government obligations.

#### *Interest Expense, Net*

Interest expense is composed of interest paid under our term loans as well as interest accrued on our finance lease obligations.

### **Critical Accounting Policies and Estimates**

#### *Lightwave Revenues*

To determine the proper revenue recognition method for Lightwave contracts, we evaluate whether two or more contracts should be combined and accounted for as one single contract and whether the combined or single contract should be accounted for as more than one performance obligation. We recognize revenue when the performance obligation has been satisfied by transferring the control of the product or service to the customer. For tangible products that contain software that is essential to the tangible product's functionality, we consider the product and software to be a single performance obligation and recognize revenue accordingly. For contracts with multiple performance obligations, we allocate the contract's transaction price to each performance obligation based on their relative stand-alone selling prices. In such circumstances, we use the observable price of goods or services which are sold separately in similar circumstances to similar customers. If these prices are not observable, then we will estimate the stand-alone selling price using information that is reasonably available. For the majority of our standard products and services, price list and discount structures related to customer type are available. For products and services that do not have price list and discount structures, we may use one or more of the following: (i) adjusted market assessment approach, (ii) expected cost plus a margin approach, and (iii) residual approach. The adjusted market approach requires us to evaluate the market in which we sell goods or services and estimate the price that a customer in that market would be willing to pay for those goods or services. The expected cost-plus margin approach requires us to forecast our expected costs of satisfying the performance obligation and then add a reasonable margin for that good or service. The residual approach decreases the total transaction price by the sum of the observable standalone selling prices if either the company sells the same good or services to different customers for a broad range of amounts or the company has not established a price for the good or service and that good or service has not been sold on a standalone basis. Shipping and handling activities primarily occur after a customer obtains control and are considered fulfillment cost rather than separate performance obligations. Similarly, sales and similar taxes assessed by a governmental authority that are both imposed on and concurrent with a specific revenue-producing transaction and collected by the entity from a customer are excluded from the measurement of the transaction price.

For standard products, we recognize revenue at a point in time when control passes to the customer. Absent substantial product acceptance clauses, this is based on the shipping terms. For custom products that require engineering and development based on customer requirements, we will recognize revenue over time using the output method for any items shipped and any finished goods or work in process that is produced for balances of open sales orders. For any finished goods or work in process that has been produced for the balance of open sales orders we recognize revenue by applying the average selling price for such open order to the lesser of the on-hand balance in finished goods or open sales order quantity which we present as a contract asset on the balance sheet. Cost of sales is recognized based on the standard cost of the finished goods and work in process associated with this revenue and inventory balances are reduced accordingly. For extended warranties and product rentals, revenue is recognized over time using the output method based on the time elapsed for the warranty or service period. In the case of warranties, we record a contract liability for amounts billed but that are not recognized until subsequent periods. A separate contract liability is recorded for the cost associated with warranty repairs based on our estimate of future expense. For testing services where we are performing testing on an asset the customer controls, revenue is recognized over time by the output method using the performance to date. For training, where the customer is receiving the benefit of training as it is occurring, and for repairs to a customer-controlled asset, revenue is recognized over time by the output method using the

performance to date. For royalty revenue, we apply the practical expedient “royalty exception” recognizing revenue based on the royalty agreement which specifies an amount based on sales or minimum amount, whichever is greater.

In some product rental contracts, a customer may be offered a discount on the purchase of an item that would provide for a material right. When a material right has been provided to a customer, a separate performance obligation is established, and a portion of the rental revenue will be deferred until the future product is purchased or the option expires. This deferred revenue is recognized as a contract liability on the balance sheet.

#### *Luna Labs Revenues*

We perform research and development for U.S. Federal government agencies, educational institutions and commercial organizations. We account for a research contract when a contract has been executed, the rights of the parties are identified, payment terms are identified, the contract has commercial substance, and collectability of the contract price is considered probable. Revenue is earned under cost reimbursable, time and materials and fixed price contracts. Direct contract costs are expensed as incurred.

Our contracts with agencies of the U.S. government are subject to periodic funding by the respective contracting agency. Funding for a contract may be provided in full at inception of the contract or ratably throughout the contract as the services are provided. In evaluating the probability of funding for purposes of assessing collectability of the contract price, we consider our previous experience with our customers, communication with our customers regarding funding status and our knowledge of available funding for the contract or program. If funding is not assessed as probable, revenue recognition is deferred until realization is reasonably assured.

Under the typical payment terms of our U.S. government contracts, the customer pays us either performance-based payments (“PBPs”) or progress payments. PBPs, which are typically used in the firm fixed price contracts, are interim payments based on quantifiable measures of performance or on the achievement of specified events or milestones. Progress payments, which are typically used in our cost type contracts, are interim payments based on costs incurred as the work progresses. For our U.S. government cost-type contracts, the customer generally pays us during the performance period for 80%-90% of our actual costs incurred. Because the customer retains a small portion of the contract price until completion of the contract and audit of allowable costs, cost type contracts generally result in revenue recognized in excess of billings which we present as contract assets on the balance sheet. Amounts billed and due from our customers are classified as receivables on the balance sheet. For non-U.S. government contracts, we typically receive interim payments as work progresses, although for some contracts, we may be entitled to receive advance payments. We recognize a liability for these advance payments and PBPs paid in advance which are in excess of the revenue recognized and present these amounts as contract liabilities on the balance sheet.

To determine the proper revenue recognition method for research and development contracts, we evaluate whether two or more contracts should be combined and accounted for as one single contract and whether the combined or single contract should be accounted for as more than one performance obligation. For instances where a contract has options that were bid with the initial contract and awarded at a later date, we combine the options with the original contract when options are awarded. For most of our contracts, the customer contracts for research with multiple milestones that are interdependent. Consequently, the entire contract is accounted for as one performance obligation. The effect of the combined or modified contract on the transaction price and measure of progress for the performance obligation to which it relates, is recognized as an adjustment to revenue (either as an increase in or a reduction of revenue) on a cumulative catch-up basis.

Contract revenue recognition is measured over time as we perform because of continuous transfer of control to the customer. For U.S. government contracts which are typically subject to the Federal Acquisition Regulation, this continuous transfer of control to the customer is supported by clauses in the contract that allow the customer to unilaterally terminate the contract for convenience, pay us for cost incurred plus a reasonable profit and take control of any work in process. From time to time, as part of normal management processes, facts may change, causing revisions to estimated total costs or revenues expected. The cumulative impact of any revisions to estimates and the full impact of anticipated losses on any type of contract are recognized in the period in which they become known.

Because of control transfers over time, revenue is recognized over time based on the extent of progress towards completion of the performance obligation. The selection of the method to measure progress towards completion requires judgment and is based on the nature of the services to be provided. We generally use the input method, more specifically the cost-to-cost measure of progress for our contracts because it best depicts the transfer of control to the customer which occurs as we incur costs on our contracts. Under the cost-to-cost measure of progress, the extent of progress towards completion is

measured based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. The underlying bases for estimating our contract research revenues are measurable expenses, such as labor, subcontractor costs and materials, and data that are updated on a regular basis for purposes of preparing our cost estimates. Our research contracts generally have a period of performance of six months to three years, and our estimates of contract costs have historically been consistent with actual results. Revisions in these estimates between accounting periods to reflect changing facts and circumstances have not had a material impact on our operating results, and we do not expect future changes in these estimates to be material. The cumulative impact of any revisions to estimates and the full impact of anticipated losses on any type of contract are recognized in the period in which they become known.

Under cost reimbursable contracts, we are reimbursed for costs that are determined to be reasonable, allowable and allocable to the contract and paid a fixed fee representing the profit negotiated between us and the contracting agency. Revenue from cost reimbursable contracts is recognized as costs are incurred plus an estimate of applicable fees earned. We consider fixed fees under cost reimbursable contracts to be earned in proportion to the allowable costs incurred in performance of the contract.

Revenue from time and materials contracts is recognized based on direct labor hours expended at contract billing rates plus other billable direct costs.

Fixed price contracts may include either a product delivery or specific service performance throughout a period. For fixed price contracts that are based on the proportional performance method and involve a specified number of deliverables, we recognize revenue based on the proportion of the cost of the deliverables compared to the cost of all deliverables included in the contract as this method more accurately measures performance under these arrangements. For fixed price contracts that provide for the development and delivery of a specific prototype or product, revenue is recognized based upon the percentage of completion method.

Whether certain costs under government contracts are allowable is subject to audit by the government. Certain indirect costs are charged to contracts using provisional or estimated indirect rates, which are subject to later revision based on government audits of those costs. Management is of the opinion that costs subsequently disallowed, if any, would not likely have a significant impact on revenues recognized for those contracts.

#### *Income Taxes*

We estimate our tax liability through calculating our current tax liability, together with assessing temporary differences resulting from the different treatment of items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which we record on our balance sheet. Management then assesses the likelihood that deferred tax assets will be recovered in future periods. In assessing the need for a valuation allowance against the net deferred tax asset, management considers factors such as future reversals of existing taxable temporary differences, taxable income in prior carry back years, whether carry back is permitted under the tax law, tax planning strategies and estimated future taxable income exclusive of reversing temporary differences and carryforwards. To the extent that we cannot conclude that it is more likely than not that the benefit of such assets will be realized, we establish a valuation allowance to reduce their net carrying value.

As we assess our projections of future taxable income or other factors that may impact our ability to generate taxable income in future periods, our estimate of the required valuation allowance may change, which could have a material impact on future earnings or losses.

We recognize tax benefits from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by taxing authorities. While it is often difficult to predict the final outcome of timing of the resolution of any particular tax matter, we establish a liability at the time we determine it is probable we will be required to pay additional taxes related to certain matters. These liabilities are recorded in accrued liabilities in our consolidated balance sheets. We adjust this provision, including any impact on the related interest and penalties, in light of changing facts and circumstances, such as the progress of a tax audit. A number of years may elapse before a particular matter for which we have established a liability is audited and finally resolved. The number of years with open tax audits varies depending on the tax jurisdiction. Settlement of any particular issue would usually require the use of cash. We recognize favorable resolutions of tax matters for which we have previously established liabilities as a reduction to our income tax expense when the amounts involved become known.

Due to differences between federal and state tax law, and accounting principles generally accepted in the United States of America ("GAAP") certain items are included in the tax return at different times than when those items are reflected in the consolidated financial statements. Therefore, the annual tax rate reflected in our consolidated financial statements is different than that reported in our tax return. Some of these differences are permanent, such as expenses that are not deductible in our tax

return. Some differences, such as depreciation expense, reverse over time and create deferred tax assets and liabilities. The tax rates used to determine deferred tax assets or liabilities are the enacted tax rates in effect for the year in which the differences are expected to reverse. Based on the evaluation of all available information, we recognize future tax benefits, such as net operating loss ("NOL") carryforwards, to the extent that realizing these benefits is considered more likely than not.

Because we have NOLs carried over from a previously acquired company that are limited under Section 382, the deferred tax assets of \$1.2 million as of December 31, 2020 are expected to be realized over an extended period of time (with continued earnings realized ratably through 2033).

Following our acquisition of OptaSense, the deferred taxes include loss carry forwards in the United Kingdom, and the United States. Given cumulative three years of losses for each of the entities, we have concluded that it is more-likely-than-not that the net deferred tax assets from the UK and US entities will not be realized, and have recorded a full valuation allowance against them.

#### *Stock-Based Compensation*

We recognize stock-based compensation expense based upon the fair value of the underlying equity award on the date of the grant. The calculation of the fair value of our awards requires certain inputs that are subjective and changes to the estimates used will cause the fair values of our stock awards and related stock-based compensation expense to vary. We have elected to use the Black-Scholes-Merton ("Black-Scholes") option pricing model to determine the fair value of stock options. The fair value of a stock option award is affected by our stock price on the date of the grant as well as other assumptions used as inputs in the valuation model including the estimated volatility of our stock price over the term of the awards, the estimate period of time that we expect employees to hold their stock options and the risk-free interest rate assumption. In addition, we are required to reduce stock-based compensation expense for the effects of actual forfeitures of unvested awards in the period they occur.

#### *Long-lived and Intangible Assets*

Long-lived assets and certain identifiable intangibles are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset might not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to future un-discounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the asset exceeds the fair value of the asset. Assets to be disposed of are reported at the lower of the carrying amount or fair value, less cost to sell.

#### *Goodwill*

Goodwill is reviewed for impairment at least annually, or more frequently if events or circumstances indicate that goodwill might be impaired. We have established October 1 as our specified annual date for impairment testing.

#### *Business Combinations*

We account for business combinations under the acquisition method of accounting, in accordance with ASC 805 - Business Combinations. Under ASC 805, the total estimated purchase consideration is allocated to the acquired tangible and intangible assets and assumed liabilities based on their estimated fair values as of the acquisition date. Any excess of the fair value of acquisition consideration over the fair value of identifiable assets acquired and liabilities assumed is recorded as goodwill.



## Results of Operations

The following table shows information derived from our consolidated statements of operations expressed as a percentage of total revenues for the periods presented.

	Years ended December 31,	
	2020	2019
<b>Revenues:</b>		
Lightwave	71.5 %	69.7 %
Luna Labs	28.5	30.3
Total revenues	100.0	100.0
<b>Cost of revenues:</b>		
Lightwave	28.2	28.6
Luna Labs	20.8	21.5
Total cost of revenues	49.0	50.1
Gross profit	51.0	49.9
Operating expense	45.0	45.2
Operating income	6.0	4.7
Total other income	0.1	0.5
Income from continuing operations before income taxes	6.1	5.2
Income from continuing operations, net of income taxes	5.7	7.6
Loss from discontinued operations, net of income taxes	(1.7)	—
Net income	4.0 %	7.6 %

### Year Ended December 31, 2020 Compared to Year Ended December 31, 2019

#### Revenues

(in thousands)	Years ended December 31,			
	2020	2019	\$ Difference	% Difference
Lightwave revenues	\$ 59,115	\$ 49,117	\$ 9,998	20.4 %
Luna Labs revenues	23,566	21,399	2,167	10.1 %
Total revenues	\$ 82,681	\$ 70,516	\$ 12,165	17.3 %

Our Lightwave segment included revenues from sales of test and measurement systems, primarily representing sales of our Optical Backscatter Reflectometer, ODiSI, and Optical Vector Analyzer platforms, optical components and sub-assemblies and sales of our Hyperion and Terahertz sensing platforms. Our Lightwave segment revenues increased \$10.0 million to \$59.1 million for the year ended December 31, 2020 compared to \$49.1 million for the year ended December 31, 2019. The increase resulted primarily from the incremental revenues associated with the acquired operations of GP and OptaSense as well as increased revenues from our sensing products during the year ended December 31, 2020. Continued growth in sales of our fiber-optic sensing products, including our ODiSI products directed toward the expanding use of composite materials and the need for improved means of testing their structural integrity, and our communications test instruments also contributed to this increase.

Our Luna Labs segment revenues increased \$2.2 million to \$23.6 million for the year ended December 31, 2020 compared to \$21.4 million for the year ended December 31, 2019. Revenues within this segment increased due to additional contract awards, including higher value Phase 2 SBIR contracts. The increase continues a growth trend experienced over the past few years largely driven by successes in Phase 2 SBIR awards. The increase was realized primarily in our advanced materials research group. As Phase 2 SBIR contracts generally have a performance period of a year or more, we currently expect Luna Labs segment revenues to remain at a similar level for the near term.

## Cost of Revenues

(in thousands)	Years ended December 31,		\$ Difference	% Difference
	2020	2019		
Lightwave costs	\$ 23,306	\$ 20,157	\$ 3,149	15.6 %
Luna Labs costs	17,187	15,176	2,011	13.3 %
Total costs of revenues	\$ 40,493	\$ 35,333	\$ 5,160	14.6 %

Our Lightwave segment costs increased \$3.1 million to \$23.3 million for the year ended December 31, 2020 compared to \$20.2 million for the year ended December 31, 2019. This increase primarily resulted from the incremental costs associated with the inclusion of approximately one month of operations from OptaSense, which was acquired in December 2020, as well as an increase in sales volume in our sensing and communications testing products.

Our Luna Labs segment costs increased \$2.0 million, to \$17.2 million for the year ended December 31, 2020 compared to \$15.2 million for the year ended December 31, 2019. The overall increase in Luna Labs segment costs was driven by increases in additional headcount and the increased spending on other direct costs to support the growth in our research contracts and was consistent with the rate of revenue growth for this business segment.

## Operating Expense

(in thousands)	Years ended December 31,		\$ Difference	% Difference
	2020	2019		
Selling, general and administrative expense	\$ 27,644	\$ 23,344	\$ 4,300	18.4 %
Research, development and engineering expense	6,713	7,496	(783)	(10.4)%
Acquisition related expense	2,204	1,027	1,177	114.6 %
Loss on sale of property and equipment	644	—	644	100.0 %
Total operating expense	\$ 37,205	\$ 31,867	\$ 5,338	16.8 %

Selling, general and administrative expense increased \$4.3 million to \$27.6 million for the year ended December 31, 2020 compared to \$23.3 million for the year ended December 31, 2019. Selling, general and administrative expense increased primarily due to the additional selling related expenses as a result of increased revenues, increased depreciation on acquired fixed assets and share-based compensation related to employee participation in our ESPP which began during the third quarter.

Research, development and engineering expenses decreased \$0.8 million to \$6.7 million for the year ended December 31, 2020 compared to \$7.5 million for the year ended December 31, 2019 primarily due to additional expenses related to product improvements in our Lightwave segment for the year ended December 31, 2019 that did not reoccur during the year ended December 31, 2020.

Acquisition related expense consists primarily of investment banking, legal and consulting fees incurred in connection with our acquisition of OptaSense for the year ended December 31, 2020. Acquisition related expense for the year ended December 31, 2019 consists of fees incurred in connection with our acquisition of GP.

The loss on sale of property and equipment was primarily due to the sale of one of our buildings and other fixed assets in order to consolidate operations in our Luna Labs operating segment.

## Investment Income

Investment income was \$0.1 million for the year ended December 31, 2020, compared to \$0.4 million for the year ended December 31, 2019. During the years ended December 31, 2020 and 2019, we invested a portion of our cash in funds holding U.S. treasury securities. The decrease in investment income is primarily related to lower returns on our cash balance held in U.S. treasury securities.

## Income Tax Expense/(Benefit)

For the year ended December 31, 2020, we recorded income tax expense of \$0.3 million, compared to an income tax benefit of \$1.7 million for the year ended December 31, 2019. The income tax expense recognized for the year ended December 31, 2020 was driven mostly by not having the benefit of a partial release of our valuation allowance partially offset by research and development tax credits received in 2020.

### *Net Income From Continuing Operations*

For the year ended December 31, 2020, we recognized income from continuing operations before income taxes of \$5.1 million, compared to \$3.7 million for the year ended December 31, 2019. After tax, our net income from continuing operations was \$4.7 million for the year ended December 31, 2020, compared to \$5.3 million for the year ended December 31, 2019.

### *Net Loss from Discontinued Operations*

For the year ended December 31, 2020, we recognized loss from discontinued operations, net of income taxes, of \$1.4 million which represented the after-tax loss on sale of our High Speed Optical Receiver ("HSOR") business. In March 2020, we settled the notice of claim dispute with Macom Technology Solutions, Inc. ("Macom") resulting in us receiving \$0.6 million and Macom receiving \$1.9 million. There were no results from discontinued operations for the year ended December 31, 2019.

### *Preferred Stock Dividend*

In January 2010, we issued 1,321,514 shares of our newly designated Series A Convertible Preferred Stock to Carilion. The Series A Convertible Preferred Stock carried an annual cumulative dividend of 6%, or approximately 79,292 shares of common stock per year. During 2019, we accrued \$0.3 million for the dividends payable to Carilion. During 2019, the total accrued dividend of 770,454 shares of common stock were issued to Carilion as shown on our consolidated statements of changes in stockholders' equity. There were no additional shares of common stock accrued or issued during 2020.

### **Liquidity and Capital Resources**

At December 31, 2020, our total cash and cash equivalents were \$15.4 million.

On December 1, 2020 (the "Effective Date"), we entered into a Loan Agreement (the "Loan Agreement") with PNC Bank, National Association, as lender (the "Lender") and our domestic subsidiaries as guarantors. The Loan Agreement provides a \$12.5 million term loan facility (the "Term Loan") and a \$15.0 million revolving credit facility (the "Revolving Line"), which include a \$3.0 million letter of credit sublimit. On the Effective Date, we borrowed the full amount of the Term Loan from the Lender pursuant to a term note (the "Term Note") and a \$7.6 million revolving loan (the "Revolving Loan") pursuant to a revolving line of credit note (the "Revolving Line of Credit Note"). We may repay and reborrow advances under the Revolving Line from time to time pursuant to the Revolving Line of Credit Note.

We used the proceeds from the Term Loan and the Revolving Loan to pay, in part, the consideration for the acquisition of OptaSense.

The Term Loan matures on December 1, 2023. The Term Loan is due and payable in 12 equal quarterly payments of principal and interest. The Term Loan bears interest at a floating per annum rate equal to the sum of (a) LIBOR plus (b) a margin ranging from 1.75% to 2.25% depending on the Net Leverage Ratio (as defined in the Loan Agreement). We may prepay the Term Loan without penalty or premium.

The Revolving Line expires on December 1, 2023. Borrowings under the Revolving Line will bear interest at a floating per annum rate equal to the sum of (a) LIBOR plus (b) a margin ranging from 1.75% to 2.25% depending on the Net Leverage Ratio. Accrued interest will be due and payable on the first day of each month and the outstanding principal balance and any accrued but unpaid interest will be due and payable on December 1, 2023. The unused portion of the Revolving Line will accrue a fee equal to 0.20% per annum multiplied by the quarterly average unused amount.

The Loan Agreement includes a number of affirmative and restrictive covenants, including, among others, financial covenants regarding minimum net leverage and fixed charge coverage, affirmative covenants regarding delivery of financial statements, payment of taxes, and maintenance of government compliance, and restrictive covenants regarding dispositions of property, acquisitions, incurrence of additional indebtedness or liens, investments and transactions with affiliates. We are also restricted from paying dividends or making other distributions or payments on our capital stock, subject to limited exceptions. Our obligations under the Loan Agreement are secured by a first priority perfected security interest in substantially all of our and the guarantors' assets.

Upon the occurrence of certain events, including our failure to satisfy its payment obligations under the Loan Agreement, failure to adhere to the financial covenants, the breach of certain of its other covenants under the Loan Agreement, cross defaults to other indebtedness or material agreements, judgment defaults and defaults related to failure to maintain governmental approvals, the Lender will have the right, among other remedies, to declare all principal and interest immediately due and payable, and to exercise secured party remedies.

We believe that our cash and cash equivalents as of December 31, 2020 in addition to amounts available to us under our Revolving Line will provide adequate liquidity for us to meet our working capital needs over the next twelve months from the date of issuance of the consolidated financial statements included elsewhere in this Annual Report on Form 10-K. Additionally, we believe that should we have the need for increased capital spending to support our planned growth, we will be able to fund such growth through either third-party financing on competitive market terms or through our available cash. However, these estimates are based on assumptions that may prove to be incorrect, including as a result of the ongoing COVID-19 pandemic and its potential impacts on our business. If we require additional capital beyond our current balances of cash and cash equivalents and borrowing capacity under the Revolving Line described above, this additional capital may not be available when needed, on reasonable terms, or at all. Moreover, our ability to raise additional capital may be adversely impacted by potential worsening global economic conditions and the recent disruptions to and volatility in the credit and financial markets in the United States and worldwide resulting from the ongoing COVID-19 pandemic.

## Discussion of Cash Flows

(in thousands)	Years ended December 31,	
	2020	2019
Net cash provided by operating activities	\$ 2,856	\$ 4,798
Net cash used in investing activities	(34,159)	(19,815)
Net cash provided by/(used in) financing activities	21,649	(2,437)
Net decrease in cash and cash equivalents	\$ (9,654)	\$ (17,454)

During 2020, the \$2.9 million of net cash provided by operating activities consisted of our net income of \$3.3 million, and included non-cash charges for depreciation and amortization of \$3.0 million, and stock-based compensation of \$2.1 million, net loss on sale of fixed assets of \$0.6 million, and a net loss from discontinued operations of \$1.4 million offset by a net cash outflow of \$7.2 million from changes in working capital. The changes in working capital were principally driven by an increase in accounts receivable of \$3.3 million, an increase in inventory of \$1.5 million, an increase in contract assets of \$1.5 million, an increase in other assets of \$2.2 million, and an increase in accounts payable and accrued expenses of \$1.1 million.

In 2019, the \$4.8 million of net cash provided by operating activities consisted of our net income of \$5.3 million and included non-cash charges for depreciation and amortization of \$2.5 million and stock-based compensation of \$1.5 million, offset by a net cash outflow of \$1.8 million from changes in working capital. The changes in working capital were principally driven by an increase in inventory of \$0.7 million, an increase in accounts receivable of \$2.2 million, an increase in contract assets of \$0.4 million, and an increase in accounts payable and accrued liabilities of \$0.6 million, all partially offset by a \$0.2 million decrease in other assets.

Cash used in investing activities in 2020 consisted primarily of the \$34.1 million payment for acquisitions, \$0.7 million of fixed asset additions and \$0.4 million of capitalized intellectual property costs partially offset by \$0.4 million from the proceeds from the sale of property and equipment and \$0.6 million from the sale of discontinued operations, net of fees.

Cash used in the investing activities in 2019 consisted primarily of \$19.0 million for our acquisition of GP, \$0.5 million of fixed asset additions and \$0.3 million of capitalized intellectual property costs.

Cash provided by financing activities for the year ended December 31, 2020 was \$21.6 million, compared to \$2.4 million of cash used in financing activities in 2019. During 2020, we received proceeds of \$20.0 million from our term loan and revolving loan, received \$1.7 million from exercises of stock options and received \$0.5 million from purchases pursuant to our employee stock purchase plan. These payments were partially offset by \$0.5 million to repurchase our common stock under our stock repurchase program. During 2019, we repaid \$0.6 million on our outstanding term loan with SVB and used \$2.2 million to repurchase our common stock under our stock repurchase program. These payments were partially offset by \$0.4 million received from exercises of stock options and warrants.

## Summary of Contractual Obligations

The following table sets forth information concerning our known contractual obligations as of December 31, 2020 that are fixed and determinable.

<i>(in thousands)</i>	Total	Less than 1 year	1 - 3 years	3 - 5 years	More than 5 years
Debt financing (1)	\$ 19,984	\$ 4,144	\$ 15,840	\$ —	\$ —
Operating facility leases (2)	15,022	2,953	5,064	3,123	3,882
Finance leases (3)	259	53	105	101	—
Purchase order obligation (4)	2,894	2,894	—	—	—
Total	<u>\$ 38,159</u>	<u>\$ 10,044</u>	<u>\$ 21,009</u>	<u>\$ 3,224</u>	<u>\$ 3,882</u>

- (1) In December 2020, we entered into a Loan Agreement with the Lender which provided us with a \$12.5 million Term Loan and a \$15.0 million Revolving Line. We have borrowed the full amount of the Term Loan and \$7.6 million against the Revolving Line. The Term Loan matures in December 2023 and the Revolving Line expires in December 2023.
- (2) We lease our facilities for all of our locations under operating leases that as of December 31, 2020, are scheduled to expire between March 2021 and September 2030. Upon expiration of our office leases, we may exercise certain renewal options as specified in the leases. Rental payments associated with these option periods are not included in the table above.
- (3) In January 2019 and December 2020, we executed leases in the amounts of \$14,500 and \$247,500, respectively, for office equipment. These equipment leases expire in 2021 and 2025, respectively.
- (4) Purchase order obligations included outstanding orders for inventory purchases. In 2020, our Luna Technologies subsidiary executed non-cancelable purchase orders for a total amount of \$3.0 million for multiple shipments of tunable lasers to be delivered over a 12-month period beginning in July 2020 and October 2020.

## Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements as of December 31, 2020.

## Inflation

We do not believe that inflation has had a material effect on our business, financial condition or results of operations.

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

Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. We do not hold or issue financial instruments for trading purposes or have any derivative financial instruments. Our exposure to market risk is limited to interest rate fluctuations, due to changes in the general level of U.S. interest rates, and foreign currency exchange rates.

### Interest Rate Risk

We do not use derivative financial instruments as a hedge against interest rate fluctuations, and, as a result, we are subject to interest rate risk on our Term Loan and Revolving Loan with variable interest rates based on LIBOR plus a margin as defined in the credit agreement governing the Term Loan and Revolving Loan. As of December 31, 2020, we had outstanding borrowings under our Term Loan and Revolving Loan of \$12.5 million and \$7.6 million, respectively, at the weighted-average variable interest rates of 2.5% and 2.4%, respectively. At this borrowing level, a 0.25% increase in interest rates would have had an unfavorable annual impact on our pre-tax earnings and cash flows in the amount of \$0.05 million.

### Foreign Currency Exchange Rate Risk

Following our acquisition of OptaSense on December 3, 2020, we are exposed to risks from foreign currency exchange rate fluctuations on the translation of our foreign operations into U.S. dollars and on the purchase of goods by these foreign operations that are not denominated in their functional currencies. As of December 31, 2020, our exposure to foreign currency rate fluctuations is not material to our financial condition or results of operations.

**ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA**

**Luna Innovations Incorporated**

**Index to Consolidated Financial Statements**

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## REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders  
Luna Innovations Incorporated

### Opinion on the financial statements

We have audited the accompanying consolidated balance sheets of Luna Innovations Incorporated (a Delaware corporation) and subsidiaries (the “Company”) as of December 31, 2020 and 2019, the related consolidated statements of operations, comprehensive income, changes in stockholders’ equity, and cash flows for the years then ended, and the related notes and financial statement schedule included under Item 15(a) (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

### Basis for opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (“PCAOB”) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

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

### Critical audit matters

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

### Revenue recognition on the Company’s fixed price contract revenue

As described further in Note 1 to the consolidated financial statements, the Company performs technology research under fixed price contracts with the associated revenue recognized over time. For fixed price revenue contracts recognized over time, management utilizes the input method to measure progress toward the complete satisfaction of the performance obligations based upon the cost incurred to date as a percentage of the total estimated cost. We identified revenue recognition for fixed price contracts as a critical audit matter.

The principal consideration for our determination that revenue recognition for fixed price contracts was a critical audit matter is that the measure of progress towards completion utilizes assumptions for future costs to complete the performance obligations, and those assumptions have significant estimation uncertainty. A significant change in the assumptions could affect the profitability of the contract. Auditing such assumptions required extensive audit effort due to the volume and complexity of these contracts and a high degree of auditor judgment when performing audit procedures and evaluating the results of those procedures.

Our audit procedures related to testing revenue recognition of fixed-price contracts included the following, among others.

- We evaluated the design effectiveness of controls over the Company’s process for recognizing revenue over time. This included the design of controls over the initial budgeting process and proportional performance determination.
- For a sample of contracts, we inquired regarding the status of the project and obtained an understanding for significant changes in budgeted to actual costs.
- For a sample of contracts, we tested the completeness and accuracy of costs incurred to date.

- We inspected a sample of contracts to evaluate the existence of an enforceable right to payment for performance completed to date, while evaluating the progress towards completion of contracts based on costs incurred, evaluating the reasonableness of management's estimate of profit margins by comparing contract to date profit margins to year to date profit margins and tested the appropriateness of timing and amount of revenue recognized.
- To evaluate management's ability to estimate progress towards completion, we selected a sample of firm fixed price contracts completed during the year, and obtained the internal budget at inception and compared the budgeted margin to the margin upon completion. We also selected an additional sample of fixed price contracts completed during the year and compared the costs incurred during the current year to the costs that were estimated to be incurred at completion as of the prior year end.

#### **Business Combination – OptaSense Holdings Limited**

As described in Note 1 to the consolidated financial statements, the Company acquired OptaSense Holdings Limited in December 2020. This acquisition was accounted for as a business combination. We identified the evaluation of the acquisition date fair value of the intangible assets acquired as a critical audit matter.

The principal consideration for our determination that the evaluation of the acquisition date fair values of the intangible assets acquired was a critical audit matter is the high degree of subjective auditor judgment associated with evaluating management's determination of the fair values of the acquired intangible assets, which is primarily due to the complexity of the valuation models used and the sensitivity of the underlying significant assumptions. The key assumptions used within the valuation models included prospective financial information, including future revenue growth and an applied discount rate. The calculated fair values are sensitive to changes in these key assumptions.

Our audit procedures related to the evaluation of acquisition date fair values of intangible assets acquired included the following, among others.

- We evaluated the design effectiveness of certain controls over the acquisition-date valuation process, including controls over the development of the key assumptions such as the revenue growth and the applied discount rate.
- We obtained the purchase price allocation analyses from management and the third-party specialist engaged by management. We assessed the qualifications and competence of management and the third-party specialist and evaluated the methodologies used to determine the fair values of the intangible assets.
- We tested the assumptions used within the discounted cash flow models to estimate the fair values of the intangible assets, which included key assumptions such as the future revenue growth and the applied discount rate.
- We assessed the reasonableness of management's forecast by inquiring with management to understand how the forecast was developed and comparing the projections to historical results and external sources including industry trends and peer companies' historical data;
- We also involved a valuation specialist who assisted in the evaluation and testing performed of the reasonableness of significant assumptions to the models, including the applied discount rate.

/s/ GRANT THORNTON LLP

We have served as the Company's auditor since 2005.

Philadelphia, Pennsylvania  
March 12, 2021



**Luna Innovations Incorporated**  
**Consolidated Balance Sheets**  
*(in thousands, except share data)*

	December 31, 2020	December 31, 2019
<b>Assets</b>		
Current assets:		
Cash and cash equivalents	\$ 15,366	\$ 25,006
Accounts receivable, net	24,951	16,269
Receivable from sale of HSOR business	—	2,501
Contract assets	7,046	2,759
Inventory	23,597	10,294
Prepaid expenses and other current assets	4,509	1,287
Total current assets	75,469	58,116
Property and equipment, net	3,308	3,466
Intangible assets, net	20,109	10,194
Goodwill	18,121	10,542
Long-term contract assets	471	449
Operating lease ROU asset	11,281	2,236
Finance lease ROU asset	244	70
Other assets	39	35
Deferred tax asset	1,960	1,416
Total assets	\$ 131,002	\$ 86,524
<b>Liabilities and stockholders' equity</b>		
Current liabilities:		
Current portion of long-term debt obligations	\$ 4,167	\$ —
Accounts payable	4,393	2,787
Accrued liabilities	12,159	9,036
Contract liabilities	7,095	3,888
Current portion of operating lease ROU liability	2,223	1,283
Current portion of finance lease ROU liability	48	50
Total current liabilities	30,085	17,044
Long-term debt obligations	15,817	—
Long-term portion of operating lease ROU liability	10,248	1,988
Long-term portion of finance lease ROU liability	196	23
Other long-term liabilities	214	—
Total liabilities	56,560	19,055
Commitments and contingencies (Note 14)		
Stockholders' equity:		
Common stock, par value \$0.001, 100,000,000 shares authorized, 32,724,512 and 31,788,896 shares issued, 31,024,537 and 30,149,105 shares outstanding at December 31, 2020 and 2019, respectively	33	32
Treasury stock at cost, 1,699,975 and 1,639,791 shares at December 31, 2020 and 2019, respectively	(4,789)	(4,337)
Additional paid-in capital	92,403	88,022
Accumulated deficit	(12,957)	(16,248)
Accumulated other comprehensive loss	(248)	—
Total stockholders' equity	74,442	67,469
Total liabilities and stockholders' equity	\$ 131,002	\$ 86,524

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

**Luna Innovations Incorporated**  
**Consolidated Statements of Operations**  
*(in thousands, except share and per share data)*

	Years ended December 31,	
	2020	2019
<b>Revenues:</b>		
Lightwave	\$ 59,115	\$ 49,117
Luna Labs	23,566	21,399
Total revenues	82,681	70,516
<b>Cost of revenues:</b>		
Lightwave	23,306	20,157
Luna Labs	17,187	15,176
Total cost of revenues	40,493	35,333
Gross profit	42,188	35,183
<b>Operating expense:</b>		
Selling, general and administrative	27,644	23,344
Research, development and engineering	6,713	7,496
Acquisition related expense	2,204	1,027
Loss on sale and disposal of property and equipment	644	—
Total operating expense	37,205	31,867
Operating income	4,983	3,316
<b>Other income/(expense):</b>		
Other income/(expense), net	50	(5)
Investment income	67	394
Interest expense, net	(25)	(16)
Total other income	92	373
Income from continuing operations before income taxes	5,075	3,689
Income tax (expense)/benefit	(348)	1,654
Net income from continuing operations	4,727	5,343
Loss from discontinued operations, net of income tax of \$464	(1,436)	—
Net income	3,291	5,343
Less: Preferred stock dividend	—	286
Net income attributable to common stockholders	\$ 3,291	\$ 5,057
<b>Net income per share from continuing operations:</b>		
Basic	\$ 0.15	\$ 0.19
Diluted	\$ 0.15	\$ 0.17
<b>Net loss per share from discontinued operations:</b>		
Basic	\$ (0.05)	\$ —
Diluted	\$ (0.04)	\$ —
<b>Net income per share attributable to common stockholders:</b>		
Basic	\$ 0.11	\$ 0.18
Diluted	\$ 0.10	\$ 0.16
<b>Weighted average shares:</b>		
Basic	30,669,874	28,688,867
Diluted	32,578,757	31,840,584

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

**Luna Innovations Incorporated**  
**Consolidated Statements of Comprehensive Income**  
*(in thousands)*

	Years ended December 31,	
	2020	2019
Net income	\$ 3,291	\$ 5,057
Other comprehensive loss	(248)	—
Total other comprehensive income	\$ 3,043	\$ 5,057

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

**Luna Innovations Incorporated**  
**Consolidated Statements of Changes in Stockholders' Equity**  
*(in thousands, except share data)*

	Preferred Stock		Common Stock		Treasury Stock		Additional Paid in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total
	Shares	\$	Shares	\$	Shares	\$				
Balance, January 1, 2019, as previously reported	1,321,514	\$ 1	27,956,401	\$ 30	1,253,105	\$ (2,117)	\$ 85,745	\$ (21,305)		\$ 62,354
Exercise of stock option	—	—	487,802	1	—	—	447	—	—	\$ 448
Stock-based compensation	—	—	16,286	—	—	—	1,544	—	—	\$ 1,544
Stock dividends (1)	—	—	770,454	—	—	—	286	(286)	—	\$ —
Preferred stock to common stock conversion	(1,321,514)	(1)	1,321,514	1	—	—	—	—	—	\$ —
Forfeitures of restricted stock grants	—	—	(16,666)	—	—	—	—	—	—	\$ —
Purchase of treasury stock	—	—	(386,686)	—	386,686	(2,220)	—	—	—	\$ (2,220)
Net income	—	—	—	—	—	—	—	5,343	—	5,343
Balance, January 1, 2020, as previously reported	—	\$ —	30,149,105	\$ 32	1,639,791	\$ (4,337)	\$ 88,022	\$ (16,248)	\$ —	\$ 67,469
Exercise of stock option	—	—	792,466	1	—	—	2,275	—	—	2,276
Stock-based compensation	—	—	83,935	—	—	—	2,134	—	—	2,134
Deferred compensation issuance	—	—	47,377	—	—	—	78	—	—	78
ESPP Issuance	—	—	93,368	—	—	—	456	—	—	456
Forfeitures of restricted stock	—	—	(81,530)	—	—	—	(562)	—	—	(562)
Purchase of treasury stock	—	—	(60,184)	—	60,184	(452)	—	—	—	(452)
Net income	—	—	—	—	—	—	—	3,291	—	3,291
Foreign currency translation adjustment	—	—	—	—	—	—	—	—	(248)	(248)
Balance, December 31, 2020	—	\$ —	31,024,537	\$ 33	1,699,975	\$ (4,789)	\$ 92,403	\$ (12,957)	\$ (248)	\$ 74,442

(1) The stock dividends payable in connection with the Series A Convertible Preferred Stock were issued at the request of Carilion. See Note 11 - Stockholders' Equity for more information.

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

**Luna Innovations Incorporated**  
**Consolidated Statements of Cash Flows**  
*(in thousands, except share data)*

	Years ended December 31,	
	2020	2019
<b>Cash flows provided by operating activities:</b>		
Net income	\$ 3,291	\$ 5,343
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	2,970	2,503
Stock-based compensation	2,134	1,544
Loss on sale and disposal of property and equipment	644	—
Loss from discontinued operations, net of tax	1,436	—
Deferred tax asset	(522)	—
Tax benefit from release of valuation allowance	—	(3,349)
Bad debt expense	127	538
Changes in operating assets and liabilities:		
Accounts receivable	(3,292)	(2,249)
Contract assets	(1,504)	(449)
Inventory	(1,550)	(723)
Prepaid expenses and other current assets	(2,203)	(242)
Other long-term assets	(3)	45
Accounts payable and accrued liabilities	1,143	592
Contract liabilities	(29)	1,245
Other long-term liabilities	214	—
Net cash provided by operating activities	<u>2,856</u>	<u>4,798</u>
<b>Cash flows used in investing activities:</b>		
Acquisitions, net of cash acquired	(34,102)	(19,004)
Acquisition of property and equipment	(681)	(541)
Proceeds from sale of property and equipment	403	—
Intangible property costs	(379)	(270)
Proceeds from sale of discontinued operations	600	—
Net cash used in investing activities	<u>(34,159)</u>	<u>(19,815)</u>
<b>Cash flows provided by/(used in) financing activities:</b>		
Proceeds from debt obligations	19,984	—
Payments on debt obligations	—	(625)
Payments on finance lease obligations	(53)	(40)
Purchase of common stock	(452)	(2,220)
Proceeds from ESPP	456	—
Proceeds from the exercise of options and warrants	1,714	448
Net cash provided by/(used in) financing activities	<u>21,649</u>	<u>(2,437)</u>
<b>Net change in cash and cash equivalents</b>	<u>(9,654)</u>	<u>(17,454)</u>
Effect of exchange rate changes on cash and cash equivalents	14	—
Cash and cash equivalents—beginning of period	25,006	42,460
Cash and cash equivalents—end of period	<u>\$ 15,366</u>	<u>\$ 25,006</u>
<b>Supplemental disclosure of cash flow information</b>		
Cash paid for interest	\$ 4	\$ 18
Cash paid for income taxes	\$ 1,244	\$ 1,160
Cash received for income tax refunds	—	—
<b>Supplemental disclosure for non-cash transactions</b>		
Contingent liability for business combination	\$ 225	\$ 1,000
Dividend on preferred stock	\$ —	\$ 286

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

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

### 1. Organization and Summary of Significant Accounting Policies

Luna Innovations Incorporated (“we” or the “Company”), headquartered in Roanoke, Virginia, was incorporated in the Commonwealth of Virginia in 1990 and reincorporated in the State of Delaware in April 2003. We are a leader in advanced optical technology, providing high performance fiber optic test, measurement and control products for the telecommunications and photonics industries; and distributed fiber optic sensing solutions that measure, or “sense,” the structures for industries ranging from aerospace, automotive, energy, oil and gas, security and infrastructure.

#### *Consolidation Policy*

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States (“GAAP”) and include our accounts and the accounts of our wholly owned subsidiaries. We eliminate from our financial results all intercompany transactions.

#### *Use of Estimates*

The preparation of our consolidated financial statements in accordance with GAAP requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements and accompanying notes.

Although these estimates are based on our knowledge of current events and actions we may undertake in the future, actual results may differ from such estimates and assumptions.

#### *Revenue Recognition*

##### *Lightwave Revenues*

Revenues from product sales are generated by the sale of commercial products and services under various sales programs to the end user and through distribution channels. We sell fiber optic test and sensing systems to end users for use in numerous fiber optic-based measurement applications. Revenues are recorded net of applicable sales taxes collected from customers and payable to state or local governmental entities.

For Lightwave contracts, we evaluate whether two or more contracts should be combined and accounted for as one single contract and whether the combined or single contract should be accounted for as more than one performance obligation. We recognize revenue when the performance obligation has been satisfied by transferring the control of the product or service to the customer. For tangible products that contain software that is essential to the tangible product’s functionality, we consider the product and software to be a single performance obligation. For contracts with multiple performance obligations, we allocate the contract’s transaction price to each performance obligation based on their relative stand-alone selling prices. In such circumstances, we use the observable price of goods or services which are sold separately in similar circumstances to similar customers. If these prices are not observable, then we will estimate the stand-alone selling price using information that is reasonably available. For the majority of our standard products and services, price list and discount structures related to customer type are available. For products and services that do not have price list and discount structures, we may use one or more of the following: (i) adjusted market assessment approach, (ii) expected cost-plus a margin approach, and (iii) residual approach. The adjusted market approach requires us to evaluate the market in which we sell goods or services and estimate the price that a customer in that market would be willing to pay for those goods or services. The expected cost plus margin approach requires us to forecast our expected costs of satisfying the performance obligation and then add a reasonable margin for that good or service. The residual approach decreases the total transaction price by the sum of the observable standalone selling prices if either the company sells the same good or services to different customers for a broad range of amounts or the company has not established a price for the good or service and that good or service has not been sold on a standalone basis. Shipping and handling activities primarily occur after a customer obtains control and are considered fulfillment cost rather than separate performance obligations. Similarly, sales and similar taxes assessed by a governmental authority that are both imposed on and concurrent with a specific revenue-producing transaction and collected by the entity from a customer are excluded from the measurement of the transaction price.

For standard products, we recognize revenue at a point in time when control passes to the customer. Absent substantial product acceptance clauses, this is based on the shipping terms. For custom products that require engineering and development based on customer requirements, we will recognize revenue over time using the output method for any items shipped and any finished goods or work in process that is produced for balances of open sales orders. For any finished goods or work in process

that has been produced for the balance of open sales orders we recognize revenue by applying the average selling price for such open order to the lesser of the on-hand balance in finished goods or open sales order quantity which we present as a contract asset on the balance sheet. Cost of sales is recognized based on the standard cost of the finished goods and work in process associated with this revenue and inventory balances are reduced accordingly. For extended warranties and product rentals, revenue is recognized over time using the output method based on the time elapsed for the warranty or service period. In the case of warranties, we record a contract liability for amounts billed but that are not recognized until subsequent periods. A separate contract liability is recorded for the cost associated with warranty repairs based on our estimate of future expense. For testing services where we are performing testing on an asset the customer controls, revenue is recognized over time by the output method using the performance to date. For training where the customer is receiving the benefit of training as it is occurring and for repairs to a customer-controlled asset, revenue is recognized over time by the output method using the performance to date. For royalty revenue, we apply the practical expedient "royalty exception" recognizing revenue based on the royalty agreement which specifies an amount based on sales or minimum amount, whichever is greater.

In some product rental contracts, a customer may be offered a discount on the purchase of an item that would provide for a material right. When a material right has been provided to a customer, a separate performance obligation is established, and a portion of the rental revenue will be deferred until the future product is purchased or the option expires. This deferred revenue is recognized as a contract liability on the balance sheet.

#### *Luna Labs Revenues*

We perform research and development for U.S. Federal government agencies, educational institutions and commercial organizations. We account for a research contract when a contract has been executed, the rights of the parties are identified, payment terms are identified, the contract has commercial substance, and collectability of the contract price is considered probable. Revenue is earned under cost reimbursable, time and materials and fixed price contracts. Direct contract costs are expensed as incurred.

Our contracts with agencies of the U.S. government are subject to periodic funding by the respective contracting agency. Funding for a contract may be provided in full at inception of the contract or ratably throughout the contract as the services are provided. In evaluating the probability of funding for purposes of assessing collectability of the contract price, we consider our previous experience with our customers, communication with our customers regarding funding status and our knowledge of available funding for the contract or program. If funding is not assessed as probable, revenue recognition is deferred until realization is reasonably assured.

Under the typical payment terms of our U.S. government contracts, the customer pays us either performance-based payments ("PBPs") or progress payments. PBPs, which are typically used in the firm fixed price contracts, are interim payments based on quantifiable measures of performance or on the achievement of specified events or milestones. Progress payments, which are typically used in our cost type contracts, are interim payments based on costs incurred as the work progresses. For our U.S. government cost-type contracts, the customer generally pays us during the performance period for 80% to 90% of our actual costs incurred. Because the customer retains a small portion of the contract price until completion of the contract and audit of allowable costs, cost type contracts generally result in revenue recognized in excess of billings which we present as contract assets on the balance sheet. Amounts billed and due from our customers are classified as receivables on the balance sheet. For non-U.S. government contracts, we typically receive interim payments as work progresses, although for some contracts, we may be entitled to receive an advance payment. We recognize a liability for these advance payments and PBPs paid in advance which are in excess of the revenue recognized and present these amounts as contract liabilities on the balance sheet.

To determine the proper revenue recognition method for research and development contracts, we evaluate whether two or more contracts should be combined and accounted for as one single modified contract and whether the combined or single contract should be accounted for as more than one performance obligation. For instances where a contract has options that were bid with the initial contract and awarded at a later date, we combine the options with the original contract when options are awarded. For most of our contracts, the customer contracts for research with multiple milestones that are interdependent. Consequently, the entire contract is accounted for as one performance obligation. The effect of the combined or modified contract on the transaction price and measure of progress for the performance obligation to which it relates, is recognized as an adjustment to revenue (either as an increase in or a reduction of revenue) on a cumulative catch-up basis.

Contract revenue recognition is measured over time as we perform because of continuous transfer of control to the customer. For U.S. government contracts which are typically subject to the Federal Acquisition Regulation, this continuous transfer of control to the customer is supported by clauses in the contract that allow the customer to unilaterally terminate the

contract for convenience, pay us for cost incurred plus a reasonable profit and take control of any work in process. From time to time, as part of normal management processes, facts may change, causing revisions to estimated total costs or revenues expected. The cumulative impact of any revisions to estimates and the full impact of anticipated losses on any type of contract are recognized in the period in which they become known.

Because of control transferring over time, revenue is recognized based on the extent of progress towards completion of the performance obligation. The selection of the method to measure progress towards completion requires judgment and is based on the nature of the services to be provided. We generally use the input method, more specifically the cost-to-cost measure of progress for our contracts because it best depicts the transfer of control to the customer, which occurs as we incur costs on our contracts. Under the cost-to-cost measure of progress, the extent of progress towards completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. The underlying bases for estimating our contract research revenues are measurable expenses, such as labor, subcontractor costs and materials, and data that are updated on a regular basis for purposes of preparing our cost estimates. Our research contracts generally have a period of performance of six months to three years, and our estimates of contract costs have historically been consistent with actual results. Revisions in these estimates between accounting periods to reflect changing facts and circumstances have not had a material impact on our operating results, and we do not expect future changes in these estimates to be material. The cumulative impact of any revisions to estimates and the full impact of anticipated losses on any type of contract are recognized in the period in which they become known.

Under cost reimbursable contracts, we are reimbursed for costs that are determined to be reasonable, allowable and allocable to the contract and paid a fixed fee representing the profit negotiated between us and the contracting agency. Revenue from cost reimbursable contracts is recognized as costs are incurred plus an estimate of applicable fees earned. We consider fixed fees under cost reimbursable contracts to be earned in proportion to the allowable costs incurred in performance of the contract.

Revenue from time and materials contracts is recognized based on direct labor hours expended at contract billing rates plus other billable direct costs.

Fixed price contracts may include either a product delivery or specific service performance throughout a period. For fixed price contracts that are based on the proportional performance method and involve a specified number of deliverables, we recognize revenue based on the proportion of the cost of the deliverables compared to the cost of all deliverables included in the contract as this method more accurately measures performance under these arrangements. For fixed price contracts that provide for the development and delivery of a specific prototype or product, revenue is recognized based upon the percentage of completion method.

Whether certain costs under government contracts are allowable is subject to audit by the government. Certain indirect costs are charged to contracts using provisional or estimated indirect rates, which are subject to later revision based on government audits of those costs. Management is of the opinion that costs subsequently disallowed, if any, would not likely have a significant impact on revenues recognized for those contracts.

#### *Allowance for Uncollectible Receivables*

Accounts receivable are recorded at their face amount, less an allowance for doubtful accounts. We review the status of our uncollected receivables on a regular basis. In determining the need for an allowance for uncollectible receivables, we consider our customers' financial stability, past payment history and other factors that bare on the ultimate collection of such amounts. The allowance was \$0.9 million at each of December 31, 2020 and 2019.

#### *Cash Equivalents*

We consider all highly liquid investments with maturities of three months or less when purchased to be cash equivalents. To date, we have not incurred losses related to cash and cash equivalents. Our foreign currency risk on cash and cash equivalents held outside of the US is not material. Cash equivalents at December 31, 2020 and 2019 included \$3.1 million and \$19.8 million, respectively, invested in U.S. Treasury obligations through a sweep account with our bank. The full value of amounts invested through the sweep account are convertible to cash on a daily basis. Our cash transactions are processed through reputable commercial banks. We regularly maintain cash balances with financial institutions which exceed Federal Deposit Insurance Corporation ("FDIC") insurance limits. At December 31, 2020 and 2019, we had approximately \$7.5 million and \$5.0 million, respectively, in excess of FDIC insured limits.



*Fair Value Measurements*

Our financial assets and liabilities are measured at fair value, which is defined as the price that would be received to sell an asset, or paid to transfer a liability, in an orderly transaction between market participants. Valuation techniques are based on observable or unobservable inputs. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect our market assumptions. These two types of inputs have created the following fair value hierarchy:

- Level 1—Quoted prices for identical instruments in active markets.
- Level 2—Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which significant value drivers are observable.
- Level 3—Valuations derived from valuation techniques in which significant value drivers are unobservable.

The carrying values of cash and cash equivalents, accounts receivable, accounts payable and accrued liabilities approximate fair value because of the short-term nature of these instruments. The carrying amount of lease liabilities approximate fair value because these financial instruments bear interest at rates that approximate current market rates for similar agreements with similar maturities and credit. We consider the terms of the PNC Bank, National Association debt facility, including its interest rate of LIBOR plus a margin ranging from 1.75% to 2.25%, to be at market based upon similar instruments that would be available to us.

*Property and Equipment, net*

Property and equipment, net, are stated at cost less accumulated depreciation. We record depreciation using the straight-line method over the following estimated useful lives:

Equipment	3 – 7 years
Furniture and fixtures	7 years
Software	3 years
Leasehold improvements	Lesser of lease term or life of improvements

*Intangible Assets*

Intangible assets consist of patents related to certain intellectual property that we have developed or acquired, and identifiable intangible assets recognized in connection with our acquisition of OptaSense Holdings Ltd. ("OptaSense") and General Photonics, Inc. ("GP"). We amortize our identified intangible assets over their estimated useful lives ranging between one and fifteen years and analyze the reasonableness of the remaining useful life whenever events or circumstances indicate that the carrying amount may not be recoverable to determine whether their carrying value has been impaired.

*Goodwill*

Goodwill is tested annually for impairment in the fourth quarter (October 1st) and whenever events or changes in circumstances indicate the carrying value of goodwill may not be recoverable. Goodwill is tested for impairment at the reporting unit level. A qualitative assessment can be performed to determine whether it is more likely than not the fair value of the reporting unit is less than its carrying value. If the reporting unit does not pass the qualitative assessment, we compare the fair value of each reporting unit to its carrying value using a quantitative assessment. If the fair value of the reporting unit exceeds its carrying value, goodwill is considered not impaired. If the fair value of the reporting unit is less than the carrying value, the difference is recorded as an impairment loss.

For the quantitative assessment, we estimate the fair value of each reporting unit using a combination of an income approach using a discounted cash flow ("DCF") analysis and a market-based valuation approach based on comparable public company trading values. Determining the fair value of a reporting unit requires the exercise of significant management judgments, including the amount and timing of projected future revenues, earnings and cash flows after considering factors such as recent operating performance, general market and industry conditions, existing and expected future contracts, changes in working capital and long-term business plans and growth initiatives. The carrying value of each reporting unit includes the assets and liabilities employed in its operations and goodwill. There are no significant allocations of amounts held at the corporate level to the reporting units.

### *Research, Development and Engineering*

Research, development and engineering expense not related to contract performance are expensed as incurred. We expensed \$6.7 million and \$7.5 million of non-contract related research, development and engineering expense for the year ended December 31, 2020 and 2019, respectively.

### *Impairment of Long-Lived Assets*

We review our long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets is measured by comparing the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds their fair value. Assets to be disposed of by sale are reflected at the lower of their carrying amount or fair value less cost to sell.

### *Inventory*

Inventory consists of finished goods, work in process and raw materials valued at the lower of cost (determined on the first-in, first-out basis) or net realizable value.

### *Net Income per Share*

Basic per share data is computed by dividing net income attributable to common stockholders by the weighted average number of shares outstanding during the period. Diluted per share data is computed by dividing net income attributable to common stockholders by the weighted average shares outstanding during the period increased to include, if dilutive, the number of additional common share equivalents that would have been outstanding if potential common shares had been issued using the treasury stock method. Diluted per share data would also include the potential common share equivalents relating to convertible securities by application of the if-converted method.

The effect of 1.9 million and 3.2 million common stock equivalents are included for the diluted per share data for the years ended December 31, 2020 and 2019, respectively. Accrued stock dividends and stock options are included in our common stock equivalents for the year ended December 31, 2020, while preferred stock is also included for the year ended December 31, 2019.

### *Stock-Based Compensation*

We have two stock-based compensation plans, which are described further in Note 11. We recognize compensation expense based upon the fair value of the underlying equity award as of the date of grant. We have elected to use the Black-Scholes option pricing model to value any stock options granted. Restricted stock and restricted stock units awarded are valued at the closing price of our common stock on the date of the award. We recognize stock-based compensation for such awards on a straight-line method over the requisite service period of the awards taking into account the effects of the expected exercise. We reduce stock-based compensation expense for the value of any forfeitures of unvested awards as such forfeitures occur.

### *Income Taxes*

We account for income taxes using the liability method. Deferred tax assets or liabilities are determined based on the difference between the financial statement and tax basis of assets and liabilities as measured by the enacted tax rates, which will be in effect when the differences reverse. A valuation allowance against net deferred tax assets is provided unless we conclude it is more likely than not that the deferred tax assets will be realized.

We recognize deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted tax rates in effect for the year in which those temporary differences are expected to be recovered or settled. We evaluate our ability to benefit from all deferred tax assets and establish valuation allowances for amounts we believe are not more-likely-than-not to be realizable. For uncertain tax positions, we use a more-likely-than-not threshold, greater than 50%, based on the technical merits of the income tax position taken. Income tax positions that meet the more-likely-than-not recognition threshold are measured in order to determine the tax benefit recognized in the financial statements. Penalties, if probable and reasonably estimable, and interest expense related to uncertain tax positions are recognized as a component of the tax provision.

## Foreign Currency

For our non-U.S. dollar functional currency subsidiaries, assets and liabilities are translated into U.S. dollars using fiscal year end exchange rates. Sales and expenses are translated at average monthly exchange rates. Foreign currency translation gains and losses are included as a component of accumulated other comprehensive loss within equity. Gains and losses resulting from foreign currency transactions are included in earnings.

## Recently Adopted Accounting Pronouncements

In January 2017, the FASB issued ASU 2017-04 *Simplifying the Test for Goodwill Impairment*, which simplifies the test for goodwill impairment by eliminating Step 2 from the goodwill impairment test which previously measured a goodwill impairment loss by comparing the implied fair value of a reporting unit's goodwill with the carrying amount. We adopted ASU 2017-04, effective January 1, 2020. As a result of adopting the new rules, we compare the estimated fair value of our reporting units to their respective carrying values when evaluating the recoverability of goodwill. If the carrying value of a reporting unit exceeds its fair value, an impairment charge will be recognized for the amount by which its carrying value exceeds the reporting unit's fair value; however, the loss recognized will not exceed the goodwill allocated to the reporting unit. The adoption of ASU 2017-04 did not have a significant impact on our consolidated financial statements.

In August 2018, the FASB issued ASU No. 2018-13 *Fair Value Measurement (Topic 820): Changes to the Disclosure Requirements for Fair Value Measurement*, which amends the disclosure requirements in ASC 820 by adding, changing, or removing certain disclosures. The ASU applies to all entities that are required under this guidance to provide disclosures about recurring or nonrecurring fair value measurements. We adopted these amendments, effective January 1, 2020. The adoption of ASU 2018-13 did not have a significant impact on our consolidated financial statements.

In August 2018, the FASB issued ASU 2018-15 *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That is a Service Contract*, which aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. We adopted ASU 2018-15, effective January 1, 2020. The adoption of ASU 2018-15 did not have a significant impact on our consolidated financial statements.

## Recently Issued Pronouncements not yet adopted

In June 2016, the FASB issued ASU 2016-13 *Financial Instruments - Credit Losses (Topic 326) - Measurement of Credit Losses on Financial Instruments*, which requires companies to measure financial assets at an amortized cost basis to be presented at the net amount expected to be collected. The new accounting rules eliminate the probable initial recognition threshold and, instead, reflect an entity's current estimate of all expected credit losses. ASU 2016-13 is applicable to our trade receivables. This pronouncement was amended under ASU 2019-10 to allow an extension on the adoption date for entities that qualify as a small reporting company. We have elected this extension and the effective date for us to adopt this standard will be for fiscal years beginning after December 15, 2022. We are currently in the process of evaluating the impact of ASU 2016-13, but we do not expect the adoption of these new accounting rules to have a significant impact on our consolidated financial statements.

In December 2019, the FASB issued ASU 2019-12 *Simplifying the Accounting for Income Taxes*, which removes certain exceptions to the general principles of the accounting for income taxes and also improves consistent application of and simplification of other areas when accounting for income taxes. The guidance is effective for us beginning in the first quarter of fiscal year 2021, while early adoption is permitted. We do not expect the adoption of these new accounting rules to have a significant impact on our consolidated financial statements.

## 2. Business Acquisitions

### *OptaSense Holdings Limited*

On December 3, 2020, we entered into and closed a Share Purchase Agreement (the "Share Purchase Agreement") with QinetiQ Holdings Limited ("QinetiQ") for the purchase of all of the shares of OptaSense, a recognized market leader in fiber optic distributed monitoring solutions for pipelines, oilfield services, security, highways and railways, as well as power and utilities monitoring systems. Pursuant to the Share Purchase Agreement, we acquired all outstanding shares of OptaSense for aggregate consideration of \$38.9 million (£29.0 million) subject to adjustment as described in the Share Purchase Agreement (the "Transaction"). The acquisition of OptaSense provides us with important distributed acoustic sensing ("DAS") intellectual

property and products. OptaSense's technology and products and geographic footprint are highly complementary to Luna, which we believe will accelerate our technology and overall growth roadmap.

The Share Purchase Agreement and a Tax Deed entered into between QinetiQ and us (the "Tax Deed") in connection with the Share Purchase Agreement contain customary representations and warranties and indemnities. In addition, at closing of the acquisition, we obtained a warranty and indemnity insurance policy from Liberty Mutual Insurance Europe SE (LMIE) in connection with the Share Purchase Agreement and the Tax Deed.

In addition, for a period of two years after closing, QinetiQ has agreed not, directly or indirectly, alone or jointly with any other person, to compete or engage in any competing business with us in countries in which OptaSense operates and not to solicit our customers, employees or suppliers, subject to specified exceptions. QinetiQ has also agreed to provide specified transitional services for a period of six months after closing.

For the period from the closing of the OptaSense acquisition through December 31, 2020, we recognized revenue of \$1.5 million and an operating loss of \$0.9 million. OptaSense's operating loss for the period from the closing of the acquisition through December 31, 2020 included \$0.1 million in amortization expense for the acquired intangibles and step-up in value of acquired inventory. The amortization expense for the acquired intangibles as well as the costs associated with the acquisition of GP are included in the cost of goods sold and selling, general and administrative expense in our consolidated statements of operations.

#### *New Ridge Technologies*

On October 29, 2020, we acquired New Ridge Technologies, a small company that develops and manufactures fiber optic test and measurement equipment and advanced fiber optic subsystems primarily for telecommunication and radio-over-fiber applications. The company's acquired operations will be integrated into, and reported as a part of, our Lightwave segment. This acquisition supports our growth strategy in the communications test arena. The total consideration was \$0.6 million which consisted of \$0.4 million paid at closing and \$0.2 million of contingent consideration related to an earn-out provision. We recorded \$0.02 million of goodwill upon the completion of the purchase consideration allocation. Depending on the achievement of certain metrics during the two years following closing, we may pay the seller up to \$0.2 million in contingent consideration related to the earn-out provision.

#### *General Photonics Corporation*

On March 1, 2019, we acquired the outstanding stock of GP for cash consideration of \$19.0 million. Of the purchase price, \$17.1 million was paid at closing and \$1.9 million was placed into escrow for possible working capital adjustments to the purchase price and potential satisfaction of certain post-closing indemnification obligations. Additionally, we may become obligated to pay additional cash consideration of up to \$1.0 million if certain revenue targets for the GP historical business are met for the twelve-month period following the closing. We estimated the fair value of the contingent obligation to be \$1.0 million, which is shown in accrued liabilities on the consolidated balance sheet and was subsequently paid during the year ended December 31, 2020. The fair value of the contingent obligation was determined using the present value of estimated likely future payments.

For the period from the closing of the GP acquisition through December 31, 2019, we recognized revenue of \$10.5 million and operating income of \$1.4 million. Operating income for the period from the closing of the acquisition through December 31, 2019 included \$1.6 million in amortization expense for the acquired intangibles and step-up in value of acquired inventory associated with the acquisition of GP. Operating income for the year ended December 31, 2019 also included \$0.9 million of costs associated with the acquisition of GP. The amortization expense for the acquired intangibles as well as the costs associated with the acquisition of GP are included in the cost of goods sold and selling, general and administrative expense in our consolidated statements of operations.

These acquisitions have been accounted for under the acquisition method of accounting in accordance with ASC 805 - Business Combinations. Under ASC 805, the total estimated purchase consideration is allocated to the acquired tangible and intangible assets and assumed liabilities based on their estimated fair values as of the acquisition date. Any excess of the fair value of the acquisition consideration over the identifiable assets acquired and liabilities assumed is recognized as goodwill. The allocation of the purchase consideration for the OptaSense acquisition is preliminary.

The following table summarizes the allocation of the purchase consideration of each acquisition (excluding cash of \$5.2 million and \$3.8 million, respectively):

<i>(in thousands)</i>	OptaSense (2020)		GP (2019)	
Accounts receivable	\$	5,553	\$	1,521
Contract assets		2,823		—
Inventory		11,483		2,698
Other current assets		1,026		764
Property and equipment		1,247		286
Identifiable intangible assets		11,263		8,200
Goodwill		7,619		10,512
Right of use asset		2,082		—
Other long-term assets		22		—
Accounts payable and accrued expenses		(4,089)		(4,076)
Contract liabilities		(3,259)		—
Other current liabilities		(747)		—
Long-term operating lease liability		(1,335)		—
<b>Total purchase consideration</b>	<b>\$</b>	<b>33,688</b>	<b>\$</b>	<b>19,905</b>

The identifiable intangible assets and their estimated useful lives were as follows:

<i>(in thousands)</i>	Estimated Useful Life	Estimated Fair Value	
		OptaSense	GP
Developed technology	8 - 10 years	\$ 7,379	\$ 7,200
Trade names and trademarks	3 - 15 years	2,580	400
Backlog	3 years	699	—
Customer relationships	5 - 15 years	605	600
		<b>\$ 11,263</b>	<b>\$ 8,200</b>

OptaSense's developed technology primarily consists of its DAS product solutions that deliver superior measurements for a wide range of applications from advanced industrial monitoring through high performance geophysical measurements. GP's developed technologies acquired primarily consisted of its technologies relating to the measurement and control of the polarization of light. The developed technologies were valued using the "multi-period excess earnings" method, under the income approach. The multi-period excess earnings method reflects the present value of the projected cash flows that are expected by the developed technologies less charges representing the contribution of other assets to those cash flows. Discount rates of 17.5% and 17% were used to discount these cash flows of OptaSense and GP, respectively, to the present value.

Trade names and trademarks are considered a type of guarantee of a certain level of recognizability, quality or performance represented by the OptaSense and GP brands. Trade names and trademarks were valued using the "relief from royalty" method under the income approach. This method is based on the assumption that in lieu of ownership, a market participant would be willing to pay a royalty in order to exploit the related benefits of these assets. Discount rates of 17.5% and 16% were used to discount these cash flows of OptaSense and GP, respectively, to the present value.

Backlog arises from unfulfilled purchase or sales order contracts. The value of OptaSense's backlog as of the acquisition date was calculated using the income approach. A discount rate of 16.5% was used to discount the cash flows attributable solely to the backlog to the present value.

Customer relationships represent the fair value of either (i) the avoidance of cost associated with the creation of a new customer relationship or (ii) the projected cash flows that will be derived from the sale of products to existing customers as of the acquisition date. OptaSense's customer relationships were valued using the cost approach based on the expected time to re-build the customer base. GP's customer relationships were valued using the "distributor" method, under the income approach.

Under this premise, the margin of a distributor within the industry is deemed to be the margin attributable to customer relationships. This isolates the cash flows attributable to the customer relationships for which a market participant would be willing to pay. Discount rates of 17.5% and 16% were used to discount these cash flows for OptaSense and GP, respectively, to the present value.

Goodwill represents the excess of consideration transferred over the net of the acquisition date fair values of the assets acquired and the liabilities assumed in connection with the acquisition. Goodwill generated from our business acquisitions was primarily attributable to expected synergies from future customer and sales growth.

#### *Pro forma consolidated results of operations*

The following unaudited pro forma financial information presents combined results of operations for each of the periods presented as if the acquisitions of OptaSense and GP had been completed on January 1, 2019. The pro forma information includes adjustments to depreciation expense for property and equipment acquired and amortization expense for the intangible assets acquired and the elimination of transaction expenses recognized in each period. Transaction-related expenses associated with the acquisition of OptaSense and excluded from pro forma income from continuing operations were \$2.2 million for the year ended December 31, 2020. Transaction-related expenses associated with the acquisition of GP and excluded from pro forma income from continuing operations were \$1.0 million for the year ended December 31, 2019.

The pro forma data are for informational purposes only and are not necessarily indicative of the consolidated results of operations or the combined business had the acquisitions of OptaSense and GP occurred on January 1, 2019, or the results of future operations of the combined business. For instance, planned or expected operational synergies following the acquisition are not reflected in the pro forma information. Consequently, actual results will differ from the unaudited pro forma information presented below.

<i>(in thousands)</i>	For the years ended		
	December 31, 2020	December 31, 2019	
	OptaSense <i>(unaudited)</i>	OptaSense <i>(unaudited)</i>	GP <i>(unaudited)</i>
Revenue	\$ 103,971	\$ 101,390	\$ 72,577
Income from continuing operations	\$ 1,364	\$ 487	\$ 6,913

### 3. Accounts Receivable, net

Accounts receivable, net, consist of the following:

<i>(in thousands)</i>	December 31,	
	2020	2019
Billed	\$ 25,418	\$ 17,194
Other	419	5
	25,837	17,199
Less: allowance for doubtful accounts	(886)	(930)
Accounts receivable, net	\$ 24,951	\$ 16,269

### 4. Inventory

Inventory consists of finished goods, work-in-process and raw materials valued at the lower of cost (determined on the first-in, first-out basis) or net realizable value.

Components of inventory are as follows:

<i>(in thousands)</i>	<b>December 31,</b>	
	<b>2020</b>	<b>2019</b>
Finished goods	\$ 11,547	\$ 1,695
Work-in-process	1,425	1,008
Raw materials	10,625	7,591
Inventory	<u>\$ 23,597</u>	<u>\$ 10,294</u>

## 5. Property and Equipment, net

Property and equipment, net, consists of the following:

<i>(in thousands)</i>	<b>December 31,</b>	
	<b>2020</b>	<b>2019</b>
Building	\$ —	\$ 70
Equipment	4,844	9,564
Furniture and fixtures	353	685
Software	106	1,178
Leasehold improvements	2,416	5,288
Construction in process	185	—
	<u>7,904</u>	<u>16,785</u>
Less—accumulated depreciation	(4,596)	(13,319)
Property and equipment, net	<u>\$ 3,308</u>	<u>\$ 3,466</u>

Depreciation for the years ended December 31, 2020 and 2019 was approximately \$1.1 million and \$1.0 million, respectively, and is included primarily in selling, general and administrative expense in our consolidated statements of operations.

## 6. Intangible Assets, net

Intangible assets, net consist of the following:

<i>(in thousands)</i>	<b>Estimated Life</b>	<b>December 31,</b>	
		<b>2020</b>	<b>2019</b>
Patent costs	1 - 18 years	\$ 5,702	\$ 5,291
Developed technology	5 - 10 years	17,344	9,800
In-process research and development	N/A	1,580	1,580
Customer base	5 - 7 years	1,302	700
Trade names	3 - 15 years	3,122	550
Backlog	3 years	696	—
		<u>29,746</u>	<u>17,921</u>
Accumulated amortization		(9,637)	(7,727)
Intangible assets, net		<u>\$ 20,109</u>	<u>\$ 10,194</u>

Amortization for the years ended December 31, 2020 and 2019 was approximately \$1.8 million and \$1.6 million, respectively, and is included primarily in selling, general and administrative expense in our consolidated statements of operations.

Estimated aggregate amortization, based on the net value of intangible assets at December 31, 2020, for each of the next five years and beyond is as follows (in thousands):

<b>Year Ending December 31,</b>		
2021	\$	2,978
2022		2,906
2023		2,807
2024		2,316
2025		2,306
2026 and beyond		6,796
	\$	<u>20,109</u>

We did not recognize any intangible asset impairment charges during the years ended December 31, 2020 or 2019.

## 7. Goodwill

As of December 31, 2020 and December 31, 2019, goodwill has been allocated to our Lightwave segment. The changes in the carrying value of goodwill during the years ended December 31, 2020 and December 31, 2019 were as follows (in thousands):

Balance as of December 31, 2018	\$	101
Goodwill resulting from business acquisition		10,512
Measurement period adjustment		(71)
Balance as of December 31, 2019		<u>10,542</u>
Goodwill resulting from business acquisitions		7,637
Foreign currency translation		(58)
Balance as of December 31, 2020	\$	<u>18,121</u>

After completing a qualitative assessment of our goodwill during the fourth quarter of 2020, we concluded the carrying value of goodwill was not impaired as of December 31, 2020.

## 8. Accrued Liabilities

Accrued liabilities consist of the following:

<i>(in thousands)</i>	<b>December 31,</b>	
	<b>2020</b>	<b>2019</b>
Accrued compensation	\$ 9,103	\$ 6,416
Contingent consideration	225	1,000
Accrued professional fees	825	113
Accrued income tax	281	716
Accrued interest	42	—
Accrued royalties	456	365
Accrued liabilities-other	1,227	426
Total accrued liabilities	\$ <u>12,159</u>	\$ <u>9,036</u>



## 9. Debt

Long-term debt consists of the following:

(in thousands)	Years ended December 31,	
	2020	2019
Term Loan (net of debt issuance costs of \$66, 2.48% at December 31, 2020)	\$ 12,434	\$ —
Revolving Loan (2.48% at December 31, 2020)	7,550	—
	19,984	—
Less: Current portion of long-term debt obligations	(4,167)	—
Long-term debt obligations	\$ 15,817	\$ —

### PNC Bank Facility

On December 1, 2020 (the “Effective Date”), we entered into a Loan Agreement (the “Loan Agreement”) with PNC Bank, National Association, as lender (the “Lender”) and our domestic subsidiaries as guarantors. The Loan Agreement provides a \$12.5 million term loan facility (the “Term Loan”) and a \$15.0 million revolving credit facility (the “Revolving Line”), which includes a \$3.0 million letter of credit sublimit. On the Effective Date, we borrowed the full amount of the Term Loan from the Lender pursuant to a term note (the “Term Note”) and a \$7.6 million revolving loan (the “Revolving Loan”) pursuant to a revolving line of credit note (the “Revolving Line of Credit Note”). We may repay and reborrow advances under the Revolving Line from time to time pursuant to the Revolving Line of Credit Note.

The Term Loan matures on December 1, 2023. The Term Loan is due and payable in 12 equal quarterly payments of principal and interest. The Term Loan bears interest at a floating per annum rate equal to the sum of (a) LIBOR plus (b) a margin ranging from 1.75% to 2.25% depending on the Net Leverage Ratio (as defined in the Loan Agreement). We may prepay the Term Loan without penalty or premium.

The Revolving Line expires on December 1, 2023. Borrowings under the Revolving Line will bear interest at a floating per annum rate equal to the sum of (a) LIBOR plus (b) a margin ranging from 1.75% to 2.25% depending on the Net Leverage Ratio. Accrued interest will be due and payable on the first day of each month and the outstanding principal balance and any accrued but unpaid interest will be due and payable on December 1, 2023. The unused portion of the Revolving Line will accrue a fee equal to 0.20% per annum multiplied by the quarterly average unused amount.

Provided our obligations under the Loan Agreement have been satisfied, we may terminate the Loan Agreement at any time upon three business days’ advance written notice to the Lender.

The Loan Agreement includes a number of affirmative and restrictive covenants applicable to us and our subsidiaries, including, among others, financial covenants regarding minimum net leverage and fixed charge coverage, affirmative covenants regarding delivery of financial statements, payment of taxes, and maintenance of government compliance, and restrictive covenants regarding dispositions of property, acquisitions, incurrence of additional indebtedness or liens, investments and transactions with affiliates. We are also restricted from paying dividends or making other distributions or payments on our capital stock, subject to limited exceptions. We were in compliance with these covenants as of December 31, 2020.

Upon the occurrence of certain events, including failure to satisfy our payment obligations under the Loan Agreement, failure to adhere to the financial covenants, the breach of certain of our other covenants under the Loan Agreement, cross defaults to other indebtedness or material agreements, judgment defaults and defaults related to failure to maintain governmental approvals, the Lender will have the right, among other remedies, to declare all principal and interest immediately due and payable, and to exercise secured party remedies.

### Silicon Valley Bank Facility

We maintained a Loan and Security Agreement (the “Credit Facility”) with Silicon Valley Bank (“SVB”) under which we had a term loan with an original borrowing amount of \$6.0 million (the “Original Term Loan”). The Original Term Loan carried a floating annual interest rate equal to SVB’s prime rate then in effect plus 2%. The Original Term Loan matured and was repaid in May 2019.

On October 8, 2020, we entered into an Amended and Restated Loan and Security Agreement (the “A&R Loan Agreement”) with SVB, which amended and restated in its entirety our previous Loan and Security Agreement dated as of October 10, 2019, as amended. Under the A&R Loan Agreement, SVB agreed to make advances available up to \$10.0 million

(the "A&R Revolving Line"). If we borrow from the A&R Revolving Line, such borrowing would carry a floating annual interest rate equal to the greater of (i) the Prime Rate (as defined in the Loan Agreement) then in effect plus .50% or (ii) 4.75%. Amounts borrowed under the A&R Revolving Line may be repaid and, prior to the A&R Revolving Line Maturity Date (defined below), reborrowed. The Revolving Line terminates on October 10, 2021 (the "A&R Revolving Line Maturity Date"), unless earlier terminated by us.

Amounts due under the A&R Loan Agreement are secured by our assets, including all personal property and bank accounts; however, intellectual property is not secured under the Loan Agreement. The Loan Agreement requires us to observe a number of financial and operational covenants, including maintenance of a specified Liquidity Coverage Ratio (as defined in the A&R Loan Agreement), protection and registration of intellectual property rights and customary negative covenants. As of December 31, 2020, there were no events of default on the Credit Facility.

On December 1, 2020, we terminated the A&R Loan Agreement, dated October 8, 2020. As of the time of termination, there were no amounts outstanding under the A&R Loan Agreement.

On April 28, 2020, we were granted a loan (the "Loan") from SVB in the aggregate amount of \$4.5 million, pursuant to the Paycheck Protection Program under Division A, Title I of the CARES Act, which was enacted March 27, 2020.

On May 4, 2020, we returned the full amount of the proceeds of the Loan to SVB. The decision to return the proceeds was based on the revised guidance issued by the U.S. Department of Treasury and the Small Business Administration subsequent to our application for the Loan.

Maturities on debt are as follows (in thousands):

<b>Year Ending December 31,</b>	<b>Amount</b>
2021	\$ 4,167
2022	4,167
2023	11,650
Total	<u>\$ 19,984</u>

Interest expense, net for the years ended December 31, 2020 and 2019 consisted of the following:

<i>(in thousands)</i>	<b>Years ended December 31,</b>	
	<b>2020</b>	<b>2019</b>
Interest expense on Term Loans	\$ 26	\$ 8
Interest expense on Revolving Line of Credit	16	—
Amortization of debt issuance costs	2	6
Other interest expense	5	2
Interest income	(24)	—
Total interest expense, net	<u>\$ 25</u>	<u>\$ 16</u>

## 10. Leases

We have operating leases for our facilities, which have remaining terms ranging from 1 to 5 years. Our leases do not have an option to extend the lease period beyond the stated term unless the new term is agreed by both parties. They also do not have an early termination clause included. Our operating lease agreements do not contain any material restrictive covenants. Some of our operating lease agreements contain variable payment provisions that provide for rental increases based on consumer price indices. The change in rent expense resulting from changes in these indices are included within variable rent.

We also have finance leases for equipment which have remaining terms ranging from 1 to 4 years. These lease agreements are for general office equipment with a 5-year useful life. These lease agreements do not have an option to extend the lease beyond the stated terms nor do they have an early termination clause. These lease agreements do not have any variable payment provisions included. The finance lease costs consist of interest expense and amortization, and are included primarily in selling, general and administrative expense in our consolidated statement of operations.

The discount rate for both our operating and finance leases was not readily determinable in the specific lease agreements. As a result, our incremental borrowing rate was used as the discount rate when establishing the ROU assets and corresponding lease liabilities. As of December 31, 2020, we had no operating or finance leases that have not yet commenced.

Rent expense is recognized on a straight-line basis over the life of the lease. Rent expense consists of the following:

<i>(in thousands)</i>	Year Ended	
	December 31, 2020	December 31, 2019
Operating lease costs	\$ 1,647	\$ 1,622
Variable rent costs	133	(147)
Total rent expense	\$ 1,780	\$ 1,475

Future minimum lease payments under non-cancelable operating and finance leases were as follows as of December 31, 2020 (in thousands):

Year Ending December 31,	Operating Leases	Finance Leases
2021	\$ 2,953	\$ 53
2022	2,674	53
2023	2,390	53
2024	1,897	52
2025	1,226	48
2026 and beyond	3,882	—
Total future minimum lease payments	15,022	259
Less: Interest	2,551	15
Total lease liabilities	\$ 12,471	\$ 244
Current lease liability	\$ 2,223	\$ 48
Long-term lease liability	10,248	196
Total lease liabilities	\$ 12,471	\$ 244

Other information related to leases is as follows:

<i>(in thousands, except weighted-average data)</i>	Year Ended	
	December 31, 2020	December 31, 2019
<b>Finance lease cost:</b>		
Amortization of right-of-use assets	\$ 48	\$ 46
Interest on lease liabilities	4	5
Total finance lease cost	\$ 52	\$ 51
<b>Other information:</b>		
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	\$ 1,647	\$ 1,622
Finance cash flows from finance leases	\$ 53	\$ 40
Right-of-use assets obtained in exchange for new operating lease liabilities	\$ 10,740	\$ —
Right-of-use assets obtained in exchange for new finance lease liabilities	\$ 247	\$ 15
Weighted-average remaining lease term (years) - operating leases	6.3	3.7
Weighted-average remaining lease term (years) - finance leases	4.9	2.1
Weighted-average discount rate - operating leases	5 %	7 %
Weighted-average discount rate - finance leases	2 %	7 %

## 11. Stockholders' Equity

### *Series A Convertible Preferred Stock*

In January 2010, we entered into a transaction with Carilion, in which Carilion agreed to exchange all of its Senior Convertible Promissory Notes with an original principal amount of \$5.0 million plus all accrued but unpaid interest, totaling \$1.2 million, for 1,321,514 shares of our newly designated Series A Convertible Preferred Stock. The Series A Convertible Preferred Stock is non-voting, carries a dividend of 6% payable in shares of common stock and maintains a liquidation preference up to \$6.2 million. In September 2019, Carilion elected to convert the 1,321,514 shares of preferred stock into an equal number of shares of our common stock. In addition, we issued 770,454 shares of our common stock in satisfaction of the accrued dividends earned on the preferred stock prior to its conversion.

### *Equity Incentive Plans*

In April 2016, we adopted our 2016 Equity Incentive Plan (the "2016 Plan") as a successor to the 2006 Plan. Under the 2016 Plan, our Board of Directors is authorized to grant both incentive and non-statutory stock options to purchase common stock and restricted stock awards to our employees, directors, and consultants. The 2016 Plan provides for the issuance of 3,500,000 shares plus any amounts forfeited from grants under the 2006 Plan after the expiration date of the 2006 Plan. Options generally have a life of 10 years and exercise price equal to or greater than the fair market value of the Common Stock as determined by the Board of Directors. Vesting typically occurs over a four-year period.

The following table sets forth the activity of the options to purchase common stock under the 2006 Plan and the 2016 Plan. The prices represent the closing price of our Common Stock on the Nasdaq Capital Market on the respective dates.

	Options Outstanding				Options Exercisable		
	Number of Shares	Price per Share Range	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)	Number of Shares	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)
<i>(in thousands, except share, per share and weighted-average data)</i>							
<b>Balance at January 1, 2019</b>	3,108,868	\$0.61 - 6.55	\$ 2.26	\$ 3,670	1,986,740	\$ 1.81	\$ 3,314
Forfeited	(14,707)	\$1.47 - 3.37	2.51				
Exercised	(558,834)	\$0.61 - 1.81	1.21				
Granted	625,070	\$3.21 - 7.37	3.63				
<b>Balance at December 31, 2019</b>	3,160,397	\$1.18 - 7.37	\$ 2.72	\$ 14,460	1,835,799	\$ 2.28	\$ 9,198
Forfeited	(108,515)	\$1.27 - 7.59	3.66				
Exercised	(792,466)	\$1.21 - 4.43	2.80				
Granted	70,000	\$6.27 - 7.59	6.65				
<b>Balance at December 31, 2020</b>	2,329,416	\$1.18 - 7.59	\$ 2.76	\$ 16,574	1,408,119	\$ 2.26	\$ 10,734

- (1) The intrinsic value of an option represents the amount by which the market value of the stock exceeds the exercise price of the option of in-the-money options only.

The fair value of each option granted is estimated as of the grant date using the Black-Scholes option pricing model with the following assumptions:

	Years ended December 31,	
	2020	2019
Risk-free interest rate range	0.7%	2.494%
Expected life of option-years	7	7
Expected stock price volatility	63%	67%
Expected dividend yield	—%	—%

The risk-free interest rate is based on U.S. Treasury interest rates, the terms of which are consistent with the expected life of the stock options. Expected volatility is based upon the average historical volatility of our common stock over the period commensurate with the expected term of the related instrument. The expected life and estimated post-employment termination behavior is based upon historical experience of homogeneous groups, executives and non-executes, within our company. We do not currently pay dividends on our common stock nor do we expect to in the foreseeable future.

	Options Outstanding				Options Exercisable		
	Range of Exercise Prices	Options Outstanding	Weighted Average Remaining Life in Years	Weighted Average Exercise Price	Options Exercisable	Weighted Average Remaining Life in Years	Weighted Average Exercise Price of Options Exercisable
Year ended December 31, 2019	\$1.18 - 7.37	3,160,397	6.24	\$2.72	1,835,799	4.30	\$2.28
Year ended December 31, 2020	\$1.18 - 7.59	2,329,416	6.04	\$2.76	1,408,119	4.73	\$2.26

*(in thousands)*

	Total Intrinsic Value of Options Exercised	Total Fair Value of Options Vested
Year ended December 31, 2019	\$ 1,642	\$ 3,268
Year ended December 31, 2020	\$ 3,322	\$ 3,178

For the years ended December 31, 2020 and 2019, the weighted average grant date fair value of options granted was \$6.65 and \$3.63 per share, respectively. We estimate the fair value of options at the grant date using the Black-Scholes model. For all stock options granted through December 31, 2020, the weighted average remaining service period is 6.0 years.

Unamortized stock option expense at December 31, 2020 that will be amortized over the weighted-average remaining service period of 2.0 years totaled \$2.1 million.

#### Restricted Stock and Restricted Stock Units

Historically, we have granted shares of restricted stock to certain employees that have vested in three equal annual installments on the anniversary dates of their grant. However, beginning in 2019, we altered our approach for these grants to replace the grant of restricted stock subject to time-based vesting with the grant of a combination of restricted stock units ("RSUs") subject to time-based vesting and performance-based vesting. Each RSU represents the contingent right to receive a single share of our common stock upon the vesting of the award. For the year ended December 31, 2020, we granted an aggregate of 138,650 RSUs to certain employees. Of the RSUs granted during 2020, 76,700 of such RSUs are subject to time-based vesting and are scheduled to vest in three equal annual installments on the anniversary dates of the grant. The remaining 61,950 RSUs are performance-based awards that will vest based on our achievement of long-term performance goals, in particular, based on our levels of 2022 revenue and operating income. The 61,950 shares issuable upon vesting of the performance-based RSUs represent the maximum payout under our performance-based awards, based upon 150% of our target performance for 2022 revenue and operating income (the payout of such awards based on target performance for 2022 revenue and operating income would be 41,300 shares). In the case of the time-based and performance-based RSUs, vesting is also subject to the employee's continuous service with us through vesting. In 2020, 137,997 shares of restricted stock and 72,335 RSUs granted to employees vested.

In addition, in conjunction with our 2018, 2019 and 2020 Annual Meetings of Stockholders, we granted RSUs to certain members of our Board of Directors in respect of the annual equity compensation under our non-employee director compensation policy (other members of our Board of Directors elected to receive their annual equity compensation for Board service in the form of stock units under our Deferred Compensation Plan as described below). RSUs granted to our non-employee Directors vest at the earlier of the one-year anniversary of their grant or the next annual stockholders' meeting. In 2020 and 2019, we granted 10,652 and 11,600, respectively, RSUs to non-employee members of our Board of Directors in respect of the annual equity compensation under our non-employee director compensation policy. In 2020 and 2019, 11,600 and 16,286 RSUs, respectively, vested.

The following table summarizes the number of unvested shares underlying our restricted stock awards and RSUs and the value of our unvested restricted stock awards and RSUs in 2020 and 2019:

<i>(in thousands, except share and weighted-average share data)</i>	Number of Unvested Shares	Weighted Average Grant Date Fair Value	Aggregate Grant Date Fair Value of Unvested Shares
Balance at January 1, 2019	458,620	\$ 2.56	\$ 1,172
Granted	291,600	3.75	1,094
Vested	(210,624)	2.33	(491)
Forfeitures	(37,499)	2.96	(111)
Balance at December 31, 2019	502,097	\$ 3.31	\$ 1,664
Granted	149,302	6.48	967
Vested	(221,932)	3.19	(708)
Balance at December 31, 2020	429,467	\$ 4.48	\$ 1,923

We recognized \$2.1 million and \$1.5 million in stock-based compensation expense, which is recorded in selling, general and administrative expense on the consolidated statement of operations for the years ended December 31, 2020 and 2019, respectively.

Unamortized restricted stock and RSUs expense at December 31, 2020 that will be amortized over the weighted-average remaining service period of 1.7 years totaled \$1.2 million.

*Employee Stock Purchase Plan*

On April 7, 2020, our board of directors approved, and on May 11, 2020, our stockholders approved, the Luna Innovations Incorporated 2020 Employee Stock Purchase Plan (the "2020 ESPP"). The 2020 ESPP grants our eligible employees a purchase right to purchase up to that number of shares of common stock purchasable either with a percentage or with a maximum dollar amount, as designed by the Board of Directors, during the period that begins on the offering date and ends on the date stated in the offering. The maximum number of shares of common stock that may be issued under the 2020 ESPP is 1,200,000 shares. The 2020 ESPP is considered a compensatory plan and the fair value of the discount and the look-back period will be estimated using the Black-Scholes option pricing model and expense will be recognized over the six-month withholding period prior to the purchase date. For the year ended December 31, 2020, we recognized \$0.2 million in share-based compensation expense related to the 2020 ESPP, which is included in our selling, general and administrative expense in the accompanying consolidated statement of operations.

*Non-employee Director Deferred Compensation Plan*

We maintain a non-employee director deferred compensation plan (the "Deferred Compensation Plan") that permits our non-employee directors to defer receipt of certain compensation that they receive for serving on our board and board committees. The Deferred Compensation Plan has historically permitted the participants to elect to defer cash fees to which they were entitled for board and committee service. For participating directors, in lieu of payment of cash fees, we credit their accounts under the Deferred Compensation Plan with a number of stock units based on the trading price of our common stock as of the date of the deferral. These stock units vest immediately, although the participating directors do not receive the shares represented by such units until a future qualifying event.

Pursuant to our Deferred Compensation Plan, non-employee directors can also elect to defer the receipt of some or all of the equity compensation that they receive for board and committee service. Stock units representing this equity compensation vest at the earlier of the one-year anniversary of their grant or the next annual stockholders' meeting.

The following is a summary of our stock unit activity under the Deferred Compensation Plan for 2020 and 2019:

<i>(in thousands, except stock units and weighted-average share data)</i>	Number of Stock Units	Weighted Average Grant Date Fair Value per Share	Intrinsic Value Outstanding
Balance, January 1, 2019	507,290	\$ 1.40	\$ 1,699
Granted	121,713	4.41	
Balance, December 31, 2019	629,003	2.09	4,585
Granted	53,757	6.62	
Issued	(47,377)	1.65	
Balance, December 31, 2020	<u>635,383</u>	<u>\$ 2.41</u>	<u>\$ 6,278</u>

As of December 31, 2020, 24,855 outstanding stock units had not yet vested.

*Stock Repurchase Program*

In August 2019, our board of directors authorized a stock repurchase program which allowed us to repurchase up to \$2.0 million of our common stock through August 2020. As of December 31, 2020, we had repurchased a total of 333,953 shares for an aggregate purchase price of \$2.0 million under this stock repurchase program, all of which had been repurchased before the program expired in September 2019. We currently maintain all repurchased shares under this stock repurchase program as treasury stock.

**12. Revenue Recognition***Disaggregation of Revenue*

We disaggregate our revenue from contracts with customers by geographic locations, customer type, contract type, timing of recognition, and major categories for each of our segments, as we believe it best depicts how the nature, amount, timing and uncertainty of our revenue and cash flows are affected by economic factors. We disaggregate revenue on the basis of where the physical goods are shipped. We also classify revenue by the customer type of entity for which it does business, which is an

indicator of the diversity of our client base. We attribute revenues generated from being a subcontractor to a commercial company as government revenue when the ultimate client is a government agency or department. Disaggregation by contract mix provides insight in terms of the degree of performance risk that we have assumed. Fixed-price contracts are considered to provide the highest amount of performance risk as we are required to deliver a scope of work or level of effort for a negotiated fixed price. Cost-based contracts are considered to provide the lowest amount of performance risk since we are generally reimbursed for all contract costs incurred in performance of contract deliverables with only the amount of incentive or award fees (if applicable) dependent on the achievement of negotiated performance requirements. By classifying revenue by major product and service, we attribute revenue from a client to the major product or service that we believe to be the client's primary market.

The details are listed in the table below for the years ended December 31, 2020 and 2019:

<i>(in thousands)</i>	Years ended December 31,					
	2020			2019		
	Lightwave	Luna Labs	Total	Lightwave	Luna Labs	Total
<b>Total Revenue by Geographic Location</b>						
United States	\$ 33,706	\$ 23,201	\$ 56,907	\$ 26,409	\$ 21,399	\$ 47,808
Asia	16,181	4	16,185	13,669	—	13,669
Europe	7,144	350	7,494	7,277	—	7,277
Canada, Central and South America	2,084	11	2,095	1,432	—	1,432
All Others	—	—	—	330	—	330
<b>Total</b>	<b>\$ 59,115</b>	<b>\$ 23,566</b>	<b>\$ 82,681</b>	<b>\$ 49,117</b>	<b>\$ 21,399</b>	<b>\$ 70,516</b>
<b>Total Revenue by Major Customer Type</b>						
Sales to the U.S. government	\$ 8,196	\$ 21,111	\$ 29,307	\$ 8,223	\$ 19,757	\$ 27,980
U.S. direct commercial sales and other	25,487	2,455	27,942	18,186	1,642	19,828
Foreign commercial sales & other	25,432	—	25,432	22,708	—	22,708
<b>Total</b>	<b>\$ 59,115</b>	<b>\$ 23,566</b>	<b>\$ 82,681</b>	<b>\$ 49,117</b>	<b>\$ 21,399</b>	<b>\$ 70,516</b>
<b>Total Revenue by Contract Type</b>						
Fixed-price contracts	\$ 56,266	\$ 13,457	\$ 69,723	\$ 45,995	\$ 11,792	\$ 57,787
Cost-type contracts	2,849	10,109	12,958	3,122	9,607	12,729
<b>Total</b>	<b>\$ 59,115</b>	<b>\$ 23,566</b>	<b>\$ 82,681</b>	<b>\$ 49,117</b>	<b>\$ 21,399</b>	<b>\$ 70,516</b>
<b>Total Revenue by Timing of Recognition</b>						
Goods transferred at a point in time	\$ 50,347	\$ 2,007	\$ 52,354	\$ 41,768	\$ 1,362	\$ 43,130
Goods/services transferred over time	8,768	21,559	30,327	7,349	20,037	27,386
<b>Total</b>	<b>\$ 59,115</b>	<b>\$ 23,566</b>	<b>\$ 82,681</b>	<b>\$ 49,117</b>	<b>\$ 21,399</b>	<b>\$ 70,516</b>
<b>Total Revenue by Major Products/Services</b>						
Technology development	\$ 7,211	\$ 21,559	\$ 28,770	\$ 5,987	\$ 20,037	\$ 26,024
Test, measurement and sensing systems	50,881	—	50,881	41,788	—	41,788
Other	1,023	2,007	3,030	1,342	1,362	2,704
<b>Total</b>	<b>\$ 59,115</b>	<b>\$ 23,566</b>	<b>\$ 82,681</b>	<b>\$ 49,117</b>	<b>\$ 21,399</b>	<b>\$ 70,516</b>

#### Contract Balances

Our contract assets consist of unbilled amounts for technology development contracts as well as custom product contracts. Also included in contract assets are royalty revenue and carrying amounts of right of returned inventory. Long-term contract assets include the fee withholding on cost reimbursable contracts that will not be billed within a year. Contract liabilities



include excess billings, subcontractor accruals, warranty expense, extended warranty revenue, right of return refund, and customer deposits. The net contract assets/(liabilities) changed by \$1.1 million primarily due to an increased number of government research programs, primarily fixed-price contracts, that have not reached milestones as designated in their respective contracts, but revenue has been recognized based on costs incurred.

The following table shows the components of our contract balances as of December 31, 2020 and 2019:

<i>(in thousands)</i>	<b>December 31,</b>	
	<b>2020</b>	<b>2019</b>
Contract assets	\$ 7,517	\$ 3,208
Contract liabilities	(7,095)	(3,888)
Net contract assets/(liabilities)	\$ 422	\$ (680)

### *Performance Obligations*

Unfulfilled performance obligations represent amounts expected to be earned on executed contracts. Indefinite delivery and quantity contracts and unexercised options are not reported in total unfulfilled performance obligations. Unfulfilled performance obligations include funded obligations, which is the amount for which money has been directly authorized by the U.S. government and for which a purchase order has been received by a commercial customer, and unfunded obligations represent firm orders for which funding has not yet been appropriated. The approximate value of our Lightwave segment's unfulfilled performance obligations was \$35.9 million at December 31, 2020. We expect to satisfy 77% of the performance obligations in 2021, 15% in 2022 and the remainder by 2025. The approximate value of our Luna Labs segment's unfulfilled performance obligations was \$19.0 million at December 31, 2020. We expect to satisfy 70% of the performance obligations in 2021, 27% in 2022 and the remainder by 2023.

### **13. Income Taxes**

Income tax expense/(benefit) from continuing operations consisted of the following for the periods indicated:

<i>(in thousands)</i>	<b>Years ended December 31,</b>	
	<b>2020</b>	<b>2019</b>
<b><u>Current:</u></b>		
Federal	\$ 89	\$ 1,467
State	460	228
Foreign	27	—
	\$ 576	\$ 1,695
<b><u>Deferred:</u></b>		
Federal	(70)	(2,849)
State	(161)	(500)
Foreign	\$ 3	\$ —
	\$ (228)	\$ (3,349)
Income tax expense/(benefit)	\$ 348	\$ (1,654)

Deferred tax assets and liabilities consist of the following components:

<i>(in thousands)</i>	Years ended December 31,	
	2020	2019
Bad debt and inventory reserve	\$ 430	\$ 376
UNICAP	113	5
Deferred revenue	111	130
ASC842 Lease Accounting (DTA)	(2,610)	797
ASC842 Lease Accounting (DTL)	2,852	(545)
Depreciation and amortization	(3,361)	(2,042)
Net operating loss carryforwards	5,767	1,680
Accrued liabilities	679	594
Stock-based compensation	829	780
Total	\$ 4,810	\$ 1,775
Valuation allowance	(2,850)	(360)
Net deferred tax asset	\$ 1,960	\$ 1,415

The expense/(benefit) from income taxes from continuing operations differs from the amount computed by applying the federal statutory income tax rate to our loss from continuing operations before income taxes as follows for the periods indicated:

	Years ended December 31,	
	2020	2019
Income tax expense at federal statutory rate	21.00 %	21.00 %
Effect of foreign operations	0.23	—
State taxes, net of federal tax effects	3.99	(8.67)
Change in valuation allowance	3.44	(67.39)
Provision to return adjustments	(0.33)	7.26
Meals and entertainment	0.13	0.50
Other permanent differences	8.81	4.20
Equity compensation	(7.25)	(1.75)
Current year R&D credit	(10.60)	—
Prior year R&D credit	(17.87)	—
Reserve for uncertain tax positions	4.20	—
Other	1.10	—
Income tax expense/(benefit)	6.85 %	(44.85)%

The realization of our deferred income tax assets is dependent upon sufficient taxable income in future periods. In assessing whether deferred tax assets may be realized, we consider whether it is more likely than not that some portion, or all, of the deferred tax asset will be realized. We consider scheduled reversals of deferred tax liabilities, projected future taxable income and tax planning strategies that we can implement in making our assessment. We have net operating loss ("NOL") carryforwards of approximately \$5.2 million for a previously acquired company expiring at varying dates through 2033. Our NOL carryovers will be subject to a Section 382 limitation based on a 2015 ownership change, and there have been no subsequent ownership changes. We continue to be in a three year cumulative net income position, and based on all available positive and negative evidence, we believe our net deferred tax asset will be fully realizable.

Our OptaSense acquisition included a UK entity and a US entity which have deferred tax assets. Based on all available evidence, including cumulative history of losses, we have realized deferred tax assets only to the extent they are supported by the reversal of existing temporary differences. As a result, we have recorded a valuation allowance of \$2.9 million as of December 31, 2020.

The following table summarizes the activity related to our gross unrecognized tax benefits:

<i>(in thousands)</i>	<b>Years ended December 31,</b>	
	<b>2020</b>	<b>2019</b>
Unrecognized tax benefits, beginning of period	\$ —	\$ —
Increases related to current period tax positions	81	—
Increases related to prior period tax positions	130	—
Unrecognized tax benefits, end of period	<u>\$ 211</u>	<u>\$ —</u>

As of December 31, 2020, we had \$0.2 million of unrecognized tax benefits. If these amounts are recognized in future periods, it would affect the effective tax rate on income from continuing operations for the years in which they are recognized. Interest and penalties released related to uncertain tax positions were not material for the year ended December 31, 2020. To the extent interest and penalties are not assessed with respect to uncertain tax positions, amounts accrued will be reduced and reflected as a reduction of the overall income tax provision in the period for which the event occurs requiring the adjustment. The amount of accrued interest and penalties as of December 31, 2020 is recorded in other long-term liabilities on the consolidated balance sheets. Our policy is to recognize interest and/or penalties related to income tax matters in income tax expense. We do not believe there are any positions for which it is reasonably possible that the total amount of unrecognized tax benefits will significantly increase or decrease within the next 12 months.

We file numerous consolidated and separate income tax returns in the US federal jurisdiction and in many state and foreign jurisdictions. The U.S. federal statute of limitations remains open for the year 2017 and onward. U.S. state jurisdictions have statutes of limitation generally ranging from three to seven years. Our OptaSense companies have open years for audit including UK - 2017 and forward; US - 2017 and forward; and Canada - 2016 and forward. Given that certain subsidiaries have federal or state net operating loss carryforwards, the statute for examination by the taxing authorities will typically remain open for a period following the use of such net operating loss carryforwards, extending the period for examination beyond the years indicated above. We currently have no income tax returns under examination,

On March 27, 2020, the United States enacted the Coronavirus Aid, Relief and Economic Security Act (the "CARES Act"). The CARES Act includes significant business tax provisions that, among other things, include the removal of certain limitations on utilization of net operating losses, increase the loss carryback period for certain losses to five years, and increase the ability to deduct interest expense, as well as amending certain provisions of the previously enacted Tax Cuts and Jobs Act. We do not expect the CARES Act to have a significant impact on our tax obligations. In December 2020, the Consolidated Appropriations Act, 2021 ("CAA") was signed into law. The CAA included additional funding through tax credits as part of its economic package for 2021. We evaluated these items in its tax computation as of December 31, 2020 and determined that the items do not have a material impact on our financial statements as of December 31, 2020.

#### **14. Commitments and Contingencies**

##### *Litigation and other contingencies*

From time to time, we may become involved in litigation in relation to claims arising out of our operations in the normal course of business. While management currently believes it is not reasonably possible the amount of ultimate liability, if any, with respect to these actions will have a material adverse effect on our financial position, results of operations or liquidity, the ultimate outcome of any litigation is uncertain.

In December 2018, we received a notice of claim (the "Claim") from Macom Technology Solutions, Inc. ("Macom"), who acquired our HSOR business in August 2017 pursuant to an asset purchase agreement. Under the asset purchase agreement, we agreed to indemnify Macom for certain matters, including, among other things, the collection of accounts receivable from certain major customers, and placed \$4.0 million of the purchase price into an escrow account for the potential settlement of any valid indemnity claims. As of December 31, 2019, \$1.5 million of the escrow balance had been received with the remaining \$2.5 million in the escrow account pending resolution of our dispute of indemnity claims received from Macom. In March 2020, we settled the dispute resulting in us receiving \$0.6 million and Macom receiving \$1.9 million. For the year ended December 31, 2020, we have recorded a loss from discontinued operations of \$1.4 million, net of income tax benefit, to reflect the settlement of the dispute.

On July 31, 2018, we sold the assets associated with our optoelectronic components and sub-assemblies ("Opto") business to an unaffiliated third party. The asset purchase agreement provides for additional consideration of up to \$1.0 million

contingent upon the achievement of a specified revenue level by the sold business during the 18 months following the sale. We did not receive any of the additional \$1.0 million of consideration because the minimum revenue targets were not achieved.

We have made, and will continue to make, efforts to comply with current and future environmental laws. We anticipate that we could incur additional capital and operating costs in the future to comply with existing environmental laws and new requirements arising from new or amended statutes and regulations. In addition, because the applicable regulatory agencies have not yet promulgated final standards for some existing environmental programs, we cannot at this time reasonably estimate the cost for compliance with these additional requirements. The amount of any such compliance costs could be material. We cannot predict the impact that future regulations will impose upon our business.

#### *Obligation under Operating Leases*

See Note 10 - Leases for discussion of our lease obligations.

#### *Purchase Commitment*

We executed a non-cancelable purchase order totaling \$1.4 million in the third quarter of 2020 and a non-cancelable purchase order totaling \$1.6 million in the fourth quarter of 2020 for multiple shipments of tunable lasers to be delivered over an 12-month period. At December 31, 2020, approximately \$2.9 million of these commitments remained and is expected to be delivered by October 31, 2021.

#### *Guarantees*

As of December 31, 2020, we had a total of \$1.2 million in performance bond guarantees outstanding in favor of certain third parties to ensure performance of its obligations under certain customer contracts and lease arrangements. These guarantees expire at various dates through September 2022. To date, we have not incurred any charges associated with non-performance covered by such guarantees and have not accrued any liabilities as of December 31, 2020.

### **15. Employee Profit Sharing Plan**

We maintain a salary reduction/profit-sharing plan under provisions of Section 401(k) of the Internal Revenue Code. The plan is offered to all permanent employees. We contribute 30% of the salary deferral elected by each employee up to a maximum deferral of 10% of annual salary.

We contributed approximately \$0.5 million and \$0.4 million to the plan for the years ended December 31, 2020 and December 31, 2019, respectively.

### **16. Relationship with Major Customers**

During the years ended December 31, 2020 and 2019, approximately 35% and 40%, respectively, of our consolidated revenues were attributable to contracts with the U.S. government.

At December 31, 2020 and 2019, receivables with respect to contracts with the U.S. government represented 14% and 12% of total trade receivables, respectively.

### **17. Financial Information About Segments**

We have two operating and reportable segments: Lightwave and Luna Labs.

During the year ended December 31, 2020, we changed our reportable segments to Lightwave and Luna Labs to align with how our Chief Operating Decision Maker (CODM) evaluates segment performance and allocates resources to the segments. Prior to the year ended December 31, 2020, we reported under two different reporting segments. We have reflected these new segment measures beginning in the year ended December 31, 2020 and prior periods have been restated for comparability.

The Lightwave segment develops, manufactures and markets distributed fiber optic sensing products and fiber optic communications test and control products. The Luna Labs segment performs applied research principally in the areas of sensing and instrumentation, advanced materials and health sciences.

Through December 31, 2020, our Chief Executive Officer and his direct reports (collectively represented our CODM), evaluated segment performance based primarily on revenues and operating income or loss. The accounting policies of our segments are the same as those described in the summary of significant accounting policies in Note 1, "Organization and Summary of Significant Accounting Policies".

Information about the results of operations for each segment is set forth in the table below. There were no significant inter-segment sales during the years ended December 31, 2020 and 2019.

During the years ended December 31, 2020 and 2019, 31% and 32%, respectively, of our total sales took place outside the United States. Customers in China represented 11% of total revenues for the year ended December 31, 2019, while no other single country, outside of the United States, represented more than 10% of total revenues for the year ended December 31, 2020.

<i>(in thousands)</i>	<b>Years ended December 31,</b>	
	<b>2020</b>	<b>2019</b>
Lightwave revenue	\$ 59,115	\$ 49,117
Luna Labs revenue	23,566	21,399
<b>Total revenue</b>	<b>\$ 82,681</b>	<b>\$ 70,516</b>
Lightwave operating income	\$ 4,914	\$ 2,261
Luna Labs operating income	69	1,055
<b>Total operating income</b>	<b>\$ 4,983</b>	<b>\$ 3,316</b>
Depreciation, Lightwave	\$ 984	\$ 697
Depreciation, Luna Labs	\$ 143	\$ 252
Amortization, Lightwave	\$ 1,714	\$ 1,486
Amortization, Luna Labs	\$ 129	\$ 68

Additional segment information is as follows:

<i>(in thousands)</i>	<b>December 31,</b>	
	<b>2020</b>	<b>2019</b>
<b>Total segment assets:</b>		
Lightwave	\$ 110,446	\$ 70,276
Luna Labs	20,556	16,248
<b>Total</b>	<b>\$ 131,002</b>	<b>\$ 86,524</b>
Property plant and equipment and intangible assets, Lightwave	\$ 40,995	\$ 23,201
Property plant and equipment and intangible assets, Luna Labs	\$ 543	\$ 1,001

**18. Quarterly Results (unaudited)**

The following table sets forth our unaudited historical revenues, operating (loss)/income and net income by quarter during 2020 and 2019.

(in thousands, except share and per share data)	Three Months Ended							
	March 31, 2020	June 30, 2020	September 30, 2020	December 31, 2020	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
Revenues:								
Lightwave	\$ 11,554	\$ 12,933	\$ 15,350	\$ 19,278	\$ 9,518	\$ 12,523	\$ 13,088	\$ 13,988
Luna Labs	5,587	5,643	5,700	6,637	5,315	5,291	5,301	5,492
Total revenues	17,141	18,576	21,050	25,915	14,833	17,814	18,389	19,480
Gross margin	8,364	9,517	10,949	13,358	6,768	8,752	9,275	10,388
Operating income/(loss)	390	1,810	2,252	530	(897)	1,014	1,482	1,718
Net income/(loss) from continuing operations	320	1,369	3,102	(64)	1,126	841	1,230	2,146
Loss from discontinued operations, net of income tax of \$464	(1,436)	—	—	—	—	—	—	—
Net (loss)/income	(1,116)	1,369	3,102	(64)	1,126	841	1,230	2,146
Net (loss)/income attributable to common stockholders	\$ (1,116)	\$ 1,369	\$ 3,102	\$ (64)	\$ 1,043	\$ 751	\$ 1,117	\$ 2,146
Net income per share from continuing operations:								
Basic	\$ 0.01	\$ 0.04	\$ 0.10	\$ —	\$ 0.04	\$ 0.03	\$ 0.04	\$ 0.07
Diluted	\$ 0.01	\$ 0.04	\$ 0.10	\$ —	\$ 0.03	\$ 0.02	\$ 0.04	\$ 0.07
Net loss per share from discontinued operations:								
Basic	\$ (0.05)	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Diluted	\$ (0.04)	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Net (loss)/income attributable to common stockholders:								
Basic	\$ (0.04)	\$ 0.04	\$ 0.10	\$ —	\$ 0.04	\$ 0.03	\$ 0.04	\$ 0.07
Diluted	\$ (0.03)	\$ 0.04	\$ 0.10	\$ —	\$ 0.03	\$ 0.02	\$ 0.03	\$ 0.07
Weighted average shares:								
Basic	30,380,345	30,589,249	30,809,896	30,895,980	28,039,080	28,246,840	28,291,297	30,159,322
Diluted	32,549,487	32,466,122	32,411,086	32,831,255	33,479,935	33,650,790	32,115,847	32,211,847

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

None.

**ITEM 9A. CONTROLS AND PROCEDURES.**

**Evaluation of Disclosure Controls and Procedures**

We maintain “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), which are controls and other procedures that are designed to provide reasonable assurance that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. In addition, the design of any system of controls also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a control system, misstatements due to error or fraud may occur and not be detected.

Under the supervision and with the participation of our management, including our President and Chief Executive Officer and our Chief Financial Officer, we evaluated the effectiveness of the design and operation of our disclosure controls and procedures as of the end of the period covered by this report. As a result of a late Form 8-K/A pertaining to the filing of audited financial statements for a recently acquired company, our President and Chief Executive Officer and our Chief Financial Officer have concluded that, as of December 31, 2020, our disclosure controls and procedures were not effective as of the end of the period covered by this report. The delinquent filing was an isolated incident and the Company has instituted additional procedures designed to ensure timely filings in the future.

**Changes in Internal Control over Financial Reporting**

There have been no changes in our internal control over financial reporting identified in connection with the evaluation required by paragraph (d) of Securities Exchange Act Rule 13a-15(e) and Rule 15d-15(e) that occurred in the quarter ended December 31, 2020 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

**Management’s Report on Internal Control over Financial Reporting**

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our internal control over financial reporting is designed, under the supervision of our principal executive and principal financial officers, and effected by our board of directors, management and other personnel to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America (“GAAP”). Our internal control over financial reporting includes those policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

On December 3, 2020, we completed our acquisition of OptaSense. Management is in the process of evaluating OptaSense’s existing controls and procedures, and integrating OptaSense into our internal control over financial reporting. In accordance with SEC staff guidance permitting a company to exclude an acquired business from management’s assessment of the effectiveness of internal control over financial reporting for the year in which the acquisition is completed, management has excluded OptaSense from its assessment of the effectiveness of internal control over financial reporting as of December 31, 2020. OptaSense represents 36% percent of our total assets as of December 31, 2020 and 2% percent of revenue for the year ended December 31, 2020.

There are inherent limitations in the effectiveness of any internal control over financial reporting, including the possibility of human error and the circumvention or overriding of controls. Accordingly, even effective internal control over financial reporting can provide only reasonable assurance with respect to financial statement preparation and may not prevent or detect all misstatements. Further, because of changes in conditions, effectiveness of internal control over financial reporting may vary over time. Our internal control system was designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP.

Under the supervision and with the participation of our management, including our President and Chief Executive Officer, and our Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2020. This evaluation was based on the criteria established in the 2013 *Internal Control—Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Based on our evaluation under the framework established in the 2013 *Internal Control—Integrated Framework*, our President and Chief Executive officer, and our Chief Financial Officer concluded that our internal control over financial reporting was effective as of December 31, 2020 to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP.

**ITEM 9B. OTHER INFORMATION.**

*None*



**PART III**

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

The information required by Item 10 of Form 10-K will be included in the proxy statement related to our 2021 Annual Meeting of Stockholders, (the "2021 Proxy Statement"), anticipated to be filed with the SEC within 120 days after December 31, 2020, and is incorporated into this report by reference.

**ITEM 11. EXECUTIVE COMPENSATION.**

The information required by Item 11 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2021 Proxy Statement.

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

The information required by Item 12 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2021 Proxy Statement.

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

The information required by Item 13 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2021 Proxy Statement.

**ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES**

The information required by Item 14 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2021 Proxy Statement.

## PART IV

## ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULE

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

- (i) Financial Statements. See Index to Consolidated Financial Statements at Item 8 of this Report on Form 10-K.
- (ii) Schedules.

Schedule II

**Luna Innovations Incorporated**  
**Valuation and Qualifying Accounts**

Column A	Column B	Column C	Column D	Column E
<i>(in thousands)</i>	Balance at beginning of Period	Additions	Deductions	Balance at end of period
<b>Year Ended December 31, 2019</b>				
Reserves deducted from assets to which they apply:				
Deferred tax valuation allowance	\$ 3,268	\$ —	\$ (2,908)	\$ 360
Allowances for doubtful accounts	285	645	—	930
	<u>\$ 3,553</u>	<u>\$ 645</u>	<u>\$ (2,908)</u>	<u>\$ 1,290</u>
<b>Year Ended December 31, 2020</b>				
Reserves deducted from assets to which they apply:				
Deferred tax valuation allowance	\$ 360	\$ 2,850	\$ (360)	\$ 2,850
Allowances for doubtful accounts	\$ 930	\$ 127	\$ (171)	\$ 886
	<u>\$ 1,290</u>	<u>\$ 2,977</u>	<u>\$ (531)</u>	<u>\$ 3,736</u>

All other schedules are omitted as the required information is inapplicable or the information is presented in the Consolidated Financial Statements and notes thereto in Item 8 of Part II of this Annual Report on Form 10-K.

◦ Exhibits. The exhibits filed as part of this report are listed under "Exhibits" at subsection (b) of this Item 15.

a. Exhibits

## EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Exhibit Document</u>
2.1#	<a href="#"><u>Agreement and Plan of Merger and Reorganization dated as of January 30, 2015, by and among Luna Innovations Incorporated, API Merger Sub, Inc. and Advanced Photonix, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on February 2, 2015).</u></a>
2.2#	<a href="#"><u>Asset Purchase Agreement, dated July 31, 2018 by and among Luna Innovations Incorporated, Advanced Photonix, Inc., Advanced Photonix Canada, Inc. and OSI Optoelectronics, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on August 1, 2018).</u></a>
2.3#	<a href="#"><u>Asset Purchase Agreement, dated October 15, 2018 by and among Luna Innovations Incorporated, Luna Technologies, Inc. and Micron Optics, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on October 16, 2018).</u></a>
2.4#	<a href="#"><u>Stock Purchase Agreement, dated March 1, 2019 by and among Luna Innovations Incorporated, Luna Technologies, Inc., Steve Yao and General Photonics Corporation (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on March 4, 2019).</u></a>
2.5#	<a href="#"><u>Share Purchase Agreement, by and between the Company and QinetiQ Holdings Limited, dated as of December 2, 2020 (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on December 3, 2020).</u></a>
3.1	<a href="#"><u>Amended and Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on June 8, 2006).</u></a>
3.2	<a href="#"><u>Certificate of Designations of the Series A Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on January 15, 2010).</u></a>
3.3	<a href="#"><u>Amended and Restated Bylaws of the Registrant (incorporated by reference to Exhibit 3.4 to the Registrant's Registration Statement on Form S-1 (File No. 333-131764) filed on February 10, 2006).</u></a>
3.4	<a href="#"><u>Amendment to Amended and Restated Bylaws (incorporated by reference to Exhibit 3.1 to the Registrant's Registration Statement on Form 8-K (File No. 000-52008) filed on May 10, 2010).</u></a>
3.5	<a href="#"><u>Amendment to Amended and Restated Bylaws (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on February 2, 2015).</u></a>
4.1	<a href="#"><u>Specimen Common Stock certificate of the Registrant (incorporated by reference to the Exhibit 4.1 to Amendment No. 5 of the Registrant's Registration Statement on Form S-1 (File No. 333-131764) filed on May 19, 2006).</u></a>
4.2	<a href="#"><u>2006 Equity Incentive Plan (incorporated by reference to Exhibit 10.9 to Amendment No. 3 of the Registrant's Registration Statement on Form S-1 (File No. 333-131764) filed on April 28, 2006).</u></a>
4.3	<a href="#"><u>Form of Stock Option Agreement under 2006 Equity Incentive Plan (incorporated by reference to Exhibit 4.7 to the Registrant's Registration Statement on Form S-1 (File No. 333-131764) filed on February 10, 2006).</u></a>
4.4	<a href="#"><u>2016 Equity Incentive Plan (incorporated by reference to Exhibit 4.7 to the Registrant's Registration Statement on Form S-8 (File No. 333-211802) filed on June 3, 2016).</u></a>
4.5	<a href="#"><u>Form of Stock Option Grant Notice and Stock Option Agreement under 2016 Equity Incentive Plan (incorporated by reference to Exhibit 4.8 of the Registrant's Registration Statement on Form S-8 (File No. 333-211802) filed on June 3, 2016).</u></a>
4.6	<a href="#"><u>Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under 2016 Equity Incentive Plan (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on January 16, 2019).</u></a>
4.7	<a href="#"><u>Form of Restricted Stock Award Grant Notice and Restricted Stock Award Agreement under 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on August 10, 2016).</u></a>
4.8	<a href="#"><u>Description of the Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934 (incorporated by reference to Exhibit 4.8 to the Registrant's Annual Report on Form 10-K (File No. 000-52008) filed on March 13, 2020).</u></a>
10.1	<a href="#"><u>Form of Indemnification Agreement for directors and executive officers (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on July 17, 2009).</u></a>
10.2**	<a href="#"><u>Amended and Restated License Agreement, dated March 19, 2004, by and between Virginia Tech Intellectual Properties, Inc. and Luna Innovations Incorporated (incorporated by reference to Exhibit 10.26 to Amendment No. 5 of the Registrant's Registration Statement on Form S-1 (File No. 333-131764) filed on May 19, 2006).</u></a>

- 10.3 [Asset Transfer and License Agreement by and between Luna Innovations Incorporated and Coherent, Inc. \(incorporated by reference to Exhibit 10.21 to Amendment No. 1 to Registrant's Annual Report on Form 10-K \(File No. 000-52008\) filed on April 6, 2007\).](#)
- 10.4\*\* [Development and Supply Agreement, dated December 12, 2006, by and between Luna Innovations Incorporated and Intuitive Surgical, Inc. dated June 11, 2007 \(incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K \(File No. 000-52008\) filed on June 14, 2007\).](#)
- 10.5 [Amendment to Commercial Lease, by and between Luna Innovations Incorporated and Canvasback Real Estate & Investments LLC dated March 18, 2008 \(incorporated by reference to Exhibit 10.5 to the Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) filed on May 9, 2008\).](#)
- 10.6 [Securities Purchase and Exchange Agreement, dated January 12, 2010, by and between Luna Innovations Incorporated and Carilion Clinic \(incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K \(File No. 000-52008\) filed on January 15, 2010\).](#)
- 10.7 [Amended and Restated Investor Rights Agreement, dated January 13, 2010, by and among Luna Innovations Incorporated, Carilion Clinic, and certain stockholders of Luna Innovations Incorporated \(incorporated by reference to Exhibit 10.4 to the Registrant's Current Report on Form 8-K \(File No. 000-52008\) filed on January 15, 2010\).](#)
- 10.8 [Non-Employee Directors' Deferred Compensation Plan \(incorporated by reference to Exhibit 10.13 to the Registrant's Annual Report on Form 10-K \(File No. 000-52008\) filed on March 21, 2018\).](#)
- 10.9\*\* [License Agreement, effective January 12, 2010, by and among Luna Innovations Incorporated, Luna Technologies, Inc. and Hansen Medical, Inc. \(incorporated by reference to Exhibit 10.6 of the Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) filed on May 17, 2010\).](#)
- 10.10\*\* [License Agreement, effective January 12, 2010, by and among Luna Innovations Incorporated, Luna Technologies, Inc. and Intuitive Surgical, Inc. \(incorporated by reference to Exhibit 10.8 to Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) file on May 17, 2010\).](#)
- 10.11 [Industrial Lease Agreement, dated as of March 21, 2006, by and between Luna Innovations Incorporated and the Economic Development Authority of Montgomery County, Virginia, as amended by a First Amendment effective as of May 11, 2006, a Second Amendment effective as of July 15, 2009 and a Third Amendment effective as of March 23, 2010 \(incorporated by reference to Exhibit 10.14 to Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) filed on May 17, 2010\).](#)
- 10.12 [Third Amendment to Commercial Lease dated June 21, 2010, by and between Canvasback Real Estate & Investments, LLC and Luna Innovations, Incorporated \(incorporated by reference to Exhibit 10.5 to Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) filed on August 16, 2010\).](#)
- 10.13 [Fourth Amendment to Industrial Lease Agreement, dated as of March 1, 2011, by and between The Economic Development Authority of Montgomery County and Luna Innovations Incorporated \(incorporated by reference to Exhibit 10.3 to Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) filed on May 16, 2011\).](#)
- 10.14 [Fifth Amendment to Industrial Lease Agreement, dated as of November 1, 2011, by and between The Economic Development Authority of Montgomery County and Luna Innovations Incorporated \(incorporated by reference to Exhibit 10.39 to the Registrant's Annual Report on Form 10-K \(File No. 000-52008\) filed on March 29, 2012\).](#)
- 10.15 [Employment Agreement dated December 5, 2017, by and between Scott A. Graeff and Luna Innovations Incorporated \(incorporated by reference to Exhibit 10.25 to the Registrant's Annual Report on Form 10-K \(File No. 000-52008\) filed on March 21, 2018\).](#)
- 10.16 [Fourth Amendment to Commercial Lease, dated as of April 15, 2012, by and between Canvasback Real Estate & Investments, LLC and Luna Innovations Incorporated \(incorporated by reference to Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) filed on August 9, 2012\).](#)
- 10.17\*\* [Cross-License Agreement by and among Luna Innovations Incorporated and Luna Technologies, Inc. and Intuitive Surgical Operations, Inc. and Intuitive Surgical International, Ltd., dated as of January 17, 2014 \(incorporated by reference to Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q \(File No. 000-52008\) filed on May 13, 2014\).](#)
- 10.18 [Sixth Amendment to Industrial Lease Agreement by and between the Economic Development Authority of Montgomery County, Virginia and Luna Innovations Incorporated dated October 1, 2014 \(incorporated by reference to Exhibit 10.47 to the Registrant's Annual Report on Form 10-K \(File No. 000-52008\) filed on March 16, 2015\).](#)

10.19	<a href="#"><u>Industrial Lease Agreement by and between The Economic Development Authority of Montgomery County, Virginia and Luna Innovations Incorporated dated October 1, 2014 (incorporated by reference to Exhibit 10.48 to the Registrant's Annual Report on Form 10-K (File No. 000-52008) filed on March 16, 2015).</u></a>
10.20	<a href="#"><u>Lease Agreement by and between SBA Tenant, LLC and Luna Innovations Incorporated dated November 2014 (incorporated by reference to Exhibit 10.49 to the Registrant's Annual Report on Form 10-K (File No. 000-52008) filed March 16, 2015).</u></a>
10.21	<a href="#"><u>First Amendment to Industrial Lease Agreement by and between the Economic Development Authority of Montgomery County, Virginia and Luna Innovation Incorporated, dated January 20, 2015 (incorporated by reference to Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on May 14, 2015).</u></a>
10.22	<a href="#"><u>Amended and Restated Non-Employee Director Compensation Policy, as amended as of February 26, 2019 (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on May 13, 2019).</u></a>
10.23	<a href="#"><u>Fifth Amendment to Commercial Lease by and between Canvasback Real Estate and Investments, LLC and the Registrant, dated as of August 5, 2015 (incorporated by reference to Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on November 13, 2015).</u></a>
10.24	<a href="#"><u>Employment Agreement, dated December 2, 2019, by and between the Registrant and Eugene J. Nestro (incorporated by reference to Exhibit 10.29 to the Registrant's Annual Report on Form 10-K (File No. 000-52008) filed on March 13, 2020).</u></a>
10.25	<a href="#"><u>First Amendment to Commercial Lease, dated as of February 21, 2020, by and between SBA Tenant, LLC and the Registrant (incorporated by reference to Exhibit 10.30 to the Registrant's Annual Report on Form 10-K (File No. 000-52008) filed on March 13, 2020).</u></a>
10.26	<a href="#"><u>First Amendment to Standard Industrial Real Estate Lease dated July 13, 2020 between the Registrant and Majestic Realty Co (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on November 9, 2020).</u></a>
10.27	<a href="#"><u>Luna Innovation Incorporated 2020 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on August 6, 2020).</u></a>
10.28	<a href="#"><u>Eighth Amendment to Commercial Lease dated May 26, 2020 between the Registrant and Canvasback Real Estate &amp; Investments LLC (incorporated by reference to Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q (File No. 000-52008) filed on August 6, 2020).</u></a>
10.29	<a href="#"><u>Tax Deed, by and between the Company and QinetiQ Holdings Limited, dated as of December 2, 2020 (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008) filed on December 3, 2020).</u></a>
10.30*	<a href="#"><u>Loan Agreement, dated December 1, 2020, by and between the Company and PNC Bank, National Association.</u></a>
10.31*	<a href="#"><u>Term Note, dated December 1, 2020, by and between the Company and PNC Bank, National Association.</u></a>
10.32*	<a href="#"><u>Revolving Line of Credit Note, dated December 1, 2020, by and between the Company and PNC Bank, National Association.</u></a>
21.1*	<a href="#"><u>List of Subsidiaries</u></a>
23.1*	<a href="#"><u>Consent of Grant Thornton LLP, Independent Registered Public Accounting Firm</u></a>
24.1	Power of Attorney (see signature page)
31.1*	<a href="#"><u>Certification of the Principal Executive Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u></a>
31.2*	<a href="#"><u>Certification of the Principal Financial Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u></a>
32.1***	<a href="#"><u>Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u></a>
32.2***	<a href="#"><u>Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u></a>
101	The following materials from the Registrant's Annual Report on Form 10-K for the year ended December 31, 2020, are formatted in XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets at December 31, 2020 and 2019, (ii) Consolidated Statements of Operations for the years ended December 31, 2020 and 2019, (iii) Consolidated Statements of Changes in Stockholder's Equity for the years ended December 31, 2020 and 2019 (iv) Consolidated Statements of Cash Flows for the years ended December 31, 2020 and 2019, and (v) Notes to Audited Consolidated Financial Statements.

- \* Filed herewith
- # Pursuant to Item 601(b)(2) of Regulation S-K, the schedules and exhibits to this agreement are omitted, but will be furnished to the Securities and Exchange Commission upon request.
- \*\* Confidential treatment has been granted with respect to portions of this exhibit, indicated by asterisks, which has been filed separately with the Securities and Exchange Commission.
- \*\*\* These certifications are being furnished solely to accompany this annual report pursuant to 18 U.S.C. Section 1350, and are not being filed for purposes of Section 18 of the Securities Exchange Act of 1934 and are not to be incorporated by reference into any filing of the registrant, whether made before or after the date hereof, regardless of any general incorporation language in such filing.





# Loan Agreement

**THIS LOAN AGREEMENT** (this “**Agreement**”) dated as of December 1, 2020 (the “**Effective Date**”) between **PNC BANK, NATIONAL ASSOCIATION** (“**Bank**”), **LUNA INNOVATIONS INCORPORATED**, a Delaware corporation, with an office located at 301 1st Street SW, Suite 200, Roanoke, Virginia 24011 (“**Borrower**”), and **LUNA TECHNOLOGIES, INC.**, a Delaware corporation, **FORMER LUNA SUBSIDIARY, INC.**, a Delaware corporation, **GENERAL PHOTONICS CORP.**, a California corporation, and **TERAMETRIX LLC**, a Delaware limited liability company, each with an office located at 301 1<sup>st</sup> Street SW, Suite 200, Roanoke, Virginia 24011 (collectively, jointly and severally, whether one or more in number, the “**Guarantors**” and, taken together collectively with the Borrower, the “**Obligors**”), recites and provides as follows.

## 1. ACCOUNTING AND OTHER TERMS

Accounting terms not defined in this Agreement shall be construed following GAAP, calculations and determinations must be made following GAAP; provided no effect shall be given to Accounting Standards Codification 842, Leases (or any other Accounting Standards Codification having similar result or effect) (and related interpretations) to the extent any lease (or similar arrangement) would be required to be treated as a capital lease thereunder where such lease (or arrangement) would have been treated as an operating lease under GAAP as in effect immediately prior to the effectiveness of such Accounting Standards Codification. Capitalized terms not otherwise defined in this Agreement shall have the meanings set forth in Section 13. All other terms contained in this Agreement, unless otherwise indicated, shall have the meaning provided by the Code to the extent such terms are defined therein.

## 2. LOAN AND TERMS OF PAYMENT

**2.1 Promise to Pay.** Borrower hereby unconditionally promises to pay Bank the outstanding principal amount of all Credit Extensions and accrued and unpaid interest thereon as and when due in accordance with the Notes and this Agreement.

### **2.2 Revolving Line.**

(a) Revolving Line Generally; Availability. Subject to the terms and conditions of this Agreement, Bank shall make Advances under the Revolving Line not exceeding the Availability Amount. Amounts borrowed under the Revolving Line may be repaid and, prior to the Revolving Line Maturity Date, reborrowed, subject to the applicable terms and conditions precedent herein.

(b) Termination; Repayment. The Revolving Line terminates on the Revolving Line Maturity Date, when the principal amount of all Advances, the unpaid interest thereon, and all other Obligations relating to the Revolving Line shall be immediately due and payable. The Revolving Line shall be repaid in accordance with the terms of the Revolving Line Note.

(c) Letter of Credit Sublimit. As part of the Revolving Line, Bank shall issue or have issued Letters of Credit denominated in Dollars or a Foreign Currency for Borrower’s account. The aggregate Dollar Equivalent amount utilized for the issuance of Letters of Credit shall at all times reduce the amount otherwise available for Advances under the Revolving Line. The aggregate Dollar Equivalent of the face amount of outstanding Letters of Credit (including drawn but unreimbursed Letters of Credit) may not exceed the lesser of (A) Three Million Dollars (\$3,000,000.00), or (B) the Revolving Line, minus the sum of all outstanding principal amounts of any Advances. The Letters of Credit shall be governed by the terms of this Agreement and by one or more customary reimbursement agreements, in form and content satisfactory to Bank, executed by Borrower in



favor of Bank (the “**Reimbursement Agreement**”). Each request for the issuance of a Letter of Credit must be accompanied by Borrower’s execution of an application on Bank’s standard forms, together with all supporting documentation. This Agreement shall control in the event of any conflict with any Reimbursement Agreement or any other related Letter of Credit application. Each Letter of Credit shall be in form and substance reasonably acceptable to Bank in its sole discretion. This Agreement is not a pre-advice for the issuance of a letter of credit. Borrower shall pay Bank’s standard issuance fee on the stated amount of each Letter of Credit upon issuance, together with such other customary fees and reasonable expenses therefor as shall be required by Bank. Borrower further agrees to be bound by the regulations and interpretations of the issuer of any Letters of Credit guarantied by Bank and opened for Borrower’s account or by Bank’s interpretations of any Letter of Credit issued by Bank for Borrower’s account, and Borrower understands and agrees that Bank shall not be liable for any error, negligence, or mistake, whether of omission or commission, in following Borrower’s instructions or those contained in the Letters of Credit or any modifications, amendments, or supplements thereto. If any outstanding Letter of Credit expires after the Revolving Line Maturity Date (or effective termination of this Agreement), then on the 91<sup>st</sup> day prior to the Revolving Line Maturity Date the Borrower shall provide to bank cash collateral in an amount equal to at least one hundred five percent (105%) for all such Letters of Credit, plus all interest, fees, and costs due or estimated by Bank to become due in connection therewith, to secure all of the Obligations relating to such Letters of Credit. Borrower may request that Bank issue a Letter of Credit payable in a Foreign Currency. If a demand for payment is made under any such Letter of Credit, Bank shall treat such demand as an Advance to Borrower of the Dollar Equivalent of the amount thereof (plus fees and charges in connection therewith such as wire, cable, SWIFT or similar charges).

(d) Overadvances. If, at any time, the sum of (a) the outstanding principal amount of any Advances, plus (b) the face amount of any outstanding Letters of Credit (including drawn but unreimbursed Letters of Credit), exceeds the Revolving Line, Borrower shall immediately pay to Bank in cash the amount of such excess (such excess, an “**Overadvance**”). Without limiting Borrower’s obligation to repay Bank any Overadvance, Borrower agrees to pay Bank interest on the outstanding amount of any Overadvance, on demand, at the rate then in effect under the Revolving Line Note.

### 2.3 Term Loan.

(a) Term Loan Generally. Subject to the terms and conditions of this Agreement, Bank shall extend the Term Loan to Borrower. Amounts borrowed under the Term Loan may not be reborrowed once repaid.

(b) Termination; Repayment. The Term Loan terminates on the Term Loan Maturity Date, when the principal amount of all Advances, the unpaid interest thereon, and all other Obligations relating to the Term Loan shall be immediately due and payable. The Term Loan shall be repaid in accordance with the terms of the Term Loan Note.

### 2.4 Fees. Borrower shall pay to Bank:

(a) Commitment Fee. A fully earned, non-refundable commitment fee of Fifty Thousand Dollars (\$50,000.00) is earned and payable as of the Effective Date;

(b) Unused Fee for Revolving Line. With respect to the Revolving Line, Borrower shall pay to Bank a fee equal to the product of (i) (x) the maximum principal amount of such Revolving Line, minus (y) the quarterly average principal balance outstanding under such Revolving Line (including, for the avoidance of doubt, the face amount of outstanding Letters of Credit) for a given fiscal quarter, multiplied by (ii) two tenths of one percent (0.20%) per annum, due on a quarterly basis in arrears and payable with the first regularly scheduled monthly payment under the Revolving Line Note in any given fiscal quarter, commencing on the first such date to occur after the date hereof; and

(c) Bank Expense. All Bank Expenses (including reasonable and documented attorneys’ fees and expenses for documentation and negotiation of this Agreement) incurred through and after the Effective Date, when due (or, if no stated due date, upon demand by Bank).

Unless otherwise provided in this Agreement or in a separate writing by Bank, Borrower shall not be entitled to any credit, rebate, or repayment of any fees earned by Bank pursuant to this Agreement notwithstanding any termination of this Agreement or the suspension or termination of Bank's obligation to make loans and advances hereunder. Bank may deduct amounts owing by Borrower under the clauses of this Section 2.4 pursuant to the terms of Section 2.5(c). Bank shall provide Borrower written notice of deductions made from the Designated Deposit Account pursuant to the terms of the clauses of this Section 2.4.

## **2.5 Payments; Application of Payments; Debit of Accounts.**

(a) All payments to be made by Borrower under any Loan Document shall be made in immediately available funds in Dollars, without setoff or counterclaim, before 12:00 p.m. Eastern time on the date when due. Payments of principal and/or interest received after 12:00 p.m. Eastern time are considered received at the opening of business on the next Business Day. When a payment is due on a day that is not a Business Day, the payment shall be due the next Business Day, and additional fees or interest, as applicable, shall continue to accrue until paid.

(b) Bank has the exclusive right to determine the order and manner in which all payments with respect to the Obligations may be applied, Borrower shall have no right to specify the order or the accounts to which Bank shall allocate or apply any payments required to be made by Borrower to Bank or otherwise received by Bank under this Agreement when any such allocation or application is not specified elsewhere in this Agreement.

(c) Bank may debit any of Borrower's deposit accounts, including the Designated Deposit Account, for principal and interest payments or any other amounts Borrower owes Bank when due. These debits shall not constitute a set-off.

**2.6 Withholding.** Payments received by Bank from Borrower under this Agreement will be made free and clear of and without deduction for any and all present or future taxes, levies, imposts, duties, deductions, withholdings, assessments, fees or other charges, imposed by any Governmental Authority (including any interest, additions to tax or penalties applicable thereto). Specifically, however, if at any time any Governmental Authority, applicable law, regulation or international agreement requires Borrower to make any withholding or deduction from any such payment or other sum payable hereunder to Bank. Borrower hereby covenants and agrees that the amount due from Borrower with respect to such payment or other sum payable hereunder will be increased to the extent necessary to ensure that, after the making of such required withholding or deduction, Bank receives a net sum equal to the sum which it would have received had no withholding or deduction been required, and Borrower shall pay the full amount withheld or deducted to the relevant Governmental Authority. Borrower will, upon request, furnish Bank with proof reasonably satisfactory to Bank indicating that Borrower has made such withholding payment; provided, however, that Borrower need not make any withholding payment if the amount or validity of such withholding payment is contested in good faith by appropriate and timely proceedings and as to which payment in full is bonded or reserved against by Borrower. The agreements and obligations of Borrower contained in this Section 2.6 shall survive the termination of this Agreement.

## **3. CONDITIONS OF LOANS**

**3.1 Conditions Precedent to Initial Credit Extension Under the Term Loan.** Bank's obligation to make the initial Credit Extension under the Term Loan is subject to the condition precedent that Bank shall have received, in form and substance reasonably satisfactory to Bank, such documents, and completion of such other matters, as Bank may reasonably deem necessary or appropriate, including, without limitation:

(a) duly executed signatures to the Loan Documents (except for any such documents to be delivered at a later date as set forth herein or in the other Loan Documents);

(b) the Operating Documents and long-form good standing certificates of Obligor certified by the Secretary of State (or equivalent agency) of such Obligor's jurisdiction of organization or formation and each

jurisdiction in which each Obligor is qualified to conduct business, each as of a date no earlier than thirty (30) days prior to the Effective Date;

(c) duly executed signatures to the completed Borrowing Resolutions for each Obligor;

(d) certified copies, dated as of a recent date, of Lien searches (including, without limitation, UCC searches), as Bank may request, accompanied by written evidence (including any termination statements) that the Liens indicated in any such financing statements either constitute Permitted Liens or have been or, in connection with the initial Credit Extension, will be terminated or released;

(e) a legal opinion (authority and enforceability) of Obligor's counsel, dated as of the Effective Date;

(f) a duly executed Perfection Certificate;

(g) a payoff letter in respect of Indebtedness to be refinanced on the Effective Date;

(h) payment of the fees and Bank Expenses then due as specified in Sections 2.4(a) and (c) hereof; and

(i) a completed and executed Loan Fee and Disbursement Authorization Form in the form provided to Borrower.

**3.2 Conditions Precedent to All Credit Extensions Under the Revolving Line.** Bank's obligations to make each Credit Extension under the Revolving Line, including the initial Credit Extension under the Revolving Line, is subject to the following conditions precedent:

(a) satisfaction of the conditions precedent set forth in Section 3.1 (excluding Section 3.1(i));

(b) timely receipt of a Credit Extension Request under the Revolving Line;

(c) the representations and warranties in this Agreement shall be true, accurate, and complete in all material respects on the date of the proposed Credit Extension and on the Funding Date of each Credit Extension; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date, and no Event of Default shall have occurred and be continuing or result from the Credit Extension. Each Credit Extension is Borrower's representation and warranty on that date that the representations and warranties in this Agreement remain true, accurate, and complete in all material respects; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date; and

(d) Bank determines to its reasonable satisfaction that there has not been a Material Adverse Change.

**3.3 Covenant to Deliver.** Borrower agrees to deliver to Bank each item required to be delivered to Bank under this Agreement as a condition precedent to any Credit Extension. Borrower expressly agrees that a Credit Extension made prior to the receipt by Bank of any such item shall not constitute a waiver by Bank of Borrower's obligation to deliver such item, and the making of any Credit Extension in the absence of a required item shall be in Bank's sole discretion.

**3.4 Credit Extension Requests Under Revolving Line.** In order to obtain a Credit Extension under the Revolving Line, Borrower shall either (a) execute and deliver to Bank a Request for Advance in the form attached hereto as Exhibit C, or (b) if permitted by Bank, make a request for a Credit Extension by telephone or electronic mail, or delivered in accordance with Bank's security procedures through any automated platform or electronic service provided by Bank, with such confirmation or verification (if any) as Bank may require in its discretion from time to time (collectively, a "**Credit Extension Request**"). Borrower authorizes Bank to accept telephonic, email, automated and electronic requests for Credit Extensions, and Bank shall be entitled to rely upon the authority of any person providing such instructions. Borrower hereby indemnifies and holds Bank harmless from and against any and all damages, losses, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) which may arise or be created by the acceptance of such telephonic, email, automated and electronic requests or by the making of such Credit Extensions. Bank will enter on its books and records, which entry when made will be presumed correct, the date and amount of each Credit Extension, as well as the date and amount of each payment made by Borrower.

#### **4. Post-Closing Requirements.**

(a) Within sixty (60) days after the Effective Date, the Borrower shall have used commercially reasonable efforts to obtain a landlord waiver for each of its chief executive offices and each other domestic office or business location containing more than One Hundred Thousand Dollars (\$100,000.00) in Collateral, in form and substance reasonably satisfactory to Bank.

(b) Within ten (10) days after the Effective Date, Bank shall have received, in form and substance satisfactory to Bank, duly executed signatures to the Control Agreement(s) required by Section 6.8.

(c) Within thirty (30) days after the Effective Date, Bank shall have received post-closing UCC lien searches for Borrower and Guarantors identifying only Permitted Liens.

(d) Within thirty (30) days after the Effective Date, the Obligors shall have executed and delivered Security Agreement Riders and shall have completed such filings as may be deemed reasonably necessary by Bank to perfect security interests in favor of Bank in the patents and trademarks described in the Perfection Certificate (but specifically excluding any patent applications).

#### **5. REPRESENTATIONS AND WARRANTIES**

Each Obligor represents and warrants as follows:

**5.1 Due Organization; Authorization; Power and Authority.** Each Obligor is duly existing and in good standing as a Registered Organization in its jurisdiction of formation and is qualified and licensed to do business and is in good standing in any jurisdiction in which the conduct of each of its business or its ownership of property requires that it be qualified except where the failure to do so could not reasonably be expected to have a material adverse effect on Borrower's business. In connection with this Agreement, the Borrower has delivered to Bank a completed certificate signed by Borrower entitled "Perfection Certificate" (the "**Perfection Certificate**"). Each Obligor represents and warrants to Bank that, as of the date of the Perfection Certificate, (a) each Obligor's exact legal name is that indicated on the Perfection Certificate and on the signature page hereof; (b) each Obligor is an organization of the type and is organized in the jurisdiction set forth in the Perfection Certificate; (c) the Perfection Certificate accurately sets forth each Obligor's organizational identification number or accurately states that such Obligor has none; (d) the Perfection Certificate accurately sets forth each Obligor's place of business, or, if more than one, its chief executive office as well as each Obligor's mailing address (if different than its chief executive office); (e) each Obligor (and each of its predecessors) has not, in the past five (5) years, changed its jurisdiction of formation, organizational structure or type, or any organizational number assigned by its jurisdiction; and (f) all other information set forth on the Perfection Certificate pertaining to the Obligors is accurate and complete in all material respects. If any Obligor is not now a Registered Organization but later becomes one, such Obligor shall promptly notify Bank of such occurrence and provide Bank with such Obligor's organizational identification number.

The execution, delivery and performance by each Obligor of the Loan Documents to which it is party have been duly authorized, and do not (i) conflict with any of Obligors' organizational documents, (ii) contravene, conflict with, constitute a default under or violate any material Requirement of Law, (iii) contravene, conflict or violate any applicable order, writ, judgment, injunction, decree, determination or award of any Governmental Authority by which any Obligor or any of their property or assets may be bound or affected, (iv) require any action by, filing, registration, or qualification with, or Governmental Approval from, any Governmental Authority (except such Governmental Approvals which have already been obtained and are in full force and effect and filings and registrations contemplated by this Agreement and the other Loan Documents), or (v) constitute an event of default under any material agreement by which any Obligor is bound. No Obligor is in default under any agreement to which it is a party or by which it is bound in which the default could reasonably be expected to have a material adverse effect on such Obligor's business.

**5.2 Collateral.** Each Obligor has good title to, rights in, and the power to transfer each item of the Collateral upon which it purports to grant a Lien hereunder, free and clear of any and all Liens except Permitted Liens. The Collateral is not in the possession of any third party bailee (such as a warehouse) except as otherwise provided in the Perfection Certificate. Other than demo or loaner equipment with an aggregate book value of up to One Million Dollars (\$1,000,000.00) that is used in the sales and clinical trial process, none of the components of the Collateral shall be maintained at locations other than as provided in the Perfection Certificate or as permitted pursuant to Section 7.2. All Inventory is in all material respects of good and marketable quality, free from material defects. Obligors are the sole owners of the Intellectual Property which they own or purport to own except for (a) licenses granted to its customers in the ordinary course of business consistent with Borrower's past practices, (b) over-the-counter software that is commercially available to the public, and (c) material Intellectual Property licensed to an Obligor and noted on the Perfection Certificate. Each Patent which it owns or purports to own and which is material to an Obligor's business is valid, and no part of the Intellectual Property which any Obligor owns or purport's to own and which is material to any Obligor's business has been judged invalid or unenforceable, in whole or in part. To the best of Obligors' knowledge, no written claim has been made that any part of the Intellectual Property violates the rights of any third party except to the extent such claim would not reasonably be expected to have a material adverse effect on any Obligor's business. Except as noted on the Perfection Certificate, no Obligor is a party to, or is bound by, any Restricted License.

**5.3 Reserved.**

**5.4 Litigation.** Except as disclosed in the Perfection Certificate, there are no actions or proceedings pending or, to the knowledge of any Responsible Officer, threatened in writing by or against any Obligor involving more than, individually Five Hundred Thousand Dollars (\$500,000.00), or in the aggregate One Million Dollars (\$1,000,000.00).

**5.5 Financial Statements; Financial Condition.** All consolidated financial statements for Borrower delivered to Bank fairly present in all material respects Borrower's consolidated financial condition and consolidated results of operations. There has not been any material deterioration in Borrower's consolidated financial condition since the date of the most recent financial statements submitted to Bank.

**5.6 Solvency.** The fair salable value of Borrower's consolidated assets (including goodwill minus disposition costs) exceeds the fair value of Borrower's consolidated liabilities; Obligors are not left with unreasonably small capital after the transactions in this Agreement; and Obligors are able to pay its debts (including trade debts) as they mature.

**5.7 Regulatory Compliance.** No Obligor is an "investment company" or a company "controlled" by an "investment company" under the Investment Company Act of 1940, as amended. No Obligor is engaged as one of its important activities in extending credit for margin stock (under Regulations X, T and U of the Federal Reserve Board of Governors). Each Obligor (a) has complied in all material respects with all Requirements of Law, and (b) has not violated any Requirements of Law, where the failure to comply or the violation of which could reasonably be expected to have a material adverse effect on its business. None of Obligor's properties or assets has been used by such parties or, to the best of such parties' knowledge, by previous Persons, in disposing, producing, storing,

treating, or transporting any hazardous substances other than legally. Obligors have obtained all consents, approvals and authorizations of, made all declarations or filings with, and given all notices to, all Governmental Authorities that are necessary to continue their respective businesses as currently conducted, except where the failure to do so could not reasonably be expected to have a material adverse effect on Obligors' business.

**5.8 Subsidiaries; Investments.** Obligors do not own any stock, partnership, or other ownership interest or other equity securities except for Permitted Investments.

**5.9 Tax Returns and Payments; Pension Contributions.** Obligors have timely filed all required tax returns and reports, or duly filed valid extensions therefore, and have timely paid when due and payable all foreign, federal, state and local taxes, assessments, deposits and contributions owed by Obligors. Notwithstanding the foregoing, Obligors may defer payment of any contested taxes, provided that such Obligor (a) contests in good faith its obligation to pay the taxes by appropriate proceedings promptly instituted and diligently conducted, (b) notify Bank in writing of the commencement of, and any material development in, the proceedings, (c) posts bonds or takes any other steps required to prevent the Governmental Authority levying such contested taxes from obtaining a Lien upon any of the Collateral that is other than a "Permitted Lien".

Obligors are unaware of any claims or adjustments, in excess of Five Hundred Thousand Dollars (\$500,000.00), proposed for any of such Obligor's prior tax years which could result in additional taxes becoming due and payable by such Obligors. Obligors have paid all amounts necessary to fund all present pension, profit sharing and deferred compensation plans in accordance with their terms, and have not withdrawn from participation in, and have not permitted partial or complete termination of, or permitted the occurrence of any other event with respect to, any such plan which could reasonably be expected to result in any liability of any Obligor, including any liability to the Pension Benefit Guaranty Corporation or its successors or any other governmental agency.

**5.10 Use of Proceeds.** Obligors shall use the proceeds of the Credit Extensions for working capital purposes and for general corporate purposes (including Permitted Investments) and not for personal, family, household or agricultural purposes.

**5.11 Full Disclosure.** No written representation, warranty or other statement of any Obligor in any written certificate or written statement given to Bank by an Obligor, as of the date such written representation, warranty, or other statement, taken together with all such written certificates and written statements given to Bank, contains any untrue statement of a material fact or omits to state a material fact necessary to make the statements contained in the written certificates or written statements not misleading (it being recognized by Bank that the projections and forecasts provided by Obligors in good faith and based upon reasonable assumptions are not viewed as facts and that actual results during the period or periods covered by such projections and forecasts may differ from the projected or forecasted results).

**5.12 Definition of "Knowledge."** For purposes of the Loan Documents, whenever a representation or warranty is made to Obligor's knowledge or awareness, to the "best of" Obligor's knowledge, or with a similar qualification, knowledge or awareness means the actual knowledge, after reasonable investigation, of any Responsible Officer.

## **6. AFFIRMATIVE COVENANTS**

Each Obligor shall do all of the following (provided that the obligations set out in Section 6.2 and Section 6.9 shall apply only to Borrower):

### **6.1 Government Compliance.**

(a) Subject to Section 7.3, maintain its legal existence and good standing in their respective jurisdictions of formation and maintain qualification in each jurisdiction in which the failure to so qualify would reasonably be expected to have a material adverse effect on such Obligor's business or operations. Each Obligor shall comply, and have each Subsidiary comply, with all laws, ordinances and regulations to which it is subject, the

noncompliance with which could reasonably be expected to have a material adverse effect on such Obligor's business.

(b) Obtain all of the Governmental Approvals necessary for the performance by each Obligor of its obligations under the Loan Documents to which it is a party and the grant of a security interest to Bank in all of the Collateral (if any). Upon request, Obligors shall promptly provide copies of any such obtained Governmental Approvals to Bank.

**6.2 Financial Statements, Reports, Certificates.** Provide Bank with the following:

(a) as soon as available, but no later than sixty (60) days after the last day of each of the first three (3) fiscal quarters of each year, a company prepared consolidated balance sheet and income statement covering the Borrower's consolidated operations for such quarter certified by a Responsible Officer and in a form reasonably acceptable to Bank;

(b) as soon as available, but no later than forty-five (45) days following the end of each fiscal year of Borrower, on a consolidated basis, and contemporaneously with any updates or amendments thereto, annual operating budgets (including income statements, balance sheets and cash flow statements, by month) for the upcoming fiscal year of Borrower;

(c) as soon as available, and in any event within one hundred twenty (120) days following the last day of Borrower's fiscal year, audited consolidated financial statements prepared under GAAP, consistently applied, on a consolidated basis, together with an unqualified opinion on the financial statements from an independent certified public accounting firm reasonably acceptable to Bank;

(d) together with the financial reports described in the preceding Sections 6.2(a) and (c), a Compliance Certificate;

(e) within five (5) days of filing, copies of all periodic and other reports, proxy statements and other materials filed by the Borrower with the SEC, any Governmental Authority succeeding to any or all of the functions of the SEC or with any national securities exchange, or distributed to its shareholders, as the case may be. Documents required to be delivered pursuant to the terms hereof (to the extent any such documents are included in materials otherwise filed with the SEC) may be delivered electronically and if so delivered, shall be deemed to have been delivered on the date on which Borrower posts such documents, or provides a link thereto, on Borrower's website on the Internet at Borrower's website address or on the date such documents are publicly available on SEC's EDGAR filing system or any successor thereto (if any);

(f) a prompt report of any legal actions pending or threatened in writing against any Obligor or any of its Subsidiaries that could result in damages or costs to such Obligor or any of its Subsidiaries of, individually, Five Hundred Thousand Dollars (\$500,000) or more, or in the aggregate One Million Dollars (\$1,000,000) or more;

(g) [reserved]; and

(h) promptly, from time to time, such other information regarding any Obligor or compliance with the terms of any Loan Documents as reasonably requested by Bank.

**6.3 Reserved.**

**6.4 Reserved.**

**6.5 Taxes; Pensions.** Timely file, and require each of its Subsidiaries to timely file, all required tax returns and reports (or extensions therefore) and timely pay, and require each of its Subsidiaries to timely pay, all foreign, federal, state and material local taxes, assessments, deposits and contributions owed by Obligors and their

Subsidiaries, except for deferred payment of any taxes contested pursuant to the terms of Section 5.9 hereof, and shall deliver to Bank, on demand, appropriate certificates attesting to such payments, and pay all amounts necessary to fund all present pension, profit sharing and deferred compensation plans in accordance with their terms.

**6.6 Access to Collateral; Books and Records.** At reasonable times, upon 5 Business Days' advance notice (provided no notice is required if an Event of Default has occurred and is continuing), Bank, or its agents, shall have the right, to inspect the Collateral and the right to audit and copy Obligors' Books, at Borrower's expense. Such inspections or audits shall be conducted no more often than once every twelve (12) months unless an Event of Default has occurred and is continuing in which case such inspections and audits shall occur as often as Bank shall determine is necessary.

#### **6.7 Insurance.**

(a) Keep its business and the Collateral insured for risks and in amounts standard for companies in Obligors' industry and location and as Bank may reasonably request. Insurance policies shall be in a form with financially sound and reputable insurance companies that are not Affiliates of an Obligor, and in amounts that are customary for companies of Borrower's size in Borrower's industry and location(s). All property policies shall have a lender's loss payable endorsement showing Bank as a lender loss payee. All liability policies shall show, or have endorsements showing, Bank as an additional insured. Bank shall be named as lender loss payee and/or additional insured with respect to any such insurance providing coverage in respect of any Collateral.

(b) Ensure that proceeds payable under any property policy are, at Bank's option, payable to Bank on account of the Obligations. Notwithstanding the foregoing, (a) so long as no Event of Default has occurred and is continuing, Borrower shall have the option of applying the proceeds of any casualty policy up to Two Hundred Fifty Thousand Dollars (\$250,000) in the aggregate for all losses under all casualty policies in any one year, toward the replacement or repair of destroyed or damaged property; provided that any such replaced or repaired property (i) shall be of equal or like value as the replaced or repaired Collateral and (ii) shall be deemed Collateral in which Bank has been granted a first priority security interest, and (b) after the occurrence and during the continuance of an Event of Default, all proceeds payable under such casualty policy shall, at the option of Bank, be payable to Bank on account of the Obligations.

(c) At Bank's request, any Obligor shall deliver certified copies of insurance policies and evidence of all premium payments. Each provider of any such insurance required under this Section 6.7 shall agree, by endorsement upon the policy or policies issued by it or by independent instruments furnished to Bank, that it will give Bank thirty (30) days prior written notice before any such policy or policies shall be materially altered or canceled. If any Obligor fails to obtain insurance as required under this Section 6.7 or to pay any amount or furnish any required proof of payment to third persons and Bank, Bank may make all or part of such payment or obtain such insurance policies required in this Section 6.7, and take any action under the policies Bank deems prudent.

**6.8 Accounts.** From the date which is 120 days after the Effective Date (or such later date as may be reasonably agreed to in writing by Bank in its sole discretion), the Obligors shall maintain all of their domestic accounts at Bank. Notwithstanding the foregoing, Borrower shall be permitted to maintain the SVB Cash Collateral Accounts until termination of the Existing Letter of Credit or cash management obligations to which such accounts relate.

#### **6.9 Financial Covenants.**

(a) Maintain at all times, commencing with the fiscal quarter ending December 31, 2020 and tested as of each fiscal quarter end, a Net Leverage Ratio which is less than 1.50 to 1.00; and

(b) Maintain at all times, commencing with the fiscal quarter ending December 31, 2020 and tested as of each fiscal quarter end, on a rolling four quarters basis, a Fixed Charge Coverage Ratio greater than or equal to 1.10 to 1.00.



## 6.10 Protection of Intellectual Property Rights.

(a) (i) Protect, defend and maintain the validity and enforceability of the Intellectual Property material to its Business; (ii) promptly advise Bank in writing of known material infringements or any other event that could reasonably be expected to materially and adversely affect the value of its Intellectual Property material to its Business; and (iii) not allow any Intellectual Property material to any Obligor's business to be abandoned, forfeited or dedicated to the public without Bank's written consent.

(b) Provide written notice to Bank within ten (10) days of entering or becoming bound by any Restricted License (other than over-the-counter software that is commercially available to the public). Obligors shall take such commercially reasonable steps as Bank requests to obtain the consent of, or waiver by, any person whose consent or waiver is necessary for (i) any Restricted License to be deemed "Collateral" and for Bank to have a security interest in it that might otherwise be restricted or prohibited by law or by the terms of any such Restricted License, whether now existing or entered into in the future, and (ii) Bank to have the ability in the event of a liquidation of any Collateral to dispose of such Collateral in accordance with Bank's rights and remedies under this Agreement and the other Loan Documents.

**6.11 Litigation Cooperation.** From the date hereof and continuing through the termination of this Agreement, make available to Bank without expense to Bank. Each Obligor and its officers, employees and agents and such Obligor's books and records, to the extent that Bank may deem them reasonably necessary to prosecute or defend any third-party suit or proceeding instituted by or against Bank with respect to any Collateral or relating to such Obligor.

## 6.12 Reserved.

**6.13 Further Assurances.** Execute any further instruments and take further action as Bank reasonably requests to perfect or continue Bank's Lien in the Collateral or to effect the purposes of this Agreement Deliver to Bank, within five (5) days after the same are sent or received, copies of all correspondence, reports, documents and other filings with any Governmental Authority regarding compliance with or maintenance of Governmental Approvals or Requirements of Law and which are outside the ordinary course of business or that could reasonably be expected to have a material effect on any of the Governmental Approvals or otherwise on the operations of Obligors.

**6.14 Creation or Acquisition of Subsidiaries.** Notwithstanding and without limiting the negative covenants contained in Sections 7.3 and 7.7 hereof, in the event any Obligor creates or acquires any Subsidiary after the Effective Date, such Obligor shall promptly notify Bank of the creation or acquisition of such new Subsidiary and, at Bank's request, in its sole discretion, shall (a) with respect to Subsidiaries which are not Excluded Subsidiaries, cause such new Subsidiary to provide to Bank a joinder to the Loan Documents to cause such Subsidiary to become a Guarantor hereunder, and grant a continuing pledge and security interest in and to the assets constituting Collateral of such Subsidiary by executing and delivering to Bank a Joinder and Amendment Agreement (in substantially the same form set forth on Exhibit B attached hereto), (b) provide to Bank appropriate certificates and powers and financing statements, pledging all of the direct or beneficial ownership interest in such new Subsidiary, in form and substance satisfactory to Bank, in each case, to the extent constituting Collateral and (c) provide to Bank all other documentation in form and substance reasonably satisfactory to Bank, which in its opinion is appropriate with respect to the execution and delivery of the applicable documentation referred to above. Any document, agreement, or instrument executed or issued pursuant to this Section 6.14 shall be a Loan Document.

## 7. NEGATIVE COVENANTS

No Obligor shall do any of the following without Bank's prior written consent:

**7.1 Dispositions.** Convey, sell, lease, transfer, assign, or otherwise dispose of (collectively, "**Transfer**"), or permit any of its Subsidiaries to Transfer, all or any material part of its business or property, except for Transfers (a) of Inventory in the ordinary course of business; (b) of worn out or obsolete Equipment; (c) in connection with Permitted Liens and Permitted Investments; (d) of nonexclusive licenses for the use of the Intellectual Property of

Obligors or their Subsidiaries in the ordinary course of business that could not result in a legal transfer of title of the licensed property but that may be exclusive in respects other than territory and that may be exclusive as to territory only as to discrete geographical areas outside of the United States; (e) permitted by Section 7.7(a); (f) any assets or property not otherwise permitted hereunder in an aggregate amount not to exceed Five Hundred Thousand (\$500,000.00) in any fiscal year; (g) consisting of the sale or issuance of any stock of Borrower permitted under this Agreement; (h) consisting of Obligors' or Subsidiaries' use or transfer of money or Cash Equivalents in a manner that is not prohibited by the terms of this Agreement or the other Loan Documents; (i) the unwinding of any swap agreements, cash management arrangements or other Banking Services or (j) leases or subleases of property.

**7.2 Changes in Business, Management, Control, or Business Locations.** (a) Engage in or permit any of its Subsidiaries, if any, to engage in any business other than the businesses currently engaged in by Obligors and any Subsidiary, as applicable, or reasonably related thereto; (b) liquidate or dissolve, other than Subsidiaries that own assets with an aggregate value of less than Fifty Thousand Dollars (\$50,000.00); (c) fail to provide notice to Bank of the Key Person departing from or ceasing to be employed by the Borrower within five (5) days after the Key Person's departure from the Borrower; or (d) permit or suffer any Change in Control.

No Obligor shall, without at least thirty (30) days prior written notice to Bank: (1) add any new offices or business locations, including warehouses (unless such new offices or business locations contain less than One Hundred Thousand Dollars (\$100,000.00) in assets or property) or deliver any portion of the Collateral valued, individually or in the aggregate, in excess of One Hundred Thousand Dollars (\$100,000.00) to a bailee at a location other than to a bailee and at a location already disclosed in the Perfection Certificate, (2) change its jurisdiction of organization, (3) change its organizational structure or type, (4) change its legal name, or (5) change any organizational number (if any) assigned by its jurisdiction of organization. If any Obligor intends to add any new offices or business locations, including warehouses, containing in excess of One Hundred Thousand Dollars (\$100,000.00) of assets or property, then such Obligor will first receive the written consent of Bank, and the Obligor shall take commercially reasonable efforts to have the landlord of any such new offices or business locations, including warehouses, execute and deliver a landlord consent in form and substance satisfactory to Bank. If any Obligor intends to deliver any portion of the Collateral valued, individually or in the aggregate, in excess of One Hundred Thousand Dollars (\$100,000.00) to a bailee, and Bank and such bailee are not already parties to a bailee agreement governing both the Collateral and the location to which Obligor intends to deliver the Collateral, then such Obligor will first receive the written consent of Bank, and such Obligor shall take commercially reasonable efforts to have such bailee execute and deliver a bailee agreement in form and substance satisfactory to Bank in its sole discretion.

**7.3 Mergers or Acquisitions.** Merge or consolidate, or permit any of its Subsidiaries to merge or consolidate, with any other Person, or acquire, or permit any of its Subsidiaries to acquire, all or substantially all of the capital stock or property of another Person (including, without limitation, by the formation of any Subsidiary); provided, however, that this Section 7.3 shall not prohibit (a) the Project Owen Acquisition, (b) the acquisition of the ownership interests or assets of one or more entities in an aggregate purchase amount (including, without limitation, any earnouts associated with such purchase) not to exceed Ten Million Dollars (\$10,000,000.00), so long as, after giving pro forma effect to such acquisition, as verified by Bank in its reasonable discretion (i) no Event of Default shall have occurred, including under the financial performance covenants set forth in Section 6.9, and (ii) the Obligors shall have demonstrated that it possesses Liquid Assets in an amount not less than Seven Million Dollars (\$7,000,000.00), (c) a Subsidiary that is not an Obligor merging or consolidating into another Subsidiary or into an Obligor, or (d) an Obligor merging into another Obligor (provided that if Borrower is subject to such a merger, Borrower shall be the surviving entity).

**7.4 Indebtedness.** Create, incur, assume, or be liable for any Indebtedness, or permit any Subsidiary to do so, other than Permitted Indebtedness.

**7.5 Encumbrance.** Create, incur, allow, or suffer any Lien on any of its property, or assign or convey any right to receive income, including the sale of any Accounts, or permit any of its Subsidiaries to do so, except for Permitted Liens, permit any Collateral not to be subject to the first priority security interest granted herein, or enter into any agreement, document, instrument or other arrangement (except with or in favor of Bank) with any Person

which directly or indirectly prohibits or has the effect of prohibiting an Obligor or any Subsidiary from assigning, mortgaging, pledging, granting a security interest in or upon, or encumbering any of Borrower's or any Subsidiary's Intellectual Property, except as is otherwise permitted in Section 7.1 hereof and the definition of "Permitted Liens" herein.

**7.6 Maintenance of Collateral Accounts.** Maintain any Collateral Account except pursuant to the terms of Section 6.8 hereof.

**7.7 Distributions; Investments.** (a) Pay any cash dividends or make any distribution or payment or redeem, retire or purchase any capital stock, provided that Borrower may (i) pay dividends solely in common stock; (ii) repurchase the stock of former or current employees, officers, directors or consultants pursuant to stock repurchase agreements, termination of employment or service or pursuant to rights of first refusal in Borrower's bylaws, so long as an Event of Default does not exist at the time of any such repurchase and would not exist after giving effect to any such repurchase, provided that the aggregate amount of all such repurchases does not exceed One Hundred Thousand Dollars (\$100,000) per fiscal year; (iii) make de minimis payments of cash in lieu of fractional shares upon conversion of convertible securities or upon any stock dividend, stock split or combination; or (iv) distribute equity securities to former or current employees, officers, consultants or directors pursuant to the exercise of employee stock options approved by the Board; or (b) directly or indirectly make any Investment (including, without limitation, any additional Investment in any Subsidiary) other than Permitted Investments, or permit any of its Subsidiaries to do so.

**7.8 Transactions with Affiliates.** Directly or indirectly enter into or permit to exist any material transaction with any Affiliate of an Obligor, except for (a) transactions that are in the ordinary course of such Obligor's business, upon fair and reasonable terms that are no less favorable to such Obligor's than would be obtained in an arm's length transaction with a non-affiliated Person, (b) sales of equity securities to its investors in bona fide equity financings so long as a Change in Control does not occur, (c) transactions between an Obligor and an Affiliate or Subsidiary that is permitted pursuant to this Section 7, (d) reasonable and customary compensation arrangements and benefit plans for officers and other employees of Borrower entered into or maintained in the ordinary course of business, and (e) reasonable and customary fees paid to members of the Board in the ordinary course of business.

**7.9 Subordinated Debt.** (a) Make or permit any payment on any Subordinated Debt, except under the terms of any subordination, intercreditor, or other similar agreement to which such Subordinated Debt is subject, or (b) amend any provision in any document relating to the Subordinated Debt which would increase the amount thereof or adversely affect the subordination thereof to Obligations owed to Bank.

**7.10 Compliance.** Become an "investment company" or a company controlled by an "investment company", under the Investment Company Act of 1940, as amended, or undertake as one of its important activities extending credit to purchase or carry margin stock (as defined in Regulation U of the Board of Governors of the Federal Reserve System), or use the proceeds of any Credit Extension for that purpose; fail to meet the minimum funding requirements of ERISA, permit a Reportable Event or Prohibited Transaction, as defined in ERISA, to occur; fail to comply with the Federal Fair Labor Standards Act or violate any other law or regulation, if the violation could reasonably be expected to have a material adverse effect on an Obligor's business, or permit any of its Subsidiaries to do so: withdraw or permit any Subsidiary to withdraw from participation in, permit partial or complete termination of, or permit the occurrence of any other event with respect to, any present pension, profit sharing and deferred compensation plan which could reasonably be expected to result in any liability of such Obligor, including any liability to the Pension Benefit Guaranty Corporation or its successors or any other governmental agency.

## **8. EVENTS OF DEFAULT**

Any one of the following shall constitute an event of default (an "**Event of Default**") under this Agreement:

**8.1 Payment Default.** Any Obligor fails to (a) make any payment of principal or interest on any Credit Extension when due or (b) pay any other Obligations within ten (10) calendar days after such Obligations are due

and payable (which ten (10) calendar day grace period shall not apply to payments due on the Revolving Line Maturity Date). During the cure period, the failure to make or pay any payment specified under clause (b) hereunder is not an Event of Default (but no Credit Extension will be made during the cure period);

## **8.2 Covenant Default.**

(a) Any Obligor fails or neglects to perform any obligation in Sections 6.2, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10 or 6.14, or violates any covenant in Section 7; or

(b) Any Obligor fails or neglects to perform, keep, or observe any other term, provision, condition, covenant or agreement contained in this Agreement or any Loan Documents, and as to any default (other than those specified in this Section 8) under such other term, provision, condition, covenant or agreement that can be cured, has failed to cure the default within thirty (30) days after the occurrence thereof; provided, however, that if the default cannot by its nature be cured within such thirty (30) day period or cannot after diligent attempts by Obligor, be cured within such thirty (30) day period, and such default is likely to be cured within a reasonable time, then Obligor's shall have an additional period (which shall not in any case exceed sixty (60) days) to attempt to cure such default, and within such reasonable time period the failure to cure the default shall not be deemed, an Event of Default (but no Credit Extensions shall be made during such cure period). Cure periods provided under this section shall not apply, among other things, to financial covenants or any other covenants set forth in clause (a) above;

## **8.3 [Reserved].**

## **8.4 Attachment; Levy; Restraint on Business.**

(a) (i) The service of process seeking to attach, by trustee or similar process, any funds of any Obligor or of any entity under the control of an Obligor (including a Subsidiary) on deposit or otherwise maintained with Bank or any Bank Affiliate, or (ii) a notice of lien or levy is filed against any of Borrower's assets by any Governmental Authority, and the same under subclauses (i) and (ii) hereof are not, within thirty (30) days after the occurrence thereof, discharged or stayed (whether through the posting of a bond or otherwise); provided, however, no Credit Extensions shall be made during any thirty (30) day cure period;

(b) (i) any material portion of an Obligor's assets is attached, seized, levied on, or comes into possession of a trustee or receiver, or (ii) any court order enjoins, restrains, or prevents Borrower from conducting all or any material part of its business;

**8.5 Insolvency.** (a) Any Obligor or any of its Subsidiaries is unable to pay its debts (including trade debts) as they become due or otherwise becomes insolvent; (b) an Obligor or any of its Subsidiaries begins an Insolvency Proceeding; or (c) an Insolvency Proceeding is begun against such Obligor or any of its Subsidiaries and is not dismissed or stayed within thirty (30) days (but no Credit Extensions shall be made while any of the conditions described in clause (a) exist and/or until any Insolvency Proceeding is dismissed);

**8.6 Other Agreements.** There is, under any agreement to which any Obligor is a party with a third party or parties, (a) any default resulting in a right by such third party or parties, whether or not exercised, to accelerate the maturity of any Indebtedness in an amount individually or in the aggregate in excess of One Million Dollars (\$1,000,000.00); or (b) any default by an Obligor, the result of which could have a material adverse effect on Obligor's business;

**8.7 Judgments; Penalties.** One or more fines, penalties or final judgments, orders or decrees for the payment of money in an amount, individually or in the aggregate, of at least One Million Dollars (\$1,000,000.00) (not covered by independent third-party insurance as to which liability has been accepted by such insurance carrier) shall be rendered against an Obligor by any Governmental Authority, and the same are not, within ten (10) days after the entry, assessment or issuance thereof, discharged, satisfied, or paid, or after execution thereof, stayed or bonded pending appeal, or such judgments are not discharged prior to the expiration of any such stay (provided that no

Credit Extensions will be made prior to the satisfaction, payment, discharge, stay, or bonding of such fine, penalty, judgment, order or decree);

**8.8 Misrepresentations.** An Obligor or any Person acting for an Obligor makes any representation, warranty, or other statement now or later in this Agreement, any Loan Document or in any writing delivered to Bank or to induce Bank to enter this Agreement or any Loan Document, and such representation, warranty, or other statement is incorrect in any material respect when made (it being recognized by Bank that the projections and forecasts provided by Borrower in good faith and based upon reasonable assumptions are not viewed as facts and that actual results during the period or periods covered by such projections and forecasts may differ from the projected or forecasted results);

**8.9 Subordinated Debt.** Any document, instrument, or agreement evidencing any Subordinated Debt shall for any reason be revoked or invalidated or otherwise cease to be in full force and effect, any Person shall be in breach thereof or contest in any manner the validity or enforceability thereof or deny that it has any further liability or obligation thereunder, or the Obligations shall for any reason be subordinated or shall not have the priority contemplated by this Agreement or any applicable subordination or intercreditor agreement; or

**8.10 Governmental Approvals.** Any Governmental Approval shall have been (a) revoked, rescinded, suspended, modified in an adverse manner or not renewed in the ordinary course for a full term or (b) subject to any decision by a Governmental Authority that designates a hearing with respect to any applications for renewal of any of such Governmental Approval or that could result in the Governmental Authority taking any of the actions described in clause (a) above, and such decision or such revocation, rescission, suspension, modification or non-renewal (i) causes, or could reasonably be expected to cause, a Material Adverse Change, or (ii) adversely affects the legal qualifications of an Obligor or any of its Subsidiaries to hold such Governmental Approval in any applicable jurisdiction and such revocation, rescission, suspension, modification or non-renewal could reasonably be expected to affect the status of or legal qualifications of an Obligor or any of its Subsidiaries to hold any Governmental Approval in any other jurisdiction.

## **9. BANK'S RIGHTS AND REMEDIES**

**9.1 Rights and Remedies.** Upon the occurrence and during the continuance of an Event of Default, Bank may, without notice or demand, do any or all of the following:

(a) declare all Obligations immediately due and payable (but if an Event of Default described in Section 8.5 occurs all Obligations are immediately due and payable without any action by Bank);

(b) stop advancing money or extending credit for Obligors' benefit under this Agreement or under any other agreement between Obligors and Bank;

(c) demand that Borrower (i) deposit cash with Bank in an amount equal to at least (A) one hundred five percent (105.0%) of the Dollar Equivalent of the aggregate face amount of all Letters of Credit denominated in Dollars remaining undrawn, and (B) one hundred ten percent (110.0%) of the Dollar Equivalent of the aggregate face amount of all Letters of Credit denominated in a Foreign Currency remaining undrawn (plus, in each case, all interest, fees, and costs due or to become due in connection therewith (as estimated by Bank in its good faith business judgment)), to secure all of the Obligations relating to such Letters of Credit, as collateral security for the repayment of any future drawings under such Letters of Credit, and Borrower shall forthwith deposit and pay such amounts, and (ii) pay in advance all letter of credit fees scheduled to be paid or payable over the remaining term of any Letters of Credit;

(d) verify the amount of, demand payment of and performance under, and collect any Accounts and General Intangibles, settle or adjust disputes and claims directly with Account Debtors for amounts on terms and in any order that Bank considers advisable, and notify any Person owing an Obligor money of Bank's security interest in such funds. All Obligors shall collect all payments in trust for Bank and, if requested by Bank,

immediately deliver the payments to Bank in the form received from the Account Debtor, with proper endorsements for deposit;

(e) make any payments and do any acts it considers necessary or reasonable to protect the Collateral and/or its security interest in the Collateral. Obligors shall assemble the Collateral if Bank requests and make it available as Bank designates. Bank may enter premises where the Collateral is located, take and maintain possession of any part of the Collateral, and pay, purchase, contest, or compromise any Lien which appears to be prior or superior to its security interest and pay all expenses incurred. Each Obligor grants Bank a license to enter and occupy any of its premises, without charge, to exercise any of Bank's rights or remedies;

(f) apply to the Obligations any (i) balances and deposits of any Obligor it holds, or (ii) amount held by Bank owing to or for the credit or the account of such Obligor;

(g) ship, reclaim, recover, store, finish, maintain, repair, prepare for sale, advertise for sale, and sell the Collateral. Bank is hereby granted a non-exclusive, royalty-free license or other right to use, without charge, Obligors' labels, Patents, Copyright, mask works, rights of use of any name, trade secrets, trade names, Trademarks, and advertising matter, or any similar property as it pertains to the Collateral, in completing production of advertising for sale, and selling any Collateral and, in connection with Bank's exercise of its rights under this Section 9.1, Obligors' rights under all licenses and all franchise agreements inure to Bank's benefit;

(h) place a "hold" on any account maintained with Bank and/or deliver a notice of exclusive control, any entitlement order, or other directions or instructions pursuant to any Control Agreement or similar agreements providing control of any Collateral;

(i) demand and receive possession of Obligors' Books; and

(j) exercise all rights and remedies available to Bank under the Loan Documents or at law or equity, including all remedies provided under the Code (including disposal of the Collateral pursuant to the terms thereof).

**9.2 Power of Attorney.** Each Obligor hereby irrevocably appoints Bank as its lawful attorney-in-fact, exercisable following the occurrence and during the continuance of an Event of Default, to: (a) endorse Obligor's name on any checks, payment instruments, or other forms of payment or security; (b) sign Obligor's name on any invoice or bill of lading for any Account or drafts against Account Debtors; (c) demand, collect, sue, and give releases to any Account Debtor for monies due, settle and adjust disputes and claims about the Accounts directly with Account Debtors, and compromise, prosecute, or defend any action, claim, case, or proceeding about any Collateral (including filing a claim or voting a claim in any bankruptcy case in Bank's or Obligor's name, as Bank chooses), in each case for amounts and on terms Bank determines reasonable; (d) make, settle, and adjust all claims under Obligor's insurance policies; (e) pay, contest or settle any Lien, charge, encumbrance, security interest, or other adverse claim in or to the Collateral, or any judgment based thereon, or otherwise take any action to terminate or discharge the same; and (f) transfer the Collateral into the name of Bank or a third party as the Code permits. Each Obligor hereby appoints Bank as its lawful attorney-in-fact to sign Obligor's name on any documents necessary to perfect or continue the perfection of Bank's security interest in the Collateral regardless of whether an Event of Default has occurred until all Obligations have been satisfied in full and the Loan Documents have been terminated. Bank's foregoing appointment as Obligor's attorney in fact, and all of Bank's rights and powers, coupled with an interest, are irrevocable until all Obligations have been fully repaid and performed and the Loan Documents have been terminated.

**9.3 Protective Payments.** If any Obligor fails to obtain the insurance called for by Section 6.7 or fails to pay any premium thereon or fails to pay any other amount which an Obligor is obligated to pay under this Agreement or any other Loan Document or which may be required to preserve the Collateral, Bank may obtain such insurance or make such payment, and all amounts so paid by Bank are Bank Expenses and immediately due and payable, bearing interest at the then highest rate applicable to the Obligations, and secured by the Collateral. Bank will make reasonable efforts to provide such Obligor with notice of Bank obtaining such insurance at the time it is obtained or

within a reasonable time thereafter. No payments by Bank are deemed an agreement to make similar payments in the future or Bank's waiver of any Event of Default.

**9.4 Application of Payments and Proceeds.** If an Event of Default has occurred and is continuing, Bank shall have the right to apply in any order any funds in its possession, whether from Obligors' account balances, payments, proceeds realized as the result of any collection of Accounts or other disposition of the Collateral, or otherwise, to the Obligations. Bank shall pay any surplus to Obligors by credit to the Designated Deposit Account or to other Persons legally entitled thereto: Obligors shall remain liable to Bank for any deficiency. If Bank, directly or indirectly, enters into a deferred payment or other credit transaction with any purchaser at any sale of Collateral. Bank shall have the option, exercisable at any time, of either reducing the Obligations by the principal amount of the purchase price or deferring the reduction of the Obligations until the actual receipt by Bank of cash therefor.

**9.5 Bank's Liability for Collateral.** So long as Bank complies with reasonable banking practices regarding the safekeeping of the Collateral in the possession or under the control of Bank, Bank shall not be liable or responsible for: (a) the safekeeping of the Collateral; (b) any loss or damage to the Collateral; (c) any diminution in the value of the Collateral; or (d) any act or default of any carrier, warehouseman, bailee, or other Person. Obligors bear all risk of loss, damage or destruction of the Collateral.

**9.6 No Waiver; Remedies Cumulative.** Bank's failure, at any time or times, to require strict performance by each Obligor of any provision of this Agreement or any other Loan Document shall not waive, affect, or diminish any right of Bank thereafter to demand strict performance and compliance herewith or therewith. No waiver hereunder shall be effective unless signed by the party granting the waiver and then is only effective for the specific instance and purpose for which it is given. Bank's rights and remedies under this Agreement and the other Loan Documents are cumulative. Bank has all rights and remedies provided under the Code by law, or in equity. Bank's exercise of one right or remedy is not an election and shall not preclude Bank from exercising any other remedy under this Agreement or other remedy available at law or in equity, and Bank's waiver or any Event of Default is not a continuing waiver. Bank's delay in exercising any remedy is not a waiver, election, or acquiescence.

**9.7 Demand Waiver.** Each Obligor waives demand, notice of default or dishonor, notice of payment and nonpayment, notice of any default, nonpayment at maturity, release, compromise, settlement, extension, or renewal of accounts, documents, instruments, chattel paper, and guarantees held by Bank on which an Obligor is liable.

**9.8 [Reserved]**

## **10. NOTICES**

All notices, consents, requests, approvals, demands, or other communication by any party to this Agreement or any other Loan Document must be in writing and shall be deemed to have been validly served, given, or delivered: (a) upon the earlier of actual receipt and three (3) Business Days after deposit in the U.S. mail, first class, registered or certified mail return receipt requested, with proper postage prepaid; (b) upon transmission, when sent by electronic mail or facsimile transmission; (c) one (1) Business Day after deposit with a reputable overnight courier with all charges prepaid; or (d) when delivered, if hand-delivered by messenger, all of which shall be addressed to the party to be notified and sent to the address, facsimile number, or email address indicated below. Bank or any Obligor may change its mailing or electronic mail address or facsimile number by giving the other party written notice thereof in accordance with the terms of this Section 10.

If to Borrower: Luna Innovations Incorporated  
301 1<sup>st</sup> Street SW, Suite 200  
Roanoke, Virginia 24011  
Attention: Scott Graeff  
Fax: (540) 769-8401

Email: graeffs@lunainnovations.com

With a copy to: Cooley LLP  
1299 Pennsylvania Avenue, NW, Suite 700  
Washington, DC 20004-2400  
Attention: Addison Pierce

Email: fpierce@cooley.com

If to Guarantor: Luna Technologies, Inc.  
Former Luna Subsidiary, Inc.  
General Photonics Corp.  
Terametrix LLC  
c/o Luna Innovations Incorporated  
301 1<sup>st</sup> Street SW, Suite 200  
Roanoke, Virginia 24011  
Attention: Scott A. Graeff  
Fax: (540) 769-8401  
Email: graeffs@lunainnovations.com

With a copy to: Cooley LLP  
1299 Pennsylvania Avenue, NW, Suite 700  
Washington, DC 20004-2400  
Attention: Addison Pierce

Email: fpierce@cooley.com

If to Bank: PNC Bank, National Association  
1001 Haxall Point, Suite 706  
Richmond, VA 23219  
Attention: Brian C. Combs  
Email: brian.combs@pnc.com

with a copy to: Williams Mullen  
200 South 10<sup>th</sup> Street  
Richmond, VA 23219  
Attention: Matthew E. Cheek  
Email: mcheek@williamsmullen.com

#### **11. CHOICE OF LAW, VENUE, JURY TRIAL WAIVER AND JUDICIAL REFERENCE**

New York law governs the Loan Documents without regard to principles of conflicts of law. Each Obligor and Bank each submit to the exclusive jurisdiction of the State and Federal courts in New York, New York: provided, however, that nothing in this Agreement shall be deemed to operate to preclude Bank from bringing suit or taking other legal action in any other jurisdiction to realize on the Collateral or any other security for the Obligations, or to enforce a judgment or other court order in favor of Bank. Each Obligor expressly submits and consents in advance to such jurisdiction in any action or suit commenced in any such court, and each Obligor hereby waives any objection that it may have based upon lack of personal jurisdiction, improper venue, or forum non conveniens and hereby consents to the granting of such legal or equitable relief as is deemed appropriate by such court. Each Obligor hereby waives personal service of the summons, complaints, and other process issued in such



action or suit and agrees that service of such summons, complaints, and other process may be made by registered or certified mail addressed to an Obligor at the address set forth in, or subsequently provided by Obligor in accordance with, Section 10 of this Agreement and that service so made shall be deemed completed upon the earlier to occur of Obligor's actual receipt thereof or three (3) days after deposit in the U.S. mails, proper postage prepaid. NOTWITHSTANDING ANYTHING TO THE CONTRARY SET FORTH HEREINABOVE. BANK SHALL SPECIFICALLY HAVE THE RIGHT TO BRING ANY ACTION OR PROCEEDING AGAINST BORROWER OR ITS PROPERTY IN THE COURTS OF ANY OTHER JURISDICTION WHICH BANK DEEMS NECESSARY OR APPROPRIATE IN ORDER TO REALIZE ON THE COLLATERAL OR TO OTHERWISE ENFORCE BANK'S RIGHTS AGAINST AN OBLIGOR OR ITS PROPERTY.

**TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, EACH OBLIGOR AND BANK EACH WAIVE THEIR RIGHT TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION ARISING OUT OF OR BASED UPON THIS AGREEMENT, THE LOAN DOCUMENTS OR ANY CONTEMPLATED TRANSACTION, INCLUDING CONTRACT, TORT, BREACH OF DUTY AND ALL OTHER CLAIMS. THIS WAIVER IS A MATERIAL INDUCEMENT FOR BOTH PARTIES TO ENTER INTO THIS AGREEMENT. EACH PARTY HAS REVIEWED THIS WAIVER WITH ITS COUNSEL.**

This Section 11 shall survive the termination of this Agreement.

## **12. general provisions**

**12.1 Termination Prior to Maturity Date; Survival.** All covenants, representations and warranties made in this Agreement shall continue in full force until this Agreement has terminated pursuant to its terms and all Obligations (other than inchoate indemnity obligations and any Obligations under Bank Services Agreements that are cash collateralized in accordance with the Loan Documents) have been satisfied. So long as Borrower has satisfied the Obligations (other than inchoate indemnity obligations, and any other obligations, which, by their terms, are to survive the termination of this Agreement and any Obligations under Bank Services Agreements that are cash collateralized in accordance with the Loan Documents), this Agreement may be terminated prior to the Term Loan Maturity Date and Revolving Line Maturity Date by Borrower, effective three (3) Business Days after written notice of termination is given to Bank. Those obligations that are expressly specified in this Agreement as surviving this Agreement's termination shall continue to survive notwithstanding this Agreement's termination.

**12.2 Successors and Assigns.** This Agreement binds and is for the benefit of the successors and permitted assigns of each party. No Obligor may assign this Agreement or any rights or obligations under it without Bank's prior written consent (which may be granted or withheld in Bank's discretion). Bank has the right, without the consent of or notice to Obligors, to sell, transfer, assign, negotiate, or grant participation in all or any part of or any interest in, Bank's obligations, rights, and benefits under this Agreement and the other Loan Documents (other than the Warrant, as to which assignment, transfer and other such actions are governed by the terms thereof). Notwithstanding the foregoing, so long as no Event of Default shall have occurred and is continuing, Bank shall not assign its interest in the Credit Extensions and Loan Documents to any Person who in the reasonable estimation of Bank is a direct competitor of Obligors or their Subsidiaries or a vulture fund.

**12.3 Indemnification.** Each Obligor agrees to indemnify, defend and hold Bank and its directors, officers, employees, agents, attorneys, or any other Person affiliated with or representing Bank (each, an "**Indemnified Person**") harmless against: (i) all obligations, demands, claims, and liabilities (collectively, "**Claims**") claimed or asserted by any other party in connection with the transactions contemplated by the Loan Documents; and (ii) all losses or expenses (including Bank Expenses) in any way suffered, incurred, or paid by such Indemnified Person as a result of, following from, consequential to, or arising from transactions between Bank and any Obligor contemplated by the Loan Documents (including reasonable attorneys' fees and expenses), except for Claims and/or losses directly caused by such Indemnified Person's gross negligence or willful misconduct. This Section 12.3 shall survive until all statutes of limitation with respect to the Claims, losses, and expenses for which indemnity is given shall have run.

**12.4 Time of Essence.** Time is of the essence for the performance of all Obligations in this Agreement.

**12.5 Severability of Provisions.** Each provision of this Agreement is severable from every other provision in determining the enforceability of any provision.

**12.6 Correction of Loan Documents.** Bank may correct patent errors and fill in any blanks in the Loan Documents consistent with the agreement of the parties.

**12.7 Amendments in Writing; Waiver; Integration.** No purported amendment or modification of any Loan Document, or waiver, discharge or termination of any obligation under any Loan Document, shall be enforceable or admissible unless, and only to the extent, expressly set forth in a writing signed by the party against which enforcement or admission is sought. Without limiting the generality of the foregoing, no oral promise or statement, nor any action, inaction, delay, failure to require performance or course of conduct shall operate as, or evidence, an amendment, supplement or waiver or have any other effect on any Loan Document. Any waiver granted shall be limited to the specific circumstance expressly described in it, and shall not apply to any subsequent or other circumstance, whether similar or dissimilar, or give rise to, or evidence, any obligation or commitment to grant any further waiver. The Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of the Loan Documents merge into the Loan Documents.

**12.8 Counterparts.** This Agreement may be executed in any number of counterparts and by different parties on separate counterparts, each of which, when executed and delivered, is an original, and all taken together, constitute one Agreement.

**12.9 Confidentiality.** In handling any confidential information, Bank shall exercise the same degree of care that it exercises for its own proprietary information, but disclosure of information may be made: (a) to Bank's Subsidiaries or Affiliates (such Subsidiaries and Affiliates, together with Bank, collectively, "**Bank Entities**"); (b) to prospective transferees or purchasers of any interest in the Credit Extensions (provided, however, Bank shall use its best efforts to obtain any prospective transferee's or purchaser's agreement to the terms of this provision); (c) as required by law, regulation, subpoena, or other order; (d) to Bank's regulators or as otherwise required in connection with Bank's examination or audit; (e) as Bank considers appropriate in exercising remedies under the Loan Documents; and (f) to third-party service providers of Bank so long as such service providers have executed a confidentiality agreement with Bank with terms no less restrictive than those contained herein. Confidential information does not include information that is either: (i) in the public domain or in Bank's possession when disclosed to Bank, or becomes part of the public domain (other than as a result of its disclosure by Bank in violation of this Agreement) after disclosure to Bank; or (ii) disclosed to Bank by a third party, if Bank does not know that the third party is prohibited from disclosing the information. Bank Entities may use anonymous forms of confidential information for aggregate datasets, for analyses or reporting, and for any other uses not expressly prohibited in writing by any Obligor. The provisions of the immediately preceding sentence shall survive the termination of this Agreement.

**12.10 Attorneys' Fees, Costs and Expenses.** In any action or proceeding between any Obligor and Bank arising out of or relating to the Loan Documents, the prevailing party shall be entitled to recover its reasonable attorneys' fees and other costs and expenses incurred, in addition to any other relief to which it may be entitled.

**12.11 Electronic Execution of Documents.** The words "execution," "signed," "signature" and words of like import in any Loan Document shall be deemed to include electronic signatures or the keeping of records in electronic form, each of which shall be of the same legal effect, validity and enforceability as a manually executed signature or the use of a paper-based recordkeeping systems, as the case may be, to the extent and as provided for in any applicable law, including, without limitation, any state law based on the Uniform Electronic Transactions Act.

**12.12 Right of Setoff.** Each Obligor hereby grants to Bank a Lien and a right of setoff as security for all Obligations to Bank, whether now existing or hereafter arising upon and against all deposits, credits, Collateral and property, now or hereafter in the possession, custody, safekeeping or control of Bank or any entity under the control of Bank (including a subsidiary of Bank) or in transit to any of them. At any time after the occurrence and during the continuance of an Event of Default, without demand or notice, Bank may setoff the same or any part thereof and

apply the same to any liability or Obligation of any Obligor even though unmatured and regardless of the adequacy of any other Collateral securing the Obligations. ANY AND ALL RIGHTS TO REQUIRE BANK TO EXERCISE ITS RIGHTS OR REMEDIES WITH RESPECT TO ANY OTHER COLLATERAL WHICH SECURES THE OBLIGATIONS, PRIOR TO EXERCISING ITS RIGHT OF SETOFF WITH RESPECT TO SUCH DEPOSITS, CREDITS OR OTHER PROPERTY OF AN OBLIGOR, ARE HEREBY KNOWINGLY, VOLUNTARILY AND IRREVOCABLY WAIVED.

**12.13 Captions.** The headings used in this Agreement are for convenience only and shall not affect the interpretation of this Agreement.

**12.14 Construction of Agreement.** The parties mutually acknowledge that they and their attorneys have participated in the preparation and negotiation of this Agreement. In cases of uncertainty this Agreement shall be construed without regard to which of the parties caused the uncertainty to exist.

**12.15 Relationship.** The relationship of the parties to this Agreement is determined solely by the provisions of this Agreement. The parties do not intend to create any agency, partnership, joint venture, trust, fiduciary or other relationship with duties or incidents different from those of parties to an arm's-length contract.

**12.16 Third Parties.** Nothing in this Agreement, whether express or implied, is intended to: (a) confer any benefits, rights or remedies under or by reason of this Agreement on any persons other than the express parties to it and their respective permitted successors and assigns; (b) relieve or discharge the obligation or liability of any person not an express party to this Agreement; or (c) give any person not an express party to this Agreement any right of subrogation or action against any party to this Agreement.

### **13. DEFINITIONS**

**13.1 Definitions.** As used in the Loan Documents, the word "shall" is mandatory, the word "may" is permissive, the word "or" is not exclusive, the words "includes" and "including" are not limiting, the singular includes the plural, and numbers denoting amounts that are set off in brackets are negative. As used in this Agreement, the following capitalized terms have the following meanings:

"**Account**" is, as to any Person, any "**account**" of such Person as "account" is defined in the Code with such additions to such term as may hereafter be made, and includes, without limitation, all accounts receivable and other sums owing to such Person.

"**Account Debtor**" is any "**account debtor**" as defined in the Code with such additions to such term as may hereafter be made.

"**Advance**" or "**Advances**" means a revolving credit loan (or revolving credit loans) under the Revolving Line.

"**Affiliate**" is, with respect to any Person, each other Person that owns or controls directly or indirectly the Person, any Person that controls or is controlled by or is under common control with the Person, and each of that Person's senior executive officers, directors, partners and, for any Person that is a limited liability company, that Person's managers and members.

"**Agreement**" is defined in the preamble hereof.

"**Authorized Signer**" is any individual listed in any Obligor's Borrowing Resolution who is authorized to execute the Loan Documents, including making (and executing if applicable) any Credit Extension request, on behalf of Borrower.

**“Availability Amount”** is (a) the Revolving Line, minus (b) the aggregate Dollar Equivalent amount of all outstanding Letters of Credit (including drawn but unreimbursed Letters of Credit), and minus (c) the outstanding principal balance of any Advances.

**“Bank”** is defined in the preamble hereof.

**“Bank Entities”** is defined in Section 12.9.

**“Bank Expenses”** are all audit fees and expenses, costs, and expenses (including reasonable attorneys’ fees and expenses) for preparing, amending, negotiating, administering, defending and enforcing the Loan Documents (including, without limitation, those incurred in connection with appeals or Insolvency Proceedings) or otherwise incurred with respect to Borrower or any Guarantors.

**“Bank Services”** are any products, credit services, and/or financial accommodations previously, now, or hereafter provided to any Obligor or any of its Subsidiaries by Bank or any Bank Affiliate, including, without limitation, any letters of credit, cash management services (including, without limitation, merchant services, direct deposit of payroll, business credit cards, and check cashing services), interest rate swap arrangements, and foreign exchange services as any such products or services may be identified in Bank’s various agreements related thereto (each, a **“Bank Services Agreement”**).

**“Bank Services Agreement”** is defined in the definition of Bank Services.

**“Board”** is an Obligor’s board of directors.

**“Borrower”** is defined in the preamble hereof.

**“Borrower’s Books”** are all Obligors’ books and records including ledgers, federal and state tax returns, records regarding Obligors’ assets or liabilities, the Collateral, business operations or financial condition, and all computer programs or storage or any equipment containing such information.

**“Borrowing Resolutions”** are, with respect to any Person, the “Resolutions for Extension of Credit and Incumbency Certificate” submitted by such Person to Bank.

**“Business Day”** is any day that is not a Saturday, Sunday or a day on which Bank is closed.

**“Cash Equivalents”** means (a) marketable direct obligations issued, or unconditionally guaranteed by the United States or any agency or any State thereof having maturities of not more than one (1) year from the date of acquisition; (b) commercial paper maturing no more than one (1) year after its creation and having the highest rating from either Standard & Poor’s Ratings Group or Moody’s Investors Service, Inc.; (c) Bank’s certificates of deposit issued maturing no more than one (1) year after issue; and (d) money market funds at least ninety-five percent (95%) of the assets of which constitute Cash Equivalents of the kinds described in clauses (a) through (c) of this definition.

**“Change in Control”** means (a) at any time, any “person” or “group” (as such terms are used in Sections 13(d) and 14(d) of the Exchange Act), shall become, or obtain rights (whether by means of warrants, options or otherwise) to become, the “beneficial owner” (as defined in Rules 13(d)-3 and 13(d)5 under the Exchange Act), directly or indirectly, of more than fifty percent (50.0%) or more of the ordinary voting power for the election of directors of Borrower (determined on a fully diluted basis) other than by the sale of Borrower’s equity securities in a public offering or to venture capital or private equity investors so long as Borrower identifies to Bank the venture capital or private equity investors at least seven (7) Business Days prior to the closing of the transaction and provides to Bank a description of the material terms of the transaction; or (b) at any time, the Borrower shall cease to own and control, of record and beneficially, directly or indirectly, one hundred percent (100.0%) of each class of outstanding capital stock of each subsidiary of Borrower free and clear of all Liens (except Liens created by this Agreement).

“**Claims**” is defined in Section 12.3.

“**Code**” is the Uniform Commercial Code, as the same may, from time to time, be enacted and in effect in the State of New York; provided, that, to the extent that the Code is used to define any term herein or in any Loan Document and such term is defined differently in different Articles of the Code, the definition of such term contained in Article 9 shall govern; provided further, that in the event that, by reason of mandatory provisions of law, any or all of the attachment, perfection, or priority of or remedies with respect to, Bank’s Lien on any Collateral is governed by the Uniform Commercial Code in effect in a jurisdiction other than the State of New York, the term “**Code**” shall mean the Uniform Commercial Code as enacted and in effect in such other jurisdiction solely for purposes of the provisions thereof relating to such attachment, perfection, priority or remedies and for purposes of definitions relating to such provisions.

“**Collateral**” shall have the meaning set forth in the Security Agreements.

“**Collateral Account**” is any Deposit Account.

“**Compliance Certificate**” is that certain certificate in the form attached hereto as Exhibit A.

“**Contingent Obligation**” is, for any Person, any direct or indirect liability, contingent or not, of that Person for (a) any indebtedness, lease, dividend, letter of credit or other obligation of another such as an obligation, in each case, directly or indirectly guaranteed, endorsed, co made, discounted or sold with recourse by that Person, or for which that Person is directly or indirectly liable; (b) any obligations for undrawn letters of credit for the account of that Person; and (c) all obligations from any interest rate, currency or commodity swap agreement, interest rate cap or collar agreement, or other agreement or arrangement designated to protect a Person against fluctuation in interest rates, currency exchange rates or commodity prices; but “Contingent Obligation” does not include endorsements in the ordinary course of business. The amount of a Contingent Obligation is the stated or determined amount of the primary obligation for which the Contingent Obligation is made or, if not determinable, the maximum reasonably anticipated liability for it determined by the Person in good faith; but the amount may not exceed the maximum of the obligations under any guarantee or other support arrangement.

“**Control Agreement**” is any control agreement entered into among the depository institution at which Borrower maintains a Deposit Account.

“**Copyrights**” are any and all copyright rights, copyright applications, copyright registrations and like protections in each work of authorship and derivative work thereof, whether published or unpublished and whether or not the same also constitutes a trade secret.

“**Credit Extension**” is the Term Loan, any Advance, Overadvance or Letter of Credit under the Revolving Line, or any other extension of credit by Bank for any Obligor’s benefit.

“**Credit Extension Request**” is defined in Section 3.4.

“**Currency**” is coined money and such other banknotes or other paper money as are authorized by law and circulate as a medium of exchange.

“**Current Maturities**” means the scheduled payments, due during the prior four fiscal quarters, of principal on all indebtedness for borrowed money having an original term of more than one year (including but not limited to amortization of capital or finance lease obligations).

“**Deferred Revenue**” is all amounts received or invoiced in advance of performance under contracts and not yet recognized as revenue.

“**Deposit Account**” is any “**deposit account**” as defined in the Code with such additions to such term as may hereafter be made.

“**Designated Deposit Account**” is the deposit account, account number ending -5697, maintained by Borrower with Silicon Valley Bank or such other account designated in writing by Borrower.

“**Dollar Equivalent**” is, at any time, (a) with respect to any amount denominated in Dollars, such amount, and (b) with respect to any amount denominated in a Foreign Currency, the equivalent amount therefor in Dollars as determined by Bank at such time on the basis of the then-prevailing rate of exchange in San Francisco, California, for sales of the Foreign Currency for transfer to the country issuing such Foreign Currency.

“**Dollars,**” “**dollars**” or use of the sign “\$” means only lawful money of the United States and not any other currency, regardless of whether that currency uses the “\$” sign to denote its currency or may be readily converted into lawful money of the United States.

“**Domestic Subsidiary**” means a Subsidiary that is organized under the laws of the United States, any state or commonwealth thereof, or the District of Columbia.

“**EBITDA**” means net income, plus interest expense, plus income tax expense, plus depreciation, plus amortization, plus stock-based compensation, plus one-time transaction costs associated with the Project Owen Acquisition, plus losses related to discontinued operations, plus or minus non-cash items as may have been approved by Bank from time to time in its reasonable discretion (calculated on a pro forma basis).

“**Effective Date**” is defined in the preamble hereof.

“**Equipment**” is all “**equipment**” as defined in the Code with such additions to such term as may hereafter be made, and includes without limitation all machinery, fixtures, goods, vehicles (including motor vehicles and trailers), and any interest in any of the foregoing.

“**ERISA**” is the Employee Retirement Income Security Act of 1974, and its regulations;

“**Event of Default**” is defined in Section 8.

“**Exchange Act**” is the Securities Exchange Act of 1934, as amended.

“**Excluded Subsidiary**” means each Foreign Subsidiary, together with its Subsidiaries.

“**Existing Letter of Credit**” has the meaning set out in the Perfection Certificate.

“**Fixed Charge Coverage Ratio**” means (i) EBITDA minus Unfunded Capital Expenditures, divided by (ii) the sum of Current Maturities, plus interest expense, plus cash taxes, paid plus dividends.

“**Foreign Currency**” means lawful money of a country other than the United States.

“**Foreign Subsidiary**” means any subsidiary which is not a Domestic Subsidiary.

“**Funding Date**” is any date on which a Credit Extension is made to or for the account of Borrower which shall be a Business Day.

“**GAAP**” is generally accepted accounting principles set forth in the opinions and pronouncements of the Accounting Principles Board of the American Institute of Certified Public Accountants and statements and pronouncements of the Financial Accounting Standards Board or in such other statements by such other Person as may be approved by a significant segment of the accounting profession, which are applicable to the circumstances as of the date of determination.

“**General Intangibles**” is all “general intangibles” as defined in the Code in effect on the date hereof with such additions to such term as may hereafter be made, and includes without limitation, all Intellectual Property,

claims, income and other tax refunds, security and other deposits, payment intangibles, contract rights, options to purchase or sell real or personal property, right in all litigation presently or hereafter pending (whether in contract, tort or otherwise), insurance policies (including without limitation key man, property damage, and business interruption insurance), payments of insurance and rights to payment of any kind.

“**Governmental Approval**” is any consent, authorization, approval, order, license, franchise, permit, certificate, accreditation, registration, filing or notice, of, issued by, from or to, or other act by or in respect of any Governmental Authority.

“**Governmental Authority**” is any nation or government, any state or other political subdivision thereof: any agency, authority, instrumentality, regulatory body, court, central bank or other entity exercising executive, legislative, judicial, taxing, regulatory or administrative functions of or pertaining to government, any securities exchange and any self-regulatory organization.

“**Guarantors**” are defined in the preamble hereof and shall include any other Person providing a Guaranty in favor of Bank.

“**Guaranty**” is any guarantee of all or any part of the Obligations, as the same may from time to time be amended, restated, modified or otherwise supplemented.

“**Indebtedness**” is (a) indebtedness for borrowed money or the deferred price of property or services, such as reimbursement and other obligations for surety bonds and letters of credit, (b) obligations evidenced by notes, bonds, debentures or similar instruments, (c) capital lease obligations, and (d) Contingent Obligations.

“**Indemnified Person**” is defined in Section 12.3.

“**Insolvency Proceeding**” is any proceeding by or against any Person under the United States Bankruptcy Code, or any other bankruptcy or insolvency law, including assignments for the benefit of creditors, compositions, extensions generally with its creditors, or proceedings seeking reorganization, arrangement, or other relief.

“**Intellectual Property**” means, with respect to any Person, all of such Person’s right, title, and interest in and to the following;

- (a) its Copyrights, Trademarks and Patents;
- (b) any and all trade secrets and trade secret rights, including, without limitation, any rights to unpatented inventions, know-how and operating manuals;
- (c) any and all source code;
- (d) any and all design rights which may be available to such Person;
- (e) any and all claims for damages by way of past, present and future infringement of any of the foregoing, with the right, but not the obligation, to sue for and collect such damages for said use or infringement of the Intellectual Property rights identified above; and
- (f) all amendments, renewals and extensions of any of the Copyrights, Trademarks or Patents.

“**Inventory**” is all “**inventory**” as defined in the Code in effect on the date hereof with such additions to such term as may hereafter be made, and includes without limitation all merchandise, raw materials, parts, supplies, packing and shipping materials, work in process and finished products, including without limitation such inventory as is temporarily out of any Obligor’s custody or possession or in transit and including any returned goods and any documents of title representing any of the above.

“**Investment**” is any beneficial ownership interest in any Person (including stock, partnership interest or other securities), and any loan, advance or capital contribution to any Person.

“**Key Person**” is Borrower’s Chief Executive Officer, who is Scott A. Graeff as of the Effective Date.

“**Letter of Credit**” is a standby or commercial letter of credit issued by Bank upon request of Borrower based upon an application, guarantee, indemnity, or similar agreement.

“**Lien**” is a claim, mortgage, deed of trust, levy, charge, pledge, security interest or other encumbrance of any kind, whether voluntarily incurred or arising by operation of law or otherwise against any property.

“**Liquid Assets**” are unencumbered cash, cash equivalents and marketable securities that are traded on a recognized stock exchange and may be easily liquidated within fifteen (15) days, all of which shall be freely available for a Person to spend or invest, not held for a specific purpose and otherwise available to such Person for immediate or general business use, together with the then-current amount unused availability under the Revolving Line.

“**Loan Documents**” are, collectively, this Agreement and any schedules, exhibits, certificates, notices, and any other documents related to this Agreement, the Notes, the Security Agreements, any Bank Services Agreement, the Disclosure Letter, any Control Agreement, any subordination agreement, any guaranties executed by any Obligor, and any other present or future agreements by any Obligor with or for the benefit of Bank in connection with this Agreement or Bank Services, all as amended, restated, or otherwise modified.

“**Material Adverse Change**” is (a) a material impairment in the perfection or priority of Bank’s Lien in the Collateral or in the value of such Collateral; (b) a material adverse change in the business, operations, or financial condition of the Obligors and their Subsidiaries, taken as a whole; (c) a material impairment of the prospect of repayment of any portion of the Obligations; or (d) Bank determines, based upon information available to it and in its reasonable judgment, that there is a reasonable likelihood that the Obligors shall fail to comply with one or more of the financial covenants in Section 6 during the next succeeding financial reporting period.

“**Net Funded Debt**” means all indebtedness for borrowed money, including but not limited to capital or finance lease obligations, reimbursement obligations in respect of letters of credit, and, without duplication, guarantees of any such indebtedness, minus unrestricted cash and Cash Equivalents up to Ten Million Dollars (\$10,000,000.00).

“**Net Leverage Ratio**” means Net Funded Debt, divided by EBITDA.

“**Notes**” are the Revolving Line of Credit Note and Term Loan Note.

“**Obligations**” are any Obligor’s obligations to pay when due any debts, principal, interest, fees, Bank Expenses, and other amounts any Obligor owes Bank now or later, whether under this Agreement, the other Loan Documents, or otherwise, including, without limitation, all obligations relating to Bank Services and interest accruing after Insolvency Proceedings begin and debts, liabilities, or obligations of any Obligor assigned to Bank, and to perform such Obligor’s duties under the Loan Document.

“**Operating Documents**” are, for any Person, such Person’s formation documents, as certified by the Secretary of State (or equivalent agency) of such Person’s jurisdiction of organization on a date that is no earlier than thirty (30) days prior to the Effective Date and, (a) if such Person is a corporation, its bylaws in current form, (b) if such Person is a limited liability company, its limited liability company agreement (or similar agreement), and (c) if such Person is a partnership, its partnership agreement (or similar agreement), each of the foregoing with all current amendments or modifications thereto.

“**Patents**” means all patents, patent applications and like protections including without limitation improvements, divisions, continuations, renewals, reissues, extensions and continuations-in-part of the same.



“**Perfection Certificate**” is defined in Section 5.1.

“**Permitted Indebtedness**” is:

- (a) Borrower’s Indebtedness to Bank under this Agreement and the other Loan Documents;
- (b) Indebtedness existing on the Effective Date and shown on the Perfection Certificate;
- (c) Subordinated Debt;
- (d) Indebtedness associated with purchase money Liens contemplated by clause (c) of the definition of “Permitted Liens” set forth herein;
- (e) intercompany Indebtedness amongst the Obligors and their Subsidiaries (subject to Section 7.7);
- (f) unsecured Indebtedness to trade creditors incurred in the ordinary course of business;
- (g) Indebtedness incurred as a result of endorsing negotiable instruments received in the ordinary course of business;
- (h) Indebtedness secured by Liens permitted under clauses (a) and (c) of the definition of “Permitted Liens” hereunder;
- (i) Indebtedness in respect of swap agreements, hedge agreements, foreign exchange transactions or other Banking Services;
- (j) Indebtedness incurred by Obligors in respect of credit cards, including prepaid cards, and letters of credit, bank guarantees, bankers’ acceptances or similar instruments issued or created, or related to obligations or liabilities incurred, in the ordinary course of business;
- (k) Indebtedness consisting of (A) the financing of insurance premiums or (B) take-or-pay obligations contained in supply arrangements, in each case in the ordinary course of business;
- (l) Indebtedness consisting of obligations under deferred compensation to employees or other similar arrangements incurred in connection with the Project Owen Acquisition or any other acquisition permitted hereunder or other investment permitted hereunder;
- (m) Indebtedness representing deferred compensation to employees of the Obligors and their Subsidiaries incurred in the ordinary course of business;
- (n) Indebtedness constituting indemnification obligations or obligations in respect of purchase price or other similar adjustments (including earnout or similar obligations) incurred in connection with the Project Owen Acquisition or any other acquisition, any other Investment or any disposition, in each case permitted under this Agreement;
- (o) additional Indebtedness in an aggregate amount not to exceed at any time outstanding \$1,000,000; and
- (p) extensions, refinancings, modifications, amendments and restatements of any items of Permitted Indebtedness (a) through (o) above, provided that the principal amount thereof is not increased or the terms thereof are not modified to impose more burdensome terms upon Borrower or any Subsidiary, as the case may be.

**“Permitted Investments”** are:

- (a) Investments shown on the Perfection Certificate and existing on the Effective Date;
- (b) (i) Cash Equivalents and (ii) any Investments permitted by Borrower’s investment policy, as amended from time to time, provided that such investment policy (and any such amendment thereto) has been approved in writing by Bank;
- (c) Investments consisting of the endorsement of negotiable instruments for deposit or collection or similar transactions in the ordinary course of any Obligor’s business;
- (d) Investments consisting of (i) travel advances and employee relocation loans and other employee loans and advances in the ordinary course of business, and (ii) loans to employees, officers or directors relating to the purchase of equity securities of any Obligor or its Subsidiaries pursuant to employee stock purchase plans or agreements approved by the Board;
- (e) Investments (including debt obligations) received in connection with the bankruptcy or reorganization of customers or suppliers and in settlement of delinquent obligations of, and other disputes with, customers or suppliers arising in the ordinary course of business;
- (f) Investments consisting of notes receivable of, or prepaid royalties and other credit extensions, to customers and suppliers who are not Affiliates, in the ordinary course of business; provided that this paragraph (f) shall not apply to Investments of any Obligor in any Subsidiary;
- (g) the Project Owen Acquisition;
- (h) Investments in swap agreements, hedge agreements, foreign exchange transactions or other Banking Services;
- (i) Investments consisting of the creation or acquisition of a Subsidiary for the purpose of consummating a merger transaction permitted by Section 7.3 of this Agreement, which is otherwise a Permitted Investment;
- (j) Investments consisting of deposit accounts in which Bank has a perfected security interest;
- (k) Investments accepted in connection with Transfers permitted hereunder;
- (l) Investments by (i) Obligors in another Obligor, (ii) non-Guarantor Subsidiaries in non-Guarantor Subsidiaries and (iii) Obligors in non-Guarantor Subsidiaries in an amount not to exceed Two Hundred Fifty Thousand Dollars (\$250,000) in the aggregate in any consecutive three (3) month period;
- (m) Investments consisting of deposits for prepaid credit cards permitted under the definition of “Permitted Indebtedness” hereunder; and
- (n) additional Investments in an aggregate amount not to exceed at any time outstanding \$1,000,000.

**“Permitted Liens”** are:

- (a) Liens existing on the Effective Date and shown on the Perfection Certificate or arising under this Agreement and the other Loan Documents;

(b) Liens for taxes, fees, assessments or other government charges or levies, either (i) not due and payable or (ii) being contested in good faith and for which Borrower maintains adequate reserves on its Books, that no notice of any such Lien has been filed or recorded under the Internal Revenue Code of 1986, as amended, and the Treasury Regulations adopted thereunder;

(c) purchase money Liens (i) on Equipment acquired or held by any Obligor incurred for financing the acquisition of the Equipment securing no more than Five Hundred Thousand Dollars (\$500,000.00) in the aggregate amount outstanding, or (ii) existing on Equipment when acquired, if the Lien is confined to the property and improvements and the proceeds of the Equipment;

(d) Liens of carriers, warehousemen, suppliers, or other Persons that are possessory in nature arising in the ordinary course of business so long as such Liens attach only to Inventory, securing liabilities in the aggregate amount not to exceed Five Hundred Thousand Dollars (\$500,000.00) and which are not delinquent or remain payable without penalty or which are being contested in good faith and by appropriate proceedings which proceedings have the effect of preventing the forfeiture or sale of the property subject thereto;

(e) Liens to secure payment of workers' compensation, employment insurance, old-age pensions, social security and other like obligations incurred in the ordinary course of business (other than Liens imposed by ERISA);

(f) Liens incurred in the extension, renewal or refinancing of the Indebtedness secured by Liens described in (a) through (c), but any extension, renewal or replacement Lien must be limited to the property encumbered by the existing Lien and the principal amount of the indebtedness may not increase;

(g) leases or subleases of real property granted in the ordinary course of Borrower's business, and leases, subleases, non-exclusive licenses or sublicenses of property (other than real property or Intellectual Property) granted in the ordinary course of any Obligor's business, if the leases, subleases, licenses and sublicenses do not prohibit granting Bank a security interest;

(h) non-exclusive licenses of Intellectual Property granted to third parties in the ordinary course of business, and licenses of Intellectual Property that could not result in a legal transfer of title of the licensed property that may be exclusive in respects other than territory and that may be exclusive as to territory only as to discrete geographical areas outside of the United States;

(i) Liens arising from judgments, orders, decrees or attachments in circumstances not constituting an Event of Default;

(j) Liens on cash or Permitted Investments securing swap agreements, hedge agreements, foreign exchange transactions or other Banking Services;

(k) Liens in favor of other financial institutions arising in connection with any Obligor's deposit and/or securities accounts held at such institutions, provided that Bank has a perfected security interest in the amounts held in such deposit and/or securities accounts; and

(l) additional Liens in an aggregate amount not to exceed at any time outstanding \$500,000.

**"Person"** is any individual, sole proprietorship, partnership, limited liability company, joint venture, company, trust, unincorporated organization, association, corporation, institution, public benefit corporation, firm, joint stock company, estate, entity or government agency.

**"Project Owen Acquisition"** means the acquisition by Borrower of 100% of the issues shares of OptaSense Holdings Limited, a limited company organized under the laws of England and Wales, pursuant to the terms of that Certain Share Purchase Agreement, to be dated on or about 2 December 2020, between Borrower and QinetiQ Holdings Limited, and the transactions related thereto.

**“Registered Organization”** is any “registered organization” as defined in the Code with such additions to such term as may hereafter be made.

**“Reimbursement Agreement”** is defined in Section 2.2(c).

**“Requirement of Law”** is as to any Person, the organizational or governing documents of such Person, and any law (statutory or common), treaty, rule or regulation or determination of an arbitrator or a court or other Governmental Authority, in each case applicable to or binding upon such Person or any of its property or to which such Person or any of its property is subject.

**“Responsible Officer”** is any of the Chief Executive Officer, President, Chief financial Officer and Controller of any Obligor.

**“Restricted License”** is any material license or other agreement with respect to which any Obligor is the licensee (a) that prohibits or otherwise restricts Borrower from granting a security interest in such Obligor’s interest in such license or agreement or any other property, or (b) for which a default under or termination of could interfere with Bank’s right to sell any Collateral.

**“Revolving Line”** is the revolving line of credit evidenced by the Revolving Line Note in an aggregate maximum principal amount equal to Fifteen Million Dollars (\$15,000,000.00).

**“Revolving Line Maturity Date”** is the “Expiration Date” as defined in the Revolving Line Note.

**“Revolving Line Note”** is the Revolving Line of Credit Note of even date herewith made by Borrower payable to the order of Bank in the principal amount of the Revolving Line, as the same may have been modified, amended, supplemented or replaced from time to time.

**“SEC”** shall mean the Securities and Exchange Commission, any successor thereto, and any analogous Governmental Authority.

**“Security Agreements”** are the Security Agreement(s) executed by Obligors encumbering the Collateral as security for the Credit Extensions, as the same may have been modified or amended from time to time.

**“Subordinated Debt”** is indebtedness incurred by any Obligor subordinated to all of such Obligor’s now or hereafter indebtedness to Bank (pursuant to a subordination, intercreditor, or other similar agreement in form and substance satisfactory to Bank entered into between Bank and the other creditor), on terms acceptable to Bank.

**“Subsidiary”** is, as to any Person, a corporation, partnership, limited liability company or other entity of which shares of stock or other ownership interests having ordinary voting power (other than stock or such other ownership interests having such power only by reason of the happening of a contingency) to elect a majority of the board of directors or other managers of such corporation, partnership or other entity are at the time owned, or the management of which is otherwise controlled, directly or indirectly through one or more intermediaries, or both, by such Person. Unless the context otherwise requires, each reference to a Subsidiary herein shall be a reference to a Subsidiary of an Obligor.

**“SVB Cash Collateral Accounts”** has the meaning set out in the Perfection Certificate.

**“Term Loan”** is the term loan evidenced by the Term Loan Note in the original principal amount of Twelve Million Five Hundred Thousand Dollars (\$12,500,000.00).

**“Term Loan Maturity Date”** is the “Maturity Date” as defined in the Term Loan Note.

“**Term Loan Note**” is the Term Loan Note of even date herewith made by Borrower payable to the order of Bank in the principal amount of the Term Loan, as the same may have been modified, amended, supplemented or replaced from time to time.

“**Trademarks**” means any trademark and servicemark rights, whether registered or not, applications to register and registrations of the same and like protections, and the entire goodwill of the business of any Obligor connected with and symbolized by such trademarks.

“**Transfer**” is defined in Section 7.1.

“**Unfunded Capital Expenditures**” means capital expenditures made from any Obligor’s funds, other than funds borrowed as term debt to finance such capital expenditures.

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# Loan Agreement

[SIGNATURE PAGE]

The undersigned parties acknowledge that they have read and understand all the provisions of this Agreement, including the waiver of jury trial, and has been advised by counsel as necessary or appropriate.

WITNESS the due execution hereof as a document under seal, as of the date first written above.

## BORROWER:

**LUNA INNOVATIONS INCORPORATED,**  
a Delaware corporation

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: Chief Executive Officer

## GUARANTORS:

**LUNA TECHNOLOGIES, INC.,**  
a Delaware corporation

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: Chief Executive Officer

**FORMER LUNA SUBSIDIARY, INC.,**  
a Delaware corporation

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: Chief Executive Officer

**GENERAL PHOTONICS CORP.,**  
a California corporation

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: Chief Executive Officer

**TERAMETRIX LLC,**  
a Delaware limited liability company

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: Chief Executive Officer

# Loan Agreement

[SIGNATURE PAGE]

The undersigned parties acknowledge that they have read and understand all the provisions of this Agreement, including the waiver of jury trial, and has been advised by counsel as necessary or appropriate.

WITNESS the due execution hereof as a document under seal, as of the date first written above.

**BANK:**

**PNC BANK, NATIONAL ASSOCIATION**

By: /s/ David Notaro

Name: David Notaro

Title: SVP



**EXHIBIT A**

**COMPLIANCE CERTIFICATE**

TO: PNC BANK, NATIONAL ASSOCIATION  
 FROM: LUNA INNOVATIONS INCORPORATED

Date: \_\_\_\_\_

The undersigned authorized officer of Luna Innovations Incorporated (the “**Borrower**”) certifies that under the terms and conditions of the Loan Agreement between Borrower and Bank (the “**Agreement**”), (1) Obligors are in complete compliance for the period ending \_\_\_\_\_, 20\_\_ with all required covenants except as noted below, (2) there are no Events of Default, (3) all representations and warranties in the Agreement are true and correct in all material respects on this date except as noted below: provided, further, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date, (4) Each Obligor, has timely filed all required tax returns and reports, and each Obligor has timely paid all foreign, federal, state and local taxes, assessments, deposits and contributions owed by any Obligor except as otherwise permitted pursuant to the terms of Section 5.9 of the Agreement, and (5) no Liens have been levied or claims made against any Obligor or any of its Subsidiaries, if any, relating to unpaid employee payroll or benefits of which such Obligor has not previously provided written notification to Bank. Attached are the required documents supporting the certification. The undersigned certifies that these are prepared in accordance with GAAP consistently applied from one period to the next except as explained in an accompanying letter or footnotes. The undersigned acknowledges that no borrowings may be requested at any time or date of determination that any Obligor is not in compliance with any of the terms of the Agreement, and that compliance is determined not just at the date this certificate is delivered. Capitalized terms used but not otherwise defined herein shall have the meanings given them in the Agreement.

Please indicate compliance status by circling Yes/No under “Complies” column.

<u>Reporting Covenants</u>	<u>Required</u>	<u>Complies</u>
Quarterly financial statements with Compliance Certificate	Quarterly within 60 days	Yes No
Operating budgets	FYE within 45 days	Yes No
Annual financial statements (CPA Audited)	FYE within 120 days	Yes No

<u>Financial Covenants</u>	<u>Required</u>	<u>Actual</u>	<u>Complies</u>
<b>Maintain as indicated:</b>			
Net Leverage Ratio	<1.50 to 1.00		Yes No
Fixed Charge Coverage Ratio	≥1.10 to 1.00		Yes No

Borrower shall attach to this Certificate such worksheets, schedules or tables as may be necessary to verify the foregoing and hereby certifies that the financial covenant analyses and information set forth on such worksheets, schedules or tables attached hereto are true and accurate as of the date of this Certificate.

The following are the exceptions with respect to the certification above:

\_\_\_\_\_

\_\_\_\_\_

---

(If blank, "NONE")

[SIGNATURE PAGE FOLLOWS]

**COMPLIANCE CERTIFICATE**

[SIGNATURE PAGE]

**BORROWER:**

LUNA INNOVATIONS INCORPORATED,  
a Delaware corporation

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**EXHIBIT B**

**JOINDER AND AMENDMENT AGREEMENT**

[TEMPLATE ATTACHED HERETO]

EXHIBIT C



## Request for Advance

(Advance Number)

**LUNA INNOVATIONS INCORPORATED**, a Delaware corporation (the “**Borrower**”), hereby requests an advance in the amount of \$\_\_\_\_\_ under the Revolving Line of Credit Note executed by the Borrower and delivered to **PNC BANK, NATIONAL ASSOCIATION** (the “**Bank**”), dated December 1, 2020 (the “**Note**”). Initially capitalized words and terms used herein without definition shall have the respective meanings assigned to them in the Note.

To induce the Bank to make such advance, the Borrower hereby represents and agrees as follows:

1. The advance hereby requested is for the following purpose (check one):
  - Working Capital Purposes
  - Capital Expenditures Described on the Attached Schedule
  - Other -- Describe Below
2. No Event of Default exists and no event has occurred which with the passage of time, notice or both would constitute an Event of Default.
3. The approval of this Request for Advance by the Bank will not be deemed to be a waiver by the Bank of any Event of Default.
4. The Borrower has performed all of its obligations under the Loan Documents, and all of the representations and warranties made by the Borrower in the Loan Documents are true and correct as of the date hereof.

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5. The undersigned has been duly authorized by the Borrower to make this request for advance.

**WITNESS** the due execution hereof with the intent to be legally bound hereby as of this \_\_\_\_\_ day of \_\_\_\_\_,  
\_\_\_\_\_.

a Delaware corporation

LUNA INNOVATIONS INCORPORATED,

Name: \_\_\_\_\_  
Title: \_\_\_\_\_

By: \_\_\_\_\_

43783253\_10



## Term Note

\$12,500,000.00 December 1, 2020

**FOR VALUE RECEIVED, LUNA INNOVATIONS INCORPORATED**, a Delaware corporation (the “**Borrower**”), with an address at 1 Riverside Circle, Suite 400, Roanoke, VA 24016, promises to pay to the order of **PNC BANK, NATIONAL ASSOCIATION** (the “**Bank**”), in lawful money of the United States of America in immediately available funds at its offices located at 1001 Haxall Point, Suite 706, Richmond, VA 23219, or at such other location as the Bank may designate from time to time, the principal sum of TWELVE MILLION FIVE HUNDRED THOUSAND AND NO/100 DOLLARS (\$12,500,000.00) (the “**Facility**”), together with interest accruing on the outstanding principal balance from the date hereof, all as provided below. All capitalized terms used herein and not otherwise defined shall have the meanings assigned to such terms in the Loan Agreement (as defined below).

1. **Interest Rate.** Amounts outstanding under this Note will bear interest at a rate per annum equal to the sum of (A) LIBOR in effect on each Reset Date (each as defined below) plus (B) the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof).

2. **Payments.** Principal shall be due and payable in equal consecutive installments in the amount of \$1,041,666.00 each (as reduced from time to time pursuant to Section 8 hereof), commencing on the first Reset Date after the date of this Note, and continuing on each succeeding Reset Date thereafter. Interest shall be payable at the same times as the principal payments; provided that if the Reset Dates occur less frequently than every three (3) months, then interest shall also be paid every three (3) months. Any outstanding principal and accrued interest shall be due and payable in full on the Maturity Date (as defined below).

3. **Certain Definitions.** If the following terms are used in this Note, such terms shall have the meanings set forth below:

“**Alternate Rate**” shall mean the sum of (A) the Base Rate plus (B) the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof).

“**Base Rate**” shall mean the higher of (A) the Prime Rate in effect on such day, and (B) the sum of the Overnight Bank Funding Rate in effect on such day plus 50 basis points (0.50%). If and when the Base Rate (or any component thereof) changes, the rate of interest with respect to any amounts hereunder to which the Base Rate applies will change automatically without notice to the Borrower, effective on the date of any such change.

“**Business Day**” shall mean any day other than a Saturday or Sunday or a legal holiday on which commercial banks are authorized or required by law to be closed for business in New York, New York.

“**Default Rate**” shall mean the rate per annum (based on the actual number of days that principal is outstanding over a year of 360 days) equal to the lesser of (A) the sum of 3% plus the interest rate otherwise in effect from time to time under this Note, and (B) the Maximum Rate.

“**LIBOR**” shall mean, for each Reset Date, the interest rate per annum determined by the Bank by dividing (i) the rate which appears on the Bloomberg Page BBAM1 (or on such other substitute Bloomberg page that displays rates at which US dollar deposits are offered by leading banks in the

London interbank deposit market), or the rate which is quoted by another source selected by the Bank as an authorized information vendor for the purpose of displaying rates at which US dollar deposits are offered by leading banks in the London interbank deposit market (an “**Alternate Source**”), at approximately 11:00 a.m., London time, two (2) Business Days prior to such Reset Date, as the 3-month London interbank offered rate for U.S. Dollars commencing on such Reset Date (or if there shall at any time, for any reason, no longer exist a Bloomberg Page BBAM1 (or any substitute page) or any Alternate Source, a comparable replacement rate determined by the Bank at such time (which determination shall be conclusive absent manifest error)), by (ii) a number equal to 1.00 minus the LIBOR Reserve Percentage; provided, however, if LIBOR, determined as provided above, would be less than zero, then LIBOR shall be deemed to be zero. LIBOR shall be adjusted automatically without notice to the Borrower on and as of (a) each Reset Date, and (b) the effective date of any change in the LIBOR Reserve Percentage.

“**LIBOR Reserve Percentage**” shall mean, as of any day, the maximum effective percentage in effect on such day, as prescribed by the Board of Governors of the Federal Reserve System (or any successor) for determining the reserve requirements (including, without limitation, supplemental, marginal and emergency reserve requirements) with respect to eurocurrency funding (currently referred to as “Eurocurrency liabilities”).

“**Loan Agreement**” shall mean that certain Loan Agreement by and among, the Borrower, the guarantors from time to time party thereto and Bank of even date herewith, as the same may have been modified or amended from time to time.

“**Maturity Date**” shall mean December 1, 2023.

“**Maximum Rate**” shall mean the maximum rate of interest allowed by applicable law.

“**Overnight Bank Funding Rate**” shall mean, for any day, the rate comprised of both overnight federal funds and overnight Eurocurrency borrowings by U.S.-managed banking offices of depository institutions, as such composite rate shall be determined by the Federal Reserve Bank of New York (“**NYFRB**”), as set forth on its public website from time to time, and as published on the next succeeding Business Day as the overnight bank funding rate by the NYFRB (or by such other recognized electronic source (such as Bloomberg) selected by the Bank for the purpose of displaying such rate); provided, that if such day is not a Business Day, the Overnight Bank Funding Rate for such day shall be such rate on the immediately preceding Business Day; provided, further, that if such rate shall at any time, for any reason, no longer exist, a comparable replacement rate determined by the Bank at such time (which determination shall be conclusive absent manifest error). If the Overnight Bank Funding Rate determined as above would be less than zero, then such rate shall be deemed to be zero. The rate of interest charged shall be adjusted as of each Business Day based on changes in the Overnight Bank Funding Rate without notice to the Borrower.

“**Prime Rate**” shall mean the rate publicly announced by the Bank from time to time as its prime rate. The Prime Rate is determined from time to time by the Bank as a means of pricing some loans to its borrowers. The Prime Rate is not tied to any external rate of interest or index, and does not necessarily reflect the lowest rate of interest actually charged by the Bank to any particular class or category of customers.

“**Reset Date**” shall mean (i) the date of this Note, and (ii) subject to the proviso below, the first day of every third month thereafter, provided that: (a) if any such day is not a Business Day, then the first succeeding day that is a Business Day shall instead apply, unless that day falls in the next succeeding calendar month, in which case the next preceding day that is a Business Day shall instead apply, and (b) if any such day is a day of a calendar month for which there is no numerically corresponding day in certain

other months (each, a “**Non-Conforming Month**”), then any Reset Date that falls within a Non-Conforming Month shall be the last Business Day of such Non-Conforming Month.

**4. Interest Calculation; Maximum Rate.** Interest will be calculated based on the actual number of days that principal is outstanding over a year of 360 days. In no event will the rate of interest hereunder exceed the Maximum Rate. Regardless of any other provision of this Note or the other Loan Documents, if for any reason the effective interest rate should exceed the Maximum Rate, the effective interest rate shall be deemed reduced to, and shall be, the Maximum Rate, and (i) the amount which would be excessive interest shall be deemed applied to the reduction of the principal balance of this Note and not to the payment of interest, and (ii) if the loan evidenced by this Note has been or is thereby paid in full, the excess shall be returned to the party paying same, such application to the principal balance of this Note or the refunding of such excess to be a complete settlement and acquittance thereof.

**5. Alternate LIBOR Rate Provisions.** If the Bank determines (which determination shall be final and conclusive) that, by reason of circumstances affecting the eurodollar market generally, deposits in dollars (in the applicable amounts) are not being offered to banks in the eurodollar market for the selected term, or adequate means do not exist for ascertaining LIBOR, then the Bank shall give notice thereof to the Borrower. Thereafter, until the Bank notifies the Borrower that the circumstances giving rise to such suspension no longer exist, (a) the availability of LIBOR shall be suspended, and (b) the interest rate for all amounts outstanding under this Note shall be converted on the next succeeding Reset Date to a rate of interest per annum equal to the Alternate Rate.

In addition, if, after the date of this Note, the Bank shall determine (which determination shall be final and conclusive) that any enactment, promulgation or adoption of or any change in any applicable law, rule or regulation, or any change in the interpretation or administration thereof by a governmental authority, central bank or comparable agency charged with the interpretation or administration thereof, or compliance by the Bank with any guideline, request or directive (whether or not having the force of law) of any such authority, central bank or comparable agency shall make it unlawful or impossible for the Bank to make or maintain or fund loans based on LIBOR, the Bank shall notify the Borrower. Thereafter, until the Bank notifies the Borrower that the circumstances giving rise to such determination no longer apply, (a) the availability of LIBOR shall be suspended, and (b) the interest rate on all amounts outstanding under this Note shall be converted to the Alternate Rate either (i) on the next succeeding Reset Date if the Bank may lawfully continue to maintain or fund loans based on LIBOR to such day, or (ii) immediately if the Bank may not lawfully continue to maintain or fund loans based on LIBOR.

The LIBOR Replacement Rider attached to this Note and incorporated herein by this reference provides a mechanism for determining an alternative rate of interest in the event that the London interbank offered rate is no longer available or in certain other circumstances. The Bank does not warrant or accept any responsibility for and shall not have any liability with respect to, the administration, submission or any other matter related to the London interbank offered rate or other rates in the definition of “LIBOR” or with respect to any alternative or successor rate thereto, or replacement rate therefor. To the extent that any term or provision of the LIBOR Replacement Rider is or may be inconsistent with any term or provision in the remainder of this Note or any other Loan Document, the terms and provisions of the LIBOR Replacement Rider shall control.

**6. Other Payment Terms.** If any payment under this Note shall become due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day, unless that day falls in the next succeeding calendar month, in which case such payment shall be made on the next preceding day that is a Business Day. The Borrower hereby authorizes the Bank to charge the Borrower’s deposit account at the Bank for any payment when due under this Note or any other Loan Document. Payments received will be applied to charges, fees and expenses (including attorneys’ fees), accrued interest and principal in any order the Bank may choose, in its sole discretion. Any amortization schedule provided to Borrower is only an estimate, and is superseded by the terms of this Note regarding the accrual and payment of interest.



7. **Late Payments; Default Rate.** If the Borrower fails to make any payment of principal, interest or other amount coming due pursuant to the provisions of this Note within 15 calendar days of the date due and payable, the Borrower also shall pay to the Bank a late charge equal to the lesser of 3% of the amount of such payment or \$100.00 (the “**Late Charge**”). Such 15-day period shall not be construed in any way to extend the due date of any such payment. Upon maturity, whether by acceleration, demand or otherwise, and at the Bank’s option upon the occurrence of any Event of Default (as hereinafter defined) and during the continuance thereof, amounts outstanding under this Note shall bear interest at the Default Rate. The Default Rate shall continue to apply whether or not judgment shall be entered on this Note. Both the Late Charge and the Default Rate are imposed as liquidated damages for the purpose of defraying the Bank’s expenses incident to the handling of delinquent payments, but are in addition to, and not in lieu of, the Bank’s exercise of any rights and remedies hereunder, under the other Loan Documents or under applicable law, and any fees and expenses of any agents or attorneys which the Bank may employ. In addition, the Default Rate reflects the increased credit risk to the Bank of carrying a loan that is in default. The Borrower agrees that the Late Charge and Default Rate are reasonable forecasts of just compensation for anticipated and actual harm incurred by the Bank, and that the actual harm incurred by the Bank cannot be estimated with certainty and without difficulty.

8. **Prepayment.** The Borrower shall have the right to prepay any amounts outstanding hereunder at any time and from time to time without penalty or premium, in whole or in part; subject, however, to payment of any break funding indemnification amounts owing pursuant to the paragraph entitled “Break Funding Indemnification” below. Upon request of Borrower, prepayments of the Facility shall be applied to reduce (i.e., reamortize) the subsequent scheduled payments of the Facility as set forth herein, so long as any such prepayment (a) shall not be less than One Million Dollars (\$1,000,000.00), and (b) shall be made concurrently with a regularly scheduled payment due on a Reset Date. For the avoidance of doubt, prepayments made pursuant to the preceding sentence shall not be deemed or construed by any party as (i) permitting Borrower to avoid making any regularly scheduled payments hereunder, or (ii) modifying the Maturity Date.

9. **Increased Costs; Yield Protection.** On written demand, together with written evidence of the justification therefor, the Borrower agrees to pay the Bank all direct costs incurred, any losses suffered or payments made by the Bank as a result of any Change in Law (hereinafter defined), imposing any reserve, deposit, allocation of capital or similar requirement (including without limitation, Regulation D of the Board of Governors of the Federal Reserve System) on the Bank, its holding company or any of their respective assets relative to the Facility. “**Change in Law**” means the occurrence, after the date of this Note, of any of the following: (a) the adoption or taking effect of any law, rule, regulation or treaty, (b) any change in any law, rule, regulation or treaty or in the administration, interpretation, implementation or application thereof by any governmental authority or (c) the making or issuance of any request, rule, guideline or directive (whether or not having the force of law) by any governmental authority; provided that notwithstanding anything herein to the contrary, (x) the Dodd-Frank Wall Street Reform and Consumer Protection Act and all requests, rules, guidelines or directives thereunder or issued in connection therewith and (y) all requests, rules, guidelines or directives promulgated by the Bank for International Settlements, the Basel Committee on Banking Supervision (or any successor or similar authority) or the United States or foreign regulatory authorities, in each case pursuant to Basel III, shall in each case be deemed to be a “Change in Law”, regardless of the date enacted, adopted or issued.

10. **Break Funding Indemnification.** The Borrower agrees to indemnify the Bank against any liabilities, losses or expenses (including, without limitation, loss of margin, any loss or expense sustained or incurred in liquidating or employing deposits from third parties, and any loss or expense incurred in connection with funds acquired to effect, fund or maintain any amounts hereunder (or any part thereof) bearing interest based on LIBOR) which the Bank sustains or incurs as a consequence of either (i) the Borrower’s failure to make a payment on the due date thereof, (ii) the Borrower’s revocation (expressly, by later inconsistent notices or otherwise) in whole or in part of any notice given to Bank to request, convert, renew or prepay any amounts bearing interest based on LIBOR, or (iii) the Borrower’s payment or prepayment (whether voluntary, after acceleration of the maturity of this Note or otherwise) or conversion of any amounts bearing interest based on LIBOR on a day other than the regularly scheduled due date therefor. A notice as to any amounts payable

pursuant to this paragraph given to the Borrower by the Bank shall, in the absence of manifest error, be conclusive and shall be payable upon demand. The Borrower's indemnification obligations hereunder shall survive the payment in full of all amounts payable hereunder.

**11. Other Loan Documents.** This Note is issued in connection with the Loan Agreement and the other Loan Documents (as the same may be amended, modified or renewed from time to time), and is secured by the property (if any) described in the Loan Documents and by any and all mortgages, security agreements, assignments, loan agreements, pledge agreements and other documents or instruments evidencing a security interest or other lien in favor of the Bank and delivered by the Borrower in connection with the Loan Agreement and the other Loan Documents. Such documents may be executed contemporaneously with the execution of this Note, or they may be executed and delivered at another time.

**12. Events of Default.** The occurrence of any "Event of Default" under the Loan Agreement shall constitute an "Event of Default" under this Note. Upon the occurrence and during the continuance of an Event of Default: subject to any cure periods in the Loan Agreement, (a) the Bank shall be under no further obligation to make advances hereunder; (b) if an Event of Default specified in clause (iii) or (iv) above shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder shall be immediately due and payable without demand or notice of any kind; (c) if any other Event of Default shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder, at the Bank's option and without demand or notice of any kind, may be accelerated and become immediately due and payable; (d) at the Bank's option, this Note will bear interest at the Default Rate from the date of the occurrence of the Event of Default; and (e) the Bank may exercise from time to time any of the rights and remedies available under the Loan Documents or under applicable law.

**13. Right of Setoff.** In addition to all liens upon and rights of setoff against the Borrower's money, securities or other property given to the Bank by law, the Bank shall have, with respect to the Borrower's obligations to the Bank under this Note and to the extent permitted by law, a contractual possessory security interest in and a contractual right of setoff against, and the Borrower hereby grants the Bank a security interest in, and hereby assigns, conveys, delivers, pledges and transfers to the Bank, all of the Borrower's right, title and interest in and to, all of the Borrower's deposits, moneys, securities and other property now or hereafter in the possession of or on deposit with, or in transit to, the Bank or any other direct or indirect subsidiary of The PNC Financial Services Group, Inc., whether held in a general or special account or deposit, whether held jointly with someone else, or whether held for safekeeping or otherwise, excluding, however, all IRA, Keogh, and trust accounts. Every such security interest and right of setoff may be exercised without demand upon or notice to the Borrower. Every such right of setoff shall be deemed to have been exercised immediately upon the occurrence of an Event of Default hereunder without any action of the Bank, although the Bank may enter such setoff on its books and records at a later time.

**14. Anti-Money Laundering/International Trade Law Compliance.** The Borrower represents and warrants to the Bank, as of the date hereof, the date of each advance of proceeds under the Facility, the date of any renewal, extension or modification of the Facility, and at all times until the Facility has been terminated and all amounts thereunder have been indefeasibly paid in full, that: (a) no Covered Entity (i) is a Sanctioned Person; (ii) has any of its assets in a Sanctioned Country or in the possession, custody or control of a Sanctioned Person; or (iii) does business in or with, or derives any of its operating income from investments in or transactions with, any Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (b) the proceeds of the Facility will not be used to fund any operations in, finance any investments or activities in, or, make any payments to, a Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (c) the funds used to repay the Facility are not derived from any unlawful activity; and (d) each Covered Entity is in compliance with, and no Covered Entity engages in any dealings or transactions prohibited by, any laws of the United States, including but not limited to any Anti-Terrorism Laws. Borrower covenants and agrees that it shall immediately notify the Bank in writing upon the occurrence of a Reportable Compliance Event. Notwithstanding anything to the contrary

herein or in any of the other Loan Documents, the collateral securing any debt, liabilities or other obligations of any Obligor to the Bank shall not include any Embargoed Property, but only to the extent and for so long as such collateral is or remains Embargoed Property.

As used herein: “**Anti-Terrorism Laws**” means any laws relating to terrorism, trade sanctions programs and embargoes, import/export licensing, money laundering, or bribery, all as amended, supplemented or replaced from time to time; “**Compliance Authority**” means each and all of the (a) U.S. Treasury Department/Office of Foreign Assets Control, (b) U.S. Treasury Department/Financial Crimes Enforcement Network, (c) U.S. State Department/Directorate of Defense Trade Controls, (d) U.S. Commerce Department/Bureau of Industry and Security, (e) U.S. Internal Revenue Service, (f) U.S. Justice Department, and (g) U.S. Securities and Exchange Commission; “**Covered Entity**” means the Borrower, its affiliates and subsidiaries, all guarantors, pledgors of collateral, all owners of the foregoing, and all brokers or other agents of the Borrower acting in any capacity in connection with the Facility; “**Embargoed Property**” means any property (a) in which a Sanctioned Person holds an interest; (b) beneficially owned, directly or indirectly, by a Sanctioned Person; (c) that is due to or from a Sanctioned Person; (d) that is located in a Sanctioned Country; or (e) that would otherwise cause any actual or possible violation by Bank of any applicable Anti-Terrorism Law if the Bank were to obtain an encumbrance on, lien on, pledge of or security interest in such property or provide services in consideration of such property; “**Reportable Compliance Event**” means that any Covered Entity becomes a Sanctioned Person, or is indicted, arraigned, investigated or custodially detained, or receives an inquiry from regulatory or law enforcement officials, in connection with any Anti-Terrorism Law or any predicate crime to any Anti-Terrorism Law, or self-discovers facts or circumstances implicating any aspect of its operations with the actual or possible violation of any Anti-Terrorism Law; “**Sanctioned Country**” means a country subject to a sanctions program maintained by any Compliance Authority; and “**Sanctioned Person**” means any individual person, group, regime, entity or thing listed or otherwise recognized as a specially designated, prohibited, sanctioned or debarred person or entity, or subject to any limitations or prohibitions (including but not limited to the blocking of property or rejection of transactions), under any order or directive of any Compliance Authority or otherwise subject to, or specially designated under, any sanctions program maintained by any Compliance Authority.

15. **[Reserved].**

16. **Miscellaneous.** All notices, demands, requests, consents, approvals and other communications required or permitted hereunder (“**Notices**”) must be in writing (except as may be agreed otherwise above with respect to borrowing requests or as otherwise provided in this Note) and will be effective upon receipt. Notices may be given in any manner to which the parties may agree. Without limiting the foregoing, first-class mail, postage prepaid, facsimile transmission and commercial courier service are hereby agreed to as acceptable methods for giving Notices. In addition, the parties agree that Notices may be sent electronically to any electronic address provided by a party from time to time. Notices may be sent to a party’s address as set forth above or to such other address as any party may give to the other for such purpose in accordance with this paragraph. No delay or omission on the Bank’s part to exercise any right or power arising hereunder will impair any such right or power or be considered a waiver of any such right or power, nor will the Bank’s action or inaction impair any such right or power. The Bank’s rights and remedies hereunder are cumulative and not exclusive of any other rights or remedies which the Bank may have under other agreements, at law or in equity. No modification, amendment or waiver of, or consent to any departure by the Borrower from, any provision of this Note will be effective unless made in a writing signed by the Bank, and then such waiver or consent shall be effective only in the specific instance and for the purpose for which given. Notwithstanding the foregoing, the Bank may modify this Note for the purposes of completing missing content or correcting erroneous content, without the need for a written amendment, provided that the Bank shall send a copy of any such modification to the Borrower (which notice may be given by electronic mail). The Borrower agrees to pay on demand, to the extent permitted by law, all costs and expenses incurred by the Bank in the enforcement of its rights in this Note and in any security therefor, including without limitation reasonable fees and expenses of the Bank’s counsel. If any provision of this Note is found to be invalid, illegal or unenforceable in any respect by a court, all the other provisions of this Note will remain in full force and effect. The Borrower and all other makers and indorsers of this Note hereby forever

waive presentment, protest, notice of dishonor, notice of non-payment, notice of intent to accelerate and notice of acceleration, and any other notice of any kind. The Borrower also waives all defenses based on suretyship or impairment of collateral. If this Note is executed by more than one Borrower, the obligations of such persons or entities hereunder will be joint and several. This Note shall bind the Borrower and its heirs, executors, administrators, successors and assigns, and the benefits hereof shall inure to the benefit of the Bank and its successors and assigns; provided, however, that the Borrower may not assign this Note in whole or in part without the Bank's written consent and the Bank at any time may assign this Note in whole or in part.

**17. Governing Law and Venue.** This Note has been delivered to and accepted by the Bank and will be deemed to be made in the State of New York (the "State"). **This Note will be interpreted and the rights and liabilities of the Bank and the Borrower determined in accordance with the laws of the state, excluding its conflict of laws rules, including without limitation the Electronic Transactions Act (or equivalent) in effect in the state (or, to the extent controlling, the laws of the United States Of America, including without limitation the Electronic Signatures in Global and National Commerce Act).** The Borrower hereby irrevocably consents to the exclusive jurisdiction of any state or federal court in the county or judicial district in the State; provided that nothing contained in this Note will prevent the Bank from bringing any action, enforcing any award or judgment or exercising any rights against the Borrower individually, against any security or against any property of the Borrower within any other county, state or other foreign or domestic jurisdiction. The Borrower acknowledges and agrees that the venue provided above is the most convenient forum for both the Bank and the Borrower. The Borrower waives any objection to venue and any objection based on a more convenient forum in any action instituted under this Note.

**18. Commercial Purpose.** The Borrower represents that the indebtedness evidenced by this Note is being incurred by the Borrower solely for the purpose of acquiring or carrying on a business, professional or commercial activity, and not for personal, family or household purposes.

**19. USA PATRIOT Act Notice.** To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify and record information that identifies each Borrower that opens an account. What this means: when the Borrower opens an account, the Bank will ask for the business name, business address, taxpayer identifying number and other information that will allow the Bank to identify the Borrower, such as organizational documents. For some businesses and organizations, the Bank may also need to ask for identifying information and documentation relating to certain individuals associated with the business or organization.

**20. Representation by Counsel.** The Borrower hereby represents that it has been represented by competent counsel of its choice, or has knowingly waived its right to use and retain counsel, in the negotiation and execution of this Note and the other Loan Documents; that it has read and fully understood the terms hereof; that the Borrower and any retained counsel have been afforded an opportunity to review, negotiate and modify the terms of this Note and the other Loan Documents; and that it intends to be bound hereby. In accordance with the foregoing, the general rule of construction to the effect that any ambiguities in a contract are to be resolved against the party drafting the contract shall not be employed in the construction and interpretation of this Note or any other Loan Document.

**21. Authorization to Obtain Credit Reports.** By signing below, each person, who is signing in his or her individual capacity, requests and provides written authorization to the Bank or its designee (and any assignee or potential assignee hereof) to obtain such individual's personal credit profile from one or more national credit bureaus. This authorization extends to obtaining a credit profile in (i) considering an application for credit that is evidenced, guaranteed or secured by this document, (ii) assessing creditworthiness and (iii) considering extensions of credit, including on an ongoing basis, as necessary for the purposes of (a) update, renewal or extension of such credit or additional credit, (b) reviewing, administering or collecting the resulting account and (c) reporting on the repayment and satisfaction of such credit obligations. By signing below, such individual further ratifies and confirms his or her prior requests and authorizations with respect to the matters set forth

herein. For the avoidance of doubt, this provision does not apply to persons signing below in their capacities as officers or other authorized representatives of entities, organizations or governmental bodies.

22. **Counterparts; Electronic Signatures and Records.** This Note and any other Loan Document may be signed in any number of counterpart copies and by the parties hereto on separate counterparts, but all such copies shall constitute one and the same instrument. Notwithstanding any other provision herein, the Borrower agrees that this Note, the Loan Documents, any amendments thereto, and any other information, notice, signature card, agreement or authorization related thereto (each, a “**Communication**”) may, at the Bank’s option, be in the form of an electronic record. Any Communication may, at the Bank’s option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention.

23. **WAIVER OF JURY TRIAL.** The Borrower irrevocably waives any and all rights the Borrower may have to a trial by jury in any action, proceeding or claim of any nature relating to this Note, any documents executed in connection with this Note or any transaction contemplated in any of such documents. The Borrower acknowledges that the foregoing waiver is knowing and voluntary.

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# Term Note

[SIGNATURE PAGE]

**The Borrower acknowledges that it has read and understands all the provisions of this Note, including the waiver of jury trial, and has been advised by counsel as necessary or appropriate.**

**WITNESS** the due execution hereof as a document under seal, as of the date first written above, with the intent to be legally bound hereby.

LUNA INNOVATIONS INCORPORATED,  
a Delaware corporation

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: Chief Executive Officer

## **LIBOR REPLACEMENT Rider**

(a) **Benchmark Replacement.** Notwithstanding anything to the contrary in the Note or in any other Loan Document, if the Bank determines that a Benchmark Transition Event or an Early Opt-in Event has occurred, the Bank may amend the Note to replace LIBOR with a Benchmark Replacement in accordance with the provisions of this Rider; and any such amendment shall be in writing, shall specify the date that the Benchmark Replacement is effective and will not require any further action or consent of the Borrower. Until the Benchmark Replacement is effective, amounts bearing interest with reference to LIBOR will continue to bear interest with reference to LIBOR; provided however, during a Benchmark Unavailability Period such amounts automatically will bear interest at the rate and on the terms that would have been applicable under the Note if the Bank had given notice that LIBOR had become unavailable.

(b) **Benchmark Replacement Conforming Changes.** In connection with the implementation of a Benchmark Replacement, the Bank will have the right to make Benchmark Replacement Conforming Changes from time to time and, notwithstanding anything to the contrary herein or in any other Loan Document, any amendments implementing such Benchmark Replacement Conforming Changes will become effective without any further action or consent of the Borrower.

(c) **Notices; Standards for Decisions and Determinations.** The Bank will promptly notify the Borrower of (i) the effectiveness of any Benchmark Replacement Conforming Changes and (ii) the commencement of any Benchmark Unavailability Period. Any determination, decision or election that may be made by the Bank pursuant to this Rider, including any determination with respect to a tenor, rate or adjustment or of the occurrence or non-occurrence of an event, circumstance or date and any decision to take or refrain from taking any action, will be conclusive and binding absent manifest error and may be made in its sole discretion and without consent from the Borrower, except, in each case, as expressly required pursuant to this Rider. In addition to any delivery method permitted pursuant to the terms of the Loan Documents, the Bank may provide any amendment, notice or other communication to the Borrower hereunder electronically (including to any electronic address that the Borrower provides to the Bank) or through an automated platform that the Bank provides to the Borrower.

(d) **Certain Defined Terms.** As used in this Rider:

“**Benchmark Replacement**” means the sum of: (a) the Benchmark Replacement Index and (b) the Benchmark Replacement Adjustment; provided that, if at any time the Benchmark Replacement as so determined would be less than the Benchmark Replacement Floor, the Benchmark Replacement will be deemed to be the Benchmark Replacement Floor for the purposes of the Note.

“**Benchmark Replacement Adjustment**” means, for each applicable LIBOR-based rate and tenor, the spread adjustment to the Benchmark Replacement Index, or method for calculating or determining such spread adjustment (which may be a positive or negative value or zero) that has been selected by the Bank (a) giving due consideration to (i) any selection or recommendation of a spread adjustment, or method for calculating or determining such spread adjustment, for the replacement of LIBOR with the applicable Benchmark Replacement Index by the Relevant Governmental Body or (ii) any evolving or then-prevailing market convention for determining a spread adjustment, or method for calculating or determining such spread adjustment, for such replacement of LIBOR for U.S. dollar-denominated credit facilities at such time and (b) which also may reflect adjustments to account for (i) the effects of the transition from LIBOR to the Benchmark Replacement and (ii) yield- or risk-based differences between LIBOR and the Benchmark Replacement.

**“Benchmark Replacement Commencement Date”** means the date a Benchmark Replacement has replaced LIBOR for all purposes under the Note in accordance with this Rider.

**“Benchmark Replacement Conforming Changes”** means, with respect to any Benchmark Replacement, any technical, administrative or operational changes (including, for example, changes to the definition of “Base Rate,” the definition of “LIBOR Interest Period,” timing and frequency of determining rates and making payments of interest and other administrative matters) that the Bank decides may be appropriate to reflect the adoption and implementation of such Benchmark Replacement and to permit the administration thereof by the Bank in a manner substantially consistent with market practice (or, if the Bank decides that adoption of any portion of such market practice is not administratively feasible or if the Bank determines that no market practice for the administration of the Benchmark Replacement exists, in such other manner of administration as the Bank decides is reasonably necessary in connection with the administration of the Note).

**“Benchmark Replacement Floor”** means the minimum rate of interest, if any, specified for LIBOR under the terms of the Note or, if no minimum rate of interest is specified, zero.

**“Benchmark Replacement Index”** means the alternate benchmark rate that has been selected by the Bank to replace LIBOR giving due consideration to (a) any selection or recommendation of a replacement rate or the mechanism for determining such a rate by the Relevant Governmental Body or (b) any evolving or then-prevailing market convention for determining a rate of interest as a replacement to LIBOR for U.S. dollar-denominated credit facilities.

**“Benchmark Replacement Transition Date”** means the earlier to occur of the following events with respect to LIBOR:

- (1) in the case of clause (1) or (2) of the definition of “Benchmark Transition Event,” the later of (a) the date of the public statement or publication of information referenced therein and (b) the date on which the administrator of LIBOR permanently or indefinitely ceases to provide LIBOR; or
- (2) in the case of clause (3) of the definition of “Benchmark Transition Event,” the date of the public statement or publication of information referenced therein.

**“Benchmark Transition Event”** means the occurrence of one or more of the following events with respect to LIBOR:

- (1) a public statement or publication of information by or on behalf of the administrator of LIBOR announcing that such administrator has ceased or will cease to provide LIBOR, permanently or indefinitely, provided that, at the time of such statement or publication, there is no successor administrator that will continue to provide LIBOR;
- (2) a public statement or publication of information by a Governmental Authority having jurisdiction over the Bank, the regulatory supervisor for the administrator of LIBOR, the U.S. Federal Reserve System, an insolvency official with jurisdiction over the administrator for LIBOR, a resolution authority with jurisdiction over the administrator for LIBOR or a court or an entity with similar insolvency or resolution authority over the administrator for LIBOR, which states that the administrator of LIBOR has ceased or will cease to provide LIBOR permanently or indefinitely, provided that, at the time of such statement or publication, there is no successor administrator that will continue to provide LIBOR; or
- (3) a public statement or publication of information by the regulatory supervisor for the administrator of LIBOR or a Governmental Authority having jurisdiction over the Bank announcing that LIBOR is no longer representative.



**“Benchmark Unavailability Period”** means the period, if any, beginning on the Benchmark Replacement Transition Date and ending on the Benchmark Replacement Commencement Date, it being understood that if the Benchmark Replacement Commencement Date occurs on or before the Benchmark Replacement Transition Date a Benchmark Unavailability Period will not occur.

**“Early Opt-in Event”** means a determination by the Bank that U.S. dollar-denominated credit facilities being executed at such time, or that include language similar to that contained in this Rider, are being executed or amended, as applicable, to incorporate or adopt a new benchmark interest rate to replace LIBOR.

**“Governmental Authority”** means the government of the United States of America or any other nation, or of any political subdivision thereof, whether state or local, and any agency, authority, instrumentality, regulatory body, court, central bank or other entity exercising executive, legislative, judicial, taxing, regulatory or administrative powers or functions of or pertaining to government (including any supra-national bodies such as the European Union or the European Central Bank).

**“LIBOR”** means, for purposes of this Rider only, any interest rate that is based on the London interbank offered rate, including the Daily LIBOR Rate.

**“Relevant Governmental Body”** means the Federal Reserve Board and/or the Federal Reserve Bank of New York, or a committee officially endorsed or convened by the Federal Reserve Board and/or the Federal Reserve Bank of New York or any successor thereto.

## **EXHIBIT A**

As used herein, the term “**Applicable Margin**” shall mean, beginning on the date hereof, two and one quarter percent (2.25%) per annum and, thereafter, the Applicable Margin shall be subject to adjustment as of the end of Borrower’s fiscal quarter ending after the Effective Date, based on the Net Leverage Ratio as of such quarter end and for each successive quarter thereafter. Any increase or decrease in the Applicable Margin computed as of a quarter end shall be effective on the date on which the Compliance Certificate evidencing such computation is due to be delivered under Section 6.2(d) of the Loan Agreement. For the avoidance of doubt, if the Net Leverage Ratio, measured as of the end of each fiscal quarter, is as described below, the Applicable Margin shall be the Applicable Margin appearing opposite the corresponding Net Leverage Ratio:

<b>Fiscal Quarter End Net Leverage Ratio</b>	<b>Applicable Margin</b>
Net Leverage Ratio less than or equal to 0.50 to 1.00	1.75%
Net Leverage Ratio greater than 0.50 to 1.00 and less than 1.25 to 1.00	2.00%
Net Leverage Ratio greater than or equal to 1.25 to 1.00	2.25%

Bank shall determine whether any adjustment to the Applicable Margin is to be made quarterly, based on the Compliance Certificate delivered to Bank pursuant to the Loan Agreement; provided, however, that if such Compliance Certificate is not timely delivered to Bank, then, at the option of Bank, an adjustment to the Applicable Margin shall be made based on an assumed delivery of said Compliance Certificate reflecting a Net Leverage Ratio which is greater than 1.25 to 1.00; provided, further, at the option of the Bank, on and after receipt of a notice that an Event of Default has occurred, the Default Rate may then apply as of the date of such Event of Default (as reasonably determined by Bank) and shall continue to apply to but excluding the date on which such Event of Default shall cease to be continuing (and thereafter, in each case, the Applicable Margin otherwise determined in accordance with this Exhibit A shall apply). Each such adjustment shall apply to all Advances then existing and any made during the period for which such adjustment becomes effective.



## Revolving Line of Credit Note

\$15,000,000.00 December 1, 2020

**FOR VALUE RECEIVED, LUNA INNOVATIONS INCORPORATED**, a Delaware corporation (the “**Borrower**”), with an address at 1 Riverside Circle, Suite 400, Roanoke, VA 24016, promises to pay to the order of **PNC BANK, NATIONAL ASSOCIATION** (the “**Bank**”), in lawful money of the United States of America in immediately available funds at its offices located at 1001 Haxall Point, Suite 706, Richmond, VA 23219, or at such other location as the Bank may designate from time to time, the principal sum of FIFTEEN MILLION AND NO/100 DOLLARS (\$15,000,000.00) (the “**Facility**”) or such lesser amount as may be advanced to or for the benefit of the Borrower hereunder, together with interest accruing on the outstanding principal balance from the date hereof, all as provided below. All capitalized terms used herein and not otherwise defined shall have the meanings assigned to such terms in the Loan Agreement (as defined below).

**1. Revolving Line of Credit Advances.** This Note evidences a revolving line of credit. The Borrower may borrow, repay and reborrow hereunder and the Bank may advance and readvance under this Note from time to time (each an “advance” and together the “advances”) until the Expiration Date, subject to the terms and conditions of this Note and the Loan Documents. The “**Expiration Date**” shall mean December 1, 2023, or such later date as may be designated by the Bank by written notice from the Bank to the Borrower. The Borrower acknowledges and agrees that in no event will the Bank be under any obligation to extend or renew the Facility or this Note beyond the Expiration Date. In no event shall the aggregate unpaid principal amount of advances under this Note exceed the face amount of this Note.

**2. Interest Rate and Payments.** Amounts outstanding under this Note will bear interest at a rate per annum which is at all times equal to the sum of the Daily LIBOR Rate (as defined below), plus the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof). Accrued interest will be due and payable on the first day of each month, beginning with the payment due on January 1, 2021. The outstanding principal balance and any accrued but unpaid interest shall be due and payable on the Expiration Date.

**3. Certain Definitions.** If the following terms are used in this Note, such terms shall have the meanings set forth below:

“**Alternate Rate**” shall mean the sum of (A) the Base Rate plus (B) the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof).

“**Base Rate**” shall mean the higher of (A) the Prime Rate in effect on such day, and (B) the sum of the Overnight Bank Funding Rate in effect on such day plus 50 basis points (0.50%). If and when the Base Rate (or any component thereof) changes, the rate of interest with respect to any amounts hereunder to which the Base Rate applies will change automatically without notice to the Borrower, effective on the date of any such change.

“**Business Day**” shall mean any day other than a Saturday or Sunday or a legal holiday on which commercial banks are authorized or required by law to be closed for business in New York, New York.

“**Daily LIBOR Rate**” shall mean, for any day, the rate per annum determined by the Bank by dividing (A) the Published Rate by (B) a number equal to 1.00 minus the percentage prescribed by the Federal Reserve for determining the maximum reserve requirements with respect to any eurocurrency fundings by

banks on such day; provided, however, if the Daily LIBOR Rate determined as provided above would be less than zero, then such rate shall be deemed to be zero. The rate of interest will be adjusted automatically as of each Business Day based on changes in the Daily LIBOR Rate without notice to the Borrower.

“**Default Rate**” shall mean the rate per annum (based on the actual number of days that principal is outstanding over a year of 360 days) equal to the lesser of (A) the sum of 3% plus the interest rate otherwise in effect from time to time under this Note, and (B) the Maximum Rate.

“**Loan Agreement**” shall mean that certain Loan Agreement by and among, the Borrower, the guarantors from time to time party thereto and Bank of even date herewith, as the same may have been modified or amended from time to time.

“**Maximum Rate**” shall mean the maximum rate of interest allowed by applicable law.

“**Overnight Bank Funding Rate**” shall mean, for any day, the rate comprised of both overnight federal funds and overnight Eurocurrency borrowings by U.S.-managed banking offices of depository institutions, as such composite rate shall be determined by the Federal Reserve Bank of New York (“**NYFRB**”), as set forth on its public website from time to time, and as published on the next succeeding Business Day as the overnight bank funding rate by the NYFRB (or by such other recognized electronic source (such as Bloomberg) selected by the Bank for the purpose of displaying such rate); provided, that if such day is not a Business Day, the Overnight Bank Funding Rate for such day shall be such rate on the immediately preceding Business Day; provided, further, that if such rate shall at any time, for any reason, no longer exist, a comparable replacement rate determined by the Bank at such time (which determination shall be conclusive absent manifest error). If the Overnight Bank Funding Rate determined as above would be less than zero, then such rate shall be deemed to be zero. The rate of interest charged shall be adjusted as of each Business Day based on changes in the Overnight Bank Funding Rate without notice to the Borrower.

“**Prime Rate**” shall mean the rate publicly announced by the Bank from time to time as its prime rate. The Prime Rate is determined from time to time by the Bank as a means of pricing some loans to its borrowers. The Prime Rate is not tied to any external rate of interest or index, and does not necessarily reflect the lowest rate of interest actually charged by the Bank to any particular class or category of customers.

“**Published Rate**” shall mean the rate of interest published each Business Day in the Wall Street Journal under the caption “London Interbank Offered Rates” for a one month period (or, if no such rate is published therein for any reason, then the Published Rate shall be the eurodollar rate for a one month period as published in another publication selected by the Bank).

4. **Advance Procedures.** Advances hereunder shall be permitted in the manner set forth in Section 3.4 of the Loan Agreement.

5. **Interest Calculation; Maximum Rate.** Interest will be calculated based on the actual number of days that principal is outstanding over a year of 360 days. In no event will the rate of interest hereunder exceed the Maximum Rate. Regardless of any other provision of this Note or the other Loan Documents, if for any reason the effective interest rate should exceed the Maximum Rate, the effective interest rate shall be deemed reduced to, and shall be, the Maximum Rate, and (i) the amount which would be excessive interest shall be deemed applied to the reduction of the principal balance of this Note and not to the payment of interest, and (ii) if the loan evidenced by this Note has been or is thereby paid in full, the excess shall be returned to the party paying same, such application to the principal balance of this Note or the refunding of such excess to be a complete settlement and acquittance thereof.

**6. Alternate LIBOR Rate Provisions.** If the Bank determines (which determination shall be final and conclusive) that, by reason of circumstances affecting the eurodollar market generally, deposits in dollars (in the applicable amounts) are not being offered to banks in the eurodollar market for the selected term, or adequate means do not exist for ascertaining the Daily LIBOR Rate, then the Bank shall give notice thereof to the Borrower. Thereafter, until the Bank notifies the Borrower that the circumstances giving rise to such suspension no longer exist, the interest rate for all amounts outstanding under this Note shall be equal to the Alternate Rate.

In addition, if, after the date of this Note, the Bank shall determine (which determination shall be final and conclusive) that any enactment, promulgation or adoption of or any change in any applicable law, rule or regulation, or any change in the interpretation or administration thereof by a governmental authority, central bank or comparable agency charged with the interpretation or administration thereof, or compliance by the Bank with any guideline, request or directive (whether or not having the force of law) of any such authority, central bank or comparable agency shall make it unlawful or impossible for the Bank to make or maintain or fund loans based on the Daily LIBOR Rate, the Bank shall notify the Borrower. Thereafter, until the Bank notifies the Borrower that the circumstances giving rise to such determination no longer apply, the interest rate on all amounts outstanding under this Note shall be the Alternate Rate.

The LIBOR Replacement Rider attached to this Note and incorporated herein by this reference provides a mechanism for determining an alternative rate of interest in the event that the London interbank offered rate is no longer available or in certain other circumstances. The Bank does not warrant or accept any responsibility for and shall not have any liability with respect to, the administration, submission or any other matter related to the London interbank offered rate or other rates in the definition of "LIBOR" or with respect to any alternative or successor rate thereto, or replacement rate therefor. To the extent that any term or provision of the LIBOR Replacement Rider is or may be inconsistent with any term or provision in the remainder of this Note or any other Loan Document, the terms and provisions of the LIBOR Replacement Rider shall control.

**7. Other Payment Terms.** If any payment under this Note shall become due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day and such extension of time shall be included in computing interest in connection with such payment. The Borrower hereby authorizes the Bank to charge the Borrower's deposit account at the Bank for any payment when due under this Note or any other Loan Document. Payments received will be applied to charges, fees and expenses (including attorneys' fees), accrued interest and principal in any order the Bank may choose, in its sole discretion.

**8. Late Payments; Default Rate.** If the Borrower fails to make any payment of principal, interest or other amount coming due pursuant to the provisions of this Note within 15 calendar days of the date due and payable, the Borrower also shall pay to the Bank a late charge equal to the lesser of 3% of the amount of such payment or \$100.00 (the "**Late Charge**"). Such 15-day period shall not be construed in any way to extend the due date of any such payment. Upon maturity, whether by acceleration, demand or otherwise, and at the Bank's option upon the occurrence of any Event of Default (as hereinafter defined) and during the continuance thereof, amounts outstanding under this Note shall bear interest at the Default Rate. The Default Rate shall continue to apply whether or not judgment shall be entered on this Note. Both the Late Charge and the Default Rate are imposed as liquidated damages for the purpose of defraying the Bank's expenses incident to the handling of delinquent payments, but are in addition to, and not in lieu of, the Bank's exercise of any rights and remedies hereunder, under the other Loan Documents or under applicable law, and any fees and expenses of any agents or attorneys which the Bank may employ. In addition, the Default Rate reflects the increased credit risk to the Bank of carrying a loan that is in default. The Borrower agrees that the Late Charge and Default Rate are reasonable forecasts of just compensation for anticipated and actual harm incurred by the Bank, and that the actual harm incurred by the Bank cannot be estimated with certainty and without difficulty.

**9. Prepayment.** The indebtedness evidenced by this Note may be prepaid in whole or in part at any time without penalty or premium.

**10. Increased Costs; Yield Protection.** On written demand, together with written evidence of the justification therefor, the Borrower agrees to pay the Bank all direct costs incurred, any losses suffered or payments made by the Bank as a result of any Change in Law (hereinafter defined), imposing any reserve, deposit, allocation of capital or similar requirement (including without limitation, Regulation D of the Board of Governors of the Federal Reserve System) on the Bank, its holding company or any of their respective assets relative to the Facility. “**Change in Law**” means the occurrence, after the date of this Note, of any of the following: (a) the adoption or taking effect of any law, rule, regulation or treaty, (b) any change in any law, rule, regulation or treaty or in the administration, interpretation, implementation or application thereof by any governmental authority or (c) the making or issuance of any request, rule, guideline or directive (whether or not having the force of law) by any governmental authority; provided that notwithstanding anything herein to the contrary, (x) the Dodd-Frank Wall Street Reform and Consumer Protection Act and all requests, rules, guidelines or directives thereunder or issued in connection therewith and (y) all requests, rules, guidelines or directives promulgated by the Bank for International Settlements, the Basel Committee on Banking Supervision (or any successor or similar authority) or the United States or foreign regulatory authorities, in each case pursuant to Basel III, shall in each case be deemed to be a “Change in Law”, regardless of the date enacted, adopted or issued.

**11. Other Loan Documents.** This Note is issued in connection with the Loan Agreement and the other Loan Documents (as the same may be amended, modified or renewed from time to time), and is secured by the property (if any) described in the Loan Documents and by any and all mortgages, security agreements, assignments, loan agreements, pledge agreements and other documents or instruments evidencing a security interest or other lien in favor of the Bank and delivered by the Borrower in connection with the Loan Agreement and the other Loan Documents. . Such documents may be executed contemporaneously with the execution of this Note, or they may be executed and delivered at another time.

**12. Events of Default.** The occurrence of any “Event of Default” under the Loan Agreement shall constitute an “**Event of Default**” under this Note. Upon the occurrence and during the continuance of an Event of Default: subject to any cure periods in the Loan Agreement, (a) the Bank shall be under no further obligation to make advances hereunder; (b) if an Event of Default specified in clause (iii) or (iv) above shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder shall be immediately due and payable without demand or notice of any kind; (c) if any other Event of Default shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder, at the Bank’s option and without demand or notice of any kind, may be accelerated and become immediately due and payable; (d) at the Bank’s option, this Note will bear interest at the Default Rate from the date of the occurrence of the Event of Default; and (e) the Bank may exercise from time to time any of the rights and remedies available under the Loan Documents or under applicable law.

**13. Right of Setoff.** In addition to all liens upon and rights of setoff against the Borrower’s money, securities or other property given to the Bank by law, the Bank shall have, with respect to the Borrower’s obligations to the Bank under this Note and to the extent permitted by law, a contractual possessory security interest in and a contractual right of setoff against, and the Borrower hereby grants the Bank a security interest in, and hereby assigns, conveys, delivers, pledges and transfers to the Bank, all of the Borrower’s right, title and interest in and to, all of the Borrower’s deposits, moneys, securities and other property now or hereafter in the possession of or on deposit with, or in transit to, the Bank or any other direct or indirect subsidiary of The PNC Financial Services Group, Inc., whether held in a general or special account or deposit, whether held jointly with someone else, or whether held for safekeeping or otherwise, excluding, however, all IRA, Keogh, and trust accounts. Every such security interest and right of setoff may be exercised without demand upon or notice to the Borrower. Every such right of setoff shall be deemed to have been exercised immediately upon the occurrence of an Event of Default hereunder without any action of the Bank, although the Bank may enter such setoff on its books and records at a later time.

**14. Anti-Money Laundering/International Trade Law Compliance.** The Borrower represents and warrants to the Bank, as of the date hereof, the date of each advance of proceeds under the Facility, the date of any renewal, extension or modification of the Facility, and at all times until the Facility has been terminated and all amounts thereunder have been indefeasibly paid in full, that: (a) no Covered Entity (i) is a Sanctioned Person; (ii) has any of its assets in a Sanctioned Country or in the possession, custody or control of a Sanctioned Person; or (iii) does business in or with, or derives any of its operating income from investments in or transactions with, any Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (b) the proceeds of the Facility will not be used to fund any operations in, finance any investments or activities in, or, make any payments to, a Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (c) the funds used to repay the Facility are not derived from any unlawful activity; and (d) each Covered Entity is in compliance with, and no Covered Entity engages in any dealings or transactions prohibited by, any laws of the United States, including but not limited to any Anti-Terrorism Laws. Borrower covenants and agrees that it shall immediately notify the Bank in writing upon the occurrence of a Reportable Compliance Event. Notwithstanding anything to the contrary herein or in any of the other Loan Documents, the collateral securing any debt, liabilities or other obligations of any Obligor to the Bank shall not include any Embargoed Property, but only to the extent and for so long as such collateral is or remains Embargoed Property.

As used herein: “**Anti-Terrorism Laws**” means any laws relating to terrorism, trade sanctions programs and embargoes, import/export licensing, money laundering, or bribery, all as amended, supplemented or replaced from time to time; “**Compliance Authority**” means each and all of the (a) U.S. Treasury Department/Office of Foreign Assets Control, (b) U.S. Treasury Department/Financial Crimes Enforcement Network, (c) U.S. State Department/Directorate of Defense Trade Controls, (d) U.S. Commerce Department/Bureau of Industry and Security, (e) U.S. Internal Revenue Service, (f) U.S. Justice Department, and (g) U.S. Securities and Exchange Commission; “**Covered Entity**” means the Borrower, its affiliates and subsidiaries, all guarantors, pledgors of collateral, all owners of the foregoing, and all brokers or other agents of the Borrower acting in any capacity in connection with the Facility; “**Embargoed Property**” means any property (a) in which a Sanctioned Person holds an interest; (b) beneficially owned, directly or indirectly, by a Sanctioned Person; (c) that is due to or from a Sanctioned Person; (d) that is located in a Sanctioned Country; or (e) that would otherwise cause any actual or possible violation by Bank of any applicable Anti-Terrorism Law if the Bank were to obtain an encumbrance on, lien on, pledge of or security interest in such property or provide services in consideration of such property; “**Reportable Compliance Event**” means that any Covered Entity becomes a Sanctioned Person, or is indicted, arraigned, investigated or custodially detained, or receives an inquiry from regulatory or law enforcement officials, in connection with any Anti-Terrorism Law or any predicate crime to any Anti-Terrorism Law, or self-discovers facts or circumstances implicating any aspect of its operations with the actual or possible violation of any Anti-Terrorism Law; “**Sanctioned Country**” means a country subject to a sanctions program maintained by any Compliance Authority; and “**Sanctioned Person**” means any individual person, group, regime, entity or thing listed or otherwise recognized as a specially designated, prohibited, sanctioned or debarred person or entity, or subject to any limitations or prohibitions (including but not limited to the blocking of property or rejection of transactions), under any order or directive of any Compliance Authority or otherwise subject to, or specially designated under, any sanctions program maintained by any Compliance Authority.

**15. [Reserved]**

**16. Miscellaneous.** All notices, demands, requests, consents, approvals and other communications required or permitted hereunder (“**Notices**”) must be in writing (except as may be agreed otherwise above with respect to borrowing requests or as otherwise provided in this Note) and will be effective upon receipt. Notices may be given in any manner to which the parties may agree. Without limiting the foregoing, first-class mail, postage prepaid, facsimile transmission and commercial courier service are hereby agreed to as acceptable methods for giving Notices. In addition, the parties agree that Notices may be sent electronically to any electronic address provided by a party from time to time. Notices may be sent to a party’s address as set forth above or to such other address as any party may give to the other for such purpose in accordance with this paragraph. No delay or

omission on the Bank's part to exercise any right or power arising hereunder will impair any such right or power or be considered a waiver of any such right or power, nor will the Bank's action or inaction impair any such right or power. The Bank's rights and remedies hereunder are cumulative and not exclusive of any other rights or remedies which the Bank may have under other agreements, at law or in equity. No modification, amendment or waiver of, or consent to any departure by the Borrower from, any provision of this Note will be effective unless made in a writing signed by the Bank, and then such waiver or consent shall be effective only in the specific instance and for the purpose for which given. Notwithstanding the foregoing, the Bank may modify this Note for the purposes of completing missing content or correcting erroneous content, without the need for a written amendment, provided that the Bank shall send a copy of any such modification to the Borrower (which notice may be given by electronic mail). The Borrower agrees to pay on demand, to the extent permitted by law, all costs and expenses incurred by the Bank in the enforcement of its rights in this Note and in any security therefor, including without limitation reasonable fees and expenses of the Bank's counsel. If any provision of this Note is found to be invalid, illegal or unenforceable in any respect by a court, all the other provisions of this Note will remain in full force and effect. The Borrower and all other makers and indorsers of this Note hereby forever waive presentment, protest, notice of dishonor, notice of non-payment, notice of intent to accelerate and notice of acceleration, and any other notice of any kind. The Borrower also waives all defenses based on suretyship or impairment of collateral. If this Note is executed by more than one Borrower, the obligations of such persons or entities hereunder will be joint and several. This Note shall bind the Borrower and its heirs, executors, administrators, successors and assigns, and the benefits hereof shall inure to the benefit of the Bank and its successors and assigns; provided, however, that the Borrower may not assign this Note in whole or in part without the Bank's written consent and the Bank at any time may assign this Note in whole or in part.

**17. Governing Law and Venue.** This Note has been delivered to and accepted by the Bank and will be deemed to be made in the State of New York (the "State"). **This Note will be interpreted and the rights and liabilities of the Bank and the Borrower determined in accordance with the laws of the state, excluding its conflict of laws rules, including without limitation the Electronic Transactions Act (or equivalent) in effect in the state (or, to the extent controlling, the laws of the United States Of America, including without limitation the Electronic Signatures in Global and National Commerce Act).** The Borrower hereby irrevocably consents to the exclusive jurisdiction of any state or federal court in the county or judicial district in the State; provided that nothing contained in this Note will prevent the Bank from bringing any action, enforcing any award or judgment or exercising any rights against the Borrower individually, against any security or against any property of the Borrower within any other county, state or other foreign or domestic jurisdiction. The Borrower acknowledges and agrees that the venue provided above is the most convenient forum for both the Bank and the Borrower. The Borrower waives any objection to venue and any objection based on a more convenient forum in any action instituted under this Note.

**18. Commercial Purpose.** The Borrower represents that the indebtedness evidenced by this Note is being incurred by the Borrower solely for the purpose of acquiring or carrying on a business, professional or commercial activity, and not for personal, family or household purposes.

**19. USA PATRIOT Act Notice.** To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify and record information that identifies each Borrower that opens an account. What this means: when the Borrower opens an account, the Bank will ask for the business name, business address, taxpayer identifying number and other information that will allow the Bank to identify the Borrower, such as organizational documents. For some businesses and organizations, the Bank may also need to ask for identifying information and documentation relating to certain individuals associated with the business or organization.

**20. Representation by Counsel.** The Borrower hereby represents that it has been represented by competent counsel of its choice, or has knowingly waived its right to use and retain counsel, in the negotiation and execution of this Note and the other Loan Documents; that it has read and fully understood the terms hereof; that the Borrower and any retained counsel have been afforded an opportunity to review, negotiate and modify the terms



of this Note and the other Loan Documents; and that it intends to be bound hereby. In accordance with the foregoing, the general rule of construction to the effect that any ambiguities in a contract are to be resolved against the party drafting the contract shall not be employed in the construction and interpretation of this Note or any other Loan Document.

**21. Authorization to Obtain Credit Reports.** By signing below, each person, who is signing in his or her individual capacity, requests and provides written authorization to the Bank or its designee (and any assignee or potential assignee hereof) to obtain such individual's personal credit profile from one or more national credit bureaus. This authorization extends to obtaining a credit profile in (i) considering an application for credit that is evidenced, guaranteed or secured by this document, (ii) assessing creditworthiness and (iii) considering extensions of credit, including on an ongoing basis, as necessary for the purposes of (a) update, renewal or extension of such credit or additional credit, (b) reviewing, administering or collecting the resulting account and (c) reporting on the repayment and satisfaction of such credit obligations. By signing below, such individual further ratifies and confirms his or her prior requests and authorizations with respect to the matters set forth herein. For the avoidance of doubt, this provision does not apply to persons signing below in their capacities as officers or other authorized representatives of entities, organizations or governmental bodies.

**22. Counterparts; Electronic Signatures and Records.** This Note and any other Loan Document may be signed in any number of counterpart copies and by the parties hereto on separate counterparts, but all such copies shall constitute one and the same instrument. Notwithstanding any other provision herein, the Borrower agrees that this Note, the Loan Documents, any amendments thereto, and any other information, notice, signature card, agreement or authorization related thereto (each, a "**Communication**") may, at the Bank's option, be in the form of an electronic record. Any Communication may, at the Bank's option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention.

**23. WAIVER OF JURY TRIAL.** The Borrower irrevocably waives any and all rights the Borrower may have to a trial by jury in any action, proceeding or claim of any nature relating to this Note, any documents executed in connection with this Note or any transaction contemplated in any of such documents. The Borrower acknowledges that the foregoing waiver is knowing and voluntary.

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# Revolving Line of Credit Note

[SIGNATURE PAGE]

**The Borrower acknowledges that it has read and understands all the provisions of this Note, including the waiver of jury trial, and has been advised by counsel as necessary or appropriate.**

**WITNESS** the due execution hereof as a document under seal, as of the date first written above, with the intent to be legally bound hereby.

LUNA INNOVATIONS INCORPORATED,  
a Delaware corporation

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: Chief Executive Officer

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## **LIBOR REPLACEMENT Rider**

(a) **Benchmark Replacement.** Notwithstanding anything to the contrary in the Note or in any other Loan Document, if the Bank determines that a Benchmark Transition Event or an Early Opt-in Event has occurred, the Bank may amend the Note to replace LIBOR with a Benchmark Replacement in accordance with the provisions of this Rider; and any such amendment shall be in writing, shall specify the date that the Benchmark Replacement is effective and will not require any further action or consent of the Borrower. Until the Benchmark Replacement is effective, amounts bearing interest with reference to LIBOR will continue to bear interest with reference to LIBOR; provided however, during a Benchmark Unavailability Period such amounts automatically will bear interest at the rate and on the terms that would have been applicable under the Note if the Bank had given notice that LIBOR had become unavailable.

(b) **Benchmark Replacement Conforming Changes.** In connection with the implementation of a Benchmark Replacement, the Bank will have the right to make Benchmark Replacement Conforming Changes from time to time and, notwithstanding anything to the contrary herein or in any other Loan Document, any amendments implementing such Benchmark Replacement Conforming Changes will become effective without any further action or consent of the Borrower.

(c) **Notices; Standards for Decisions and Determinations.** The Bank will promptly notify the Borrower of (i) the effectiveness of any Benchmark Replacement Conforming Changes and (ii) the commencement of any Benchmark Unavailability Period. Any determination, decision or election that may be made by the Bank pursuant to this Rider, including any determination with respect to a tenor, rate or adjustment or of the occurrence or non-occurrence of an event, circumstance or date and any decision to take or refrain from taking any action, will be conclusive and binding absent manifest error and may be made in its sole discretion and without consent from the Borrower, except, in each case, as expressly required pursuant to this Rider. In addition to any delivery method permitted pursuant to the terms of the Loan Documents, the Bank may provide any amendment, notice or other communication to the Borrower hereunder electronically (including to any electronic address that the Borrower provides to the Bank) or through an automated platform that the Bank provides to the Borrower.

(d) **Certain Defined Terms.** As used in this Rider:

“**Benchmark Replacement**” means the sum of: (a) the Benchmark Replacement Index and (b) the Benchmark Replacement Adjustment; provided that, if at any time the Benchmark Replacement as so determined would be less than the Benchmark Replacement Floor, the Benchmark Replacement will be deemed to be the Benchmark Replacement Floor for the purposes of the Note.

“**Benchmark Replacement Adjustment**” means, for each applicable LIBOR-based rate and tenor, the spread adjustment to the Benchmark Replacement Index, or method for calculating or determining such spread adjustment (which may be a positive or negative value or zero) that has been selected by the Bank (a) giving due consideration to (i) any selection or recommendation of a spread adjustment, or method for calculating or determining such spread adjustment, for the replacement of LIBOR with the applicable Benchmark Replacement Index by the Relevant Governmental Body or (ii) any evolving or then-prevailing market convention for determining a spread adjustment, or method for calculating or determining such spread adjustment, for such replacement of LIBOR for U.S. dollar-denominated credit facilities at such time and (b) which also may reflect adjustments to account for (i) the effects of the transition from LIBOR to the Benchmark Replacement and (ii) yield- or risk-based differences between LIBOR and the Benchmark Replacement.

**“Benchmark Replacement Commencement Date”** means the date a Benchmark Replacement has replaced LIBOR for all purposes under the Note in accordance with this Rider.

**“Benchmark Replacement Conforming Changes”** means, with respect to any Benchmark Replacement, any technical, administrative or operational changes (including, for example, changes to the definition of “Base Rate,” the definition of “LIBOR Interest Period,” timing and frequency of determining rates and making payments of interest and other administrative matters) that the Bank decides may be appropriate to reflect the adoption and implementation of such Benchmark Replacement and to permit the administration thereof by the Bank in a manner substantially consistent with market practice (or, if the Bank decides that adoption of any portion of such market practice is not administratively feasible or if the Bank determines that no market practice for the administration of the Benchmark Replacement exists, in such other manner of administration as the Bank decides is reasonably necessary in connection with the administration of the Note).

**“Benchmark Replacement Floor”** means the minimum rate of interest, if any, specified for LIBOR under the terms of the Note or, if no minimum rate of interest is specified, zero.

**“Benchmark Replacement Index”** means the alternate benchmark rate that has been selected by the Bank to replace LIBOR giving due consideration to (a) any selection or recommendation of a replacement rate or the mechanism for determining such a rate by the Relevant Governmental Body or (b) any evolving or then-prevailing market convention for determining a rate of interest as a replacement to LIBOR for U.S. dollar-denominated credit facilities.

**“Benchmark Replacement Transition Date”** means the earlier to occur of the following events with respect to LIBOR:

- (1) in the case of clause (1) or (2) of the definition of “Benchmark Transition Event,” the later of (a) the date of the public statement or publication of information referenced therein and (b) the date on which the administrator of LIBOR permanently or indefinitely ceases to provide LIBOR; or
- (2) in the case of clause (3) of the definition of “Benchmark Transition Event,” the date of the public statement or publication of information referenced therein.

**“Benchmark Transition Event”** means the occurrence of one or more of the following events with respect to LIBOR:

- (1) a public statement or publication of information by or on behalf of the administrator of LIBOR announcing that such administrator has ceased or will cease to provide LIBOR, permanently or indefinitely, provided that, at the time of such statement or publication, there is no successor administrator that will continue to provide LIBOR;
- (2) a public statement or publication of information by a Governmental Authority having jurisdiction over the Bank, the regulatory supervisor for the administrator of LIBOR, the U.S. Federal Reserve System, an insolvency official with jurisdiction over the administrator for LIBOR, a resolution authority with jurisdiction over the administrator for LIBOR or a court or an entity with similar insolvency or resolution authority over the administrator for LIBOR, which states that the administrator of LIBOR has ceased or will cease to provide LIBOR permanently or indefinitely, provided that, at the time of such statement or publication, there is no successor administrator that will continue to provide LIBOR; or
- (3) a public statement or publication of information by the regulatory supervisor for the administrator of LIBOR or a Governmental Authority having jurisdiction over the Bank announcing that LIBOR is no longer representative.

**“Benchmark Unavailability Period”** means the period, if any, beginning on the Benchmark Replacement Transition Date and ending on the Benchmark Replacement Commencement Date, it being understood that if the Benchmark Replacement Commencement Date occurs on or before the Benchmark Replacement Transition Date a Benchmark Unavailability Period will not occur.

**“Early Opt-in Event”** means a determination by the Bank that U.S. dollar-denominated credit facilities being executed at such time, or that include language similar to that contained in this Rider, are being executed or amended, as applicable, to incorporate or adopt a new benchmark interest rate to replace LIBOR.

**“Governmental Authority”** means the government of the United States of America or any other nation, or of any political subdivision thereof, whether state or local, and any agency, authority, instrumentality, regulatory body, court, central bank or other entity exercising executive, legislative, judicial, taxing, regulatory or administrative powers or functions of or pertaining to government (including any supra-national bodies such as the European Union or the European Central Bank).

**“LIBOR”** means, for purposes of this Rider only, any interest rate that is based on the London interbank offered rate, including the Daily LIBOR Rate.

**“Relevant Governmental Body”** means the Federal Reserve Board and/or the Federal Reserve Bank of New York, or a committee officially endorsed or convened by the Federal Reserve Board and/or the Federal Reserve Bank of New York or any successor thereto.

## **EXHIBIT A**

As used herein, the term “**Applicable Margin**” shall mean, beginning on the date hereof, two and one quarter percent (2.25%) per annum and, thereafter, the Applicable Margin shall be subject to adjustment as of the end of Borrower’s fiscal quarter ending after the Effective Date, based on the Net Leverage Ratio as of such quarter end and for each successive quarter thereafter. Any increase or decrease in the Applicable Margin computed as of a quarter end shall be effective on the date on which the Compliance Certificate evidencing such computation is due to be delivered under Section 6.2(d) of the Loan Agreement. For the avoidance of doubt, if the Net Leverage Ratio, measured as of the end of each fiscal quarter, is as described below, the Applicable Margin shall be the Applicable Margin appearing opposite the corresponding Net Leverage Ratio:

<b>Fiscal Quarter End Net Leverage Ratio</b>	<b>Applicable Margin</b>
Net Leverage Ratio less than or equal to 0.50 to 1.00	1.75%
Net Leverage Ratio greater than 0.50 to 1.00 and less than 1.25 to 1.00	2.00%
Net Leverage Ratio greater than or equal to 1.25 to 1.00	2.25%

Bank shall determine whether any adjustment to the Applicable Margin is to be made quarterly, based on the Compliance Certificate delivered to Bank pursuant to the Loan Agreement; provided, however, that if such Compliance Certificate is not timely delivered to Bank, then, at the option of Bank, an adjustment to the Applicable Margin shall be made based on an assumed delivery of said Compliance Certificate reflecting a Net Leverage Ratio which is greater than 1.25 to 1.00; provided, further, at the option of the Bank, on and after receipt of a notice that an Event of Default has occurred, the Default Rate may then apply as of the date of such Event of Default (as reasonably determined by Bank) and shall continue to apply to but excluding the date on which such Event of Default shall cease to be continuing (and thereafter, in each case, the Applicable Margin otherwise determined in accordance with this Exhibit A shall apply). Each such adjustment shall apply to all Advances then existing and any made during the period for which such adjustment becomes effective.

SUBSIDIARIES

Luna Technologies, Inc.  
Former Luna Subsidiary, Inc. (previously Advanced Photonix, Inc.)  
TeraMetrix, LLC  
General Photonics Corporation  
OptaSense Holdings Limited  
OptaSense Limited  
OptaSense Inc.  
OptaSense Canada Ltd.

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We have issued our report dated March 12, 2021, with respect to the consolidated financial statements in the Annual Report of Luna Innovations Incorporated on Form 10-K for the year ended December 31, 2020. We consent to the incorporation by reference of said report in the Registration Statements of Luna Innovations Incorporated on Form S-3 (File No. 333-191809), on Form S-4 (File No. 333-201956) and on Forms S-8 (File No. 333-211802, File No. 333-204435, File No. 333-138745 and File No 333-239362).

/s/ GRANT THORNTON LLP

Philadelphia, Pennsylvania  
March 12, 2021



**CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO  
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Scott A. Graeff, certify that:

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

Date: March 12, 2021

/s/ Scott A. Graeff

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**Scott A. Graeff**  
**President and Chief Executive Officer**  
**(principal executive officer)**

**CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO  
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Eugene J. Nestro, certify that:

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

Date: March 12, 2021

/s/ Eugene J. Nestro

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**Eugene J. Nestro**  
**Chief Financial Officer**  
**(principal financial officer)**

**CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO  
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the annual report of Luna Innovations Incorporated (the "Company") on Form 10-K for the year ended December 31, 2020 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Scott A. Graeff, President and Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

This certification accompanies this Report to which it relates, shall not be deemed "filed" with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Report), irrespective of any general incorporation language contained in such filing.

/s/ Scott A. Graeff

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**Scott A. Graeff**

**President and Chief Executive Officer  
(principal executive officer)**

March 12, 2021

**CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO  
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with to the annual report of Luna Innovations Incorporated (the “Company”) on Form 10-K for the year ended December 31, 2020 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Eugene J. Nestro, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

This certification accompanies this Report to which it relates, shall not be deemed “filed” with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Report), irrespective of any general incorporation language contained in such filing.

/s/ Eugene J. Nestro

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**Eugene J. Nestro**  
**Chief Financial Officer**  
**(principal financial officer)**

March 12, 2021