

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549**

FORM 10-Q

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

For the quarterly period ended March 31, 2021

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 First Street 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 |

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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 Accelerated filer
Non-accelerated filer Smaller reporting company
Emerging growth company

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

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

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date: As of May 13, 2021, there were 31,418,971 shares of the registrant's common stock outstanding.

**LUNA INNOVATIONS INCORPORATED
QUARTERLY REPORT ON FORM 10-Q
FOR THE QUARTER ENDED MARCH 31, 2021**

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PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

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

| | March 31, 2021 (unaudited) | December 31, 2020 |
|---|-------------------------------|-------------------|
| Assets | | |
| Current assets: | | |
| Cash and cash equivalents | \$ 11,794 | \$ 15,366 |
| Accounts receivable, net | 23,697 | 24,951 |
| Contract assets | 8,328 | 7,046 |
| Inventory | 25,550 | 23,597 |
| Prepaid expenses and other current assets | 5,388 | 4,509 |
| Total current assets | 74,757 | 75,469 |
| Property and equipment, net | 3,329 | 3,308 |
| Intangible assets, net | 19,642 | 20,109 |
| Goodwill | 18,309 | 18,121 |
| Long-term contract assets | — | 471 |
| Operating lease right-of-use asset | 10,820 | 11,281 |
| Finance lease right-of-use asset | 232 | 244 |
| Other assets | 118 | 39 |
| Deferred tax asset | 1,699 | 1,960 |
| Total assets | \$ 128,906 | \$ 131,002 |
| Liabilities and stockholders' equity | | |
| Liabilities: | | |
| Current liabilities: | | |
| Current portion of long-term debt obligations | \$ 4,167 | \$ 4,167 |
| Accounts payable | 4,108 | 4,393 |
| Accrued liabilities | 10,732 | 12,159 |
| Contract liabilities | 6,228 | 7,095 |
| Current portion of operating lease liability | 2,195 | 2,223 |
| Current portion of finance lease liability | 48 | 48 |
| Total current liabilities | 27,478 | 30,085 |
| Long-term debt obligations | 14,781 | 15,817 |
| Long-term portion of operating lease liability | 9,702 | 10,248 |
| Long-term portion of operating lease liability | 184 | 196 |
| Other long-term liabilities | 214 | 214 |
| Total liabilities | 52,359 | 56,560 |
| Commitments and contingencies (Note 12) | | |
| Stockholders' equity: | | |
| Common stock, par value \$0.001, 100,000,000 shares authorized, 33,113,774 and 32,724,512 shares issued, 31,392,989 and 31,024,537 shares outstanding at March 31, 2021 and December 31, 2020, respectively | 33 | 33 |
| Treasury stock at cost, 1,720,785 and 1,699,975 shares at March 31, 2021 and December 31, 2020, respectively | (4,991) | (4,789) |
| Additional paid-in capital | 93,905 | 92,403 |
| Accumulated deficit | (13,275) | (12,957) |
| Accumulated other comprehensive income/(loss) | 875 | (248) |
| Total stockholders' equity | 76,547 | 74,442 |
| Total liabilities and stockholders' equity | \$ 128,906 | \$ 131,002 |

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

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

| | Three Months Ended March 31, | |
|--|------------------------------|------------|
| | 2021 | 2020 |
| Revenues: | | |
| Lightwave | \$ 20,997 | \$ 11,554 |
| Luna Labs | 5,302 | 5,587 |
| Total revenues | 26,299 | 17,141 |
| Cost of revenues: | | |
| Lightwave | 8,771 | 4,885 |
| Luna Labs | 4,099 | 3,892 |
| Total cost of revenues | 12,870 | 8,777 |
| Gross profit | 13,429 | 8,364 |
| Operating expense: | | |
| Selling, general and administrative | 11,290 | 6,377 |
| Research, development and engineering | 2,933 | 1,597 |
| Total operating expense | 14,223 | 7,974 |
| Operating (loss)/income | (794) | 390 |
| Other income/(expense): | | |
| Investment income | — | 59 |
| Other income | — | 9 |
| Interest expense, net | (143) | — |
| Total other (expense)/income | (143) | 68 |
| (Loss)/income from continuing operations before income taxes | (937) | 458 |
| Income tax (benefit)/expense | (619) | 138 |
| Net (loss)/income from continuing operations | (318) | 320 |
| Loss from discontinued operations, net of income tax of \$464 | — | (1,436) |
| Net loss | (318) | (1,116) |
| Net (loss)/income per share from continuing operations: | | |
| Basic | \$ (0.01) | \$ 0.01 |
| Diluted | \$ (0.01) | \$ 0.01 |
| Net loss per share from discontinued operations: | | |
| Basic | \$ — | \$ (0.05) |
| Diluted | \$ — | \$ (0.04) |
| Net loss per share attributable to common stockholders: | | |
| Basic | \$ (0.01) | \$ (0.04) |
| Diluted | \$ (0.01) | \$ (0.03) |
| Weighted average shares: | | |
| Basic | 31,350,629 | 30,380,345 |
| Diluted | 33,353,456 | 32,549,487 |

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

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

| | Three Months Ended March 31, | |
|---|-------------------------------------|-------------------|
| | 2021 | 2020 |
| Net loss | \$ (318) | \$ (1,116) |
| Other comprehensive income | 1,123 | — |
| Total other comprehensive income/(loss) | <u>\$ 805</u> | <u>\$ (1,116)</u> |

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

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

| | Three Months Ended March 31, 2021 | | | | | | | |
|---|-----------------------------------|--------------|------------------|-------------------|----------------------------------|------------------------|---|------------------|
| | Common Stock | | Treasury Stock | | Additional Paid-in Capital | Accumulated Deficit | Accumulated Other Comprehensive (Loss) Income | Total |
| | Shares | \$ | Shares | \$ | \$ | \$ | \$ | \$ |
| Balance at December 31, 2020 | 31,024,537 | \$ 33 | 1,699,975 | \$ (4,789) | \$ 92,403 | \$ (12,957) | \$ (248) | \$ 74,442 |
| Exercise of stock options | 314,697 | — | — | — | 845 | — | — | 845 |
| Share-based compensation | 74,565 | — | — | — | 657 | — | — | 657 |
| Purchase of treasury stock | (20,810) | — | 20,810 | (202) | — | — | — | (202) |
| Net loss | — | — | — | — | — | (318) | — | (318) |
| Foreign currency translation adjustment | — | — | — | — | — | — | 1,123 | 1,123 |
| Balance at March 31, 2021 | <u>31,392,989</u> | <u>\$ 33</u> | <u>1,720,785</u> | <u>\$ (4,991)</u> | <u>\$ 93,905</u> | <u>\$ (13,275)</u> | <u>\$ 875</u> | <u>\$ 76,547</u> |

| | Three Months Ended March 31, 2020 | | | | | | | |
|---------------------------------|-----------------------------------|--------------|------------------|-------------------|----------------------------------|------------------------|--|------------------|
| | Common Stock | | Treasury Stock | | Additional Paid-in Capital | Accumulated Deficit | Accumulated Other Comprehensive Income | Total |
| | Shares | \$ | Shares | \$ | \$ | \$ | \$ | \$ |
| Balance at December 31, 2019 | 30,149,105 | \$ 32 | 1,639,791 | \$ (4,337) | \$ 88,022 | \$ (16,248) | — | \$ 67,469 |
| Exercise of stock options | 316,504 | — | — | — | 1,198 | — | — | 1,198 |
| Share-based compensation | 55,668 | — | — | — | 502 | — | — | 502 |
| Net loss | — | — | — | — | — | (1,116) | — | (1,116) |
| Forfeitures of restricted stock | (34,700) | — | — | — | (276) | — | — | (276) |
| Balance at March 31, 2020 | <u>30,486,577</u> | <u>\$ 32</u> | <u>1,639,791</u> | <u>\$ (4,337)</u> | <u>\$ 89,446</u> | <u>\$ (17,364)</u> | <u>\$ —</u> | <u>\$ 67,777</u> |

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

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

| | Three Months Ended March 31, | |
|--|-------------------------------------|------------------|
| | 2021 | 2020 |
| Cash flows used in operating activities | | |
| Net loss | \$ (318) | \$ (1,116) |
| Adjustments to reconcile net loss to net cash used in operating activities | | |
| Depreciation and amortization | 1,231 | 679 |
| Share-based compensation | 657 | 226 |
| Bad debt expense | — | 14 |
| Loss from discontinued operations, net of tax | — | 1,436 |
| Deferred taxes | 262 | (127) |
| Change in assets and liabilities | | |
| Accounts receivable | 1,439 | 737 |
| Contract assets | (729) | 111 |
| Inventory | (1,617) | (897) |
| Other current assets | (847) | (287) |
| Other long term assets | (80) | — |
| Accounts payable and accrued expenses | (1,939) | (760) |
| Contract liabilities | (992) | (318) |
| Net cash used in operating activities | <u>(2,933)</u> | <u>(302)</u> |
| Cash flows (used in)/provided by investing activities | | |
| Acquisition of property and equipment | (361) | (74) |
| Intangible property costs | (48) | (91) |
| Proceeds from sale of discontinued operations | — | 600 |
| Net cash (used in)/provided by investing activities | <u>(409)</u> | <u>435</u> |
| Cash flows (used in)/provided by financing activities | | |
| Payments on finance lease obligations | (12) | (13) |
| Payments of debt obligations | (1,036) | — |
| Repurchase of common stock | (202) | — |
| Proceeds from the exercise of options and warrants | 845 | 1,198 |
| Net cash (used in)/provided by financing activities | <u>(405)</u> | <u>1,185</u> |
| Effect of exchange rate changes on cash and cash equivalents | 175 | — |
| Net (decrease)/increase in cash and cash equivalents | (3,572) | 1,318 |
| Cash and cash equivalents—beginning of period | 15,366 | 25,006 |
| Cash and cash equivalents—end of period | <u>\$ 11,794</u> | <u>\$ 26,324</u> |
| Supplemental disclosure of cash flow information | | |
| Cash paid for interest | \$ 125 | \$ 1 |
| Cash received for income tax refund, net | \$ 87 | \$ — |

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

Luna Innovations Incorporated
Notes to Unaudited Consolidated Financial Statements

1. Basis of Presentation and Significant Accounting Policies

Nature of Operations

Luna Innovations Incorporated (“we,” “Luna Innovations” 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, 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 advanced materials, sensing, and healthcare applications. Our business model is designed to accelerate the process of bringing new and innovative products to market. We use our in-house technical expertise across a range of technologies to perform applied research services for companies and for government funded projects. We continue to invest in product development and commercialization, which we anticipate will lead to increased product sales growth.

Unaudited Interim Financial Information

The accompanying unaudited consolidated interim financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (“U.S. GAAP”) for interim financial statements and Article 10 of Regulation S-X of the Securities Exchange Act of 1934, as amended. Accordingly, they do not include all of the information and footnotes required by U.S. GAAP for annual financial statements. The unaudited consolidated interim financial statements have been prepared on the same basis as the annual financial statements and in the opinion of management reflect all adjustments, consisting of only normal recurring accruals considered necessary to present fairly our financial position at March 31, 2021, results of operations, comprehensive income, changes in stockholders’ equity and cash flows for the three months ended March 31, 2021 and 2020. The results of operations for the three months ended March 31, 2021, are not necessarily indicative of the results that may be expected for the year ending December 31, 2021. The consolidated balance sheet as of December 31, 2020 was derived from our audited consolidated financial statements.

The COVID-19 pandemic has resulted in a global slowdown of economic activity. While the impact of the COVID-19 pandemic to our business and operating results presents additional uncertainty, we continue to use reasonably available information to assess certain accounting matters including, but not limited to, accounts receivable, inventory and the carrying value of goodwill and other long-lived tangible and intangible assets. While the assessments have not resulted in any material impacts to our financial statements as of March 31, 2021, we believe the full impact of the pandemic remains uncertain and ongoing developments related to the pandemic may cause material impacts to our consolidated financial statements.

The consolidated interim financial statements, including our significant accounting policies, should be read in conjunction with the audited Consolidated Financial Statements and the notes thereto for the year ended December 31, 2020, included in our Annual Report on Form 10-K as filed with the Securities and Exchange Commission (“SEC”) on March 12, 2021.

Goodwill and Intangible Assets

Goodwill and intangible assets with indefinite lives are not amortized but are tested for impairment on an annual basis, as of October 1 of each year, or whenever events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. Purchased intangible assets with finite useful lives are amortized using the straight-line method over their estimated useful lives and reviewed for impairment as described above.

Fair Value Measurements

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in the principal or most advantageous market in an orderly transaction between marketplace participants. Various valuation approaches can be used to determine fair value, each requiring different valuation inputs. The following hierarchy classifies the inputs used to determine fair value into three levels:

- 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.

Reportable Segments

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

During the three months ended June 30, 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 three months ended June 30, 2020, we reported under two different reporting segments, Products and Licensing and Technology Development. We have reflected these new segment measures beginning in the three months ended June 30, 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.

Net Income Per Share

Basic per share data is computed by dividing our net income by the weighted average number of shares outstanding during the period. Diluted per share data is computed by dividing net income 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 shares of common stock 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 effects of 2.0 million and 2.2 million common stock equivalents are included for the diluted per share data for the three months ended March 31, 2021 and 2020, respectively. Stock options and deferred stock units credited to our directors under our non-employee deferred compensation plan are included in our common stock equivalents for the three months ended March 31, 2021 and 2020.

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 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 adopted ASU 2019-12, effective January 1, 2021. The adoption of ASU 2019-12 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.

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.

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. New Ridge'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.

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 following table summarizes the allocation of the purchase consideration of the OptaSense acquisition (excluding cash of \$5.2 million):

| | <i>(in thousands)</i> | |
|---------------------------------------|-----------------------|---------|
| Accounts receivable | \$ | 5,553 |
| Contract assets | | 2,823 |
| Inventory | | 11,483 |
| Other current assets | | 1,026 |
| Property and equipment | | 1,247 |
| Identifiable intangible assets | | 11,263 |
| Goodwill | | 7,619 |
| Right of use assets | | 2,082 |
| Other long-term assets | | 22 |
| Accounts payable and accrued expenses | | (4,089) |
| Contract liabilities | | (3,259) |
| Other current liabilities | | (747) |
| Long-term operating lease liability | | (1,335) |
| Total purchase consideration | \$ | 33,688 |

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

| <i>(in thousands)</i> | Estimated Useful Life | OptaSense |
|----------------------------|--------------------------|-----------|
| Developed technology | 10 years | \$ 7,379 |
| Trade names and trademarks | 15 years | 2,580 |
| Backlog | 3 years | 699 |
| Customer relationships | 5 years | 605 |
| | | \$ 11,263 |

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. 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. A discount rate of 17.5% was used to discount the cash flows 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 brand. 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. A discount rate of 17.5% was used to discount the cash flows 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. A discount rate of 17.5% was used to discount these cash flows 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 the period presented as if the acquisition of OptaSense had been completed on January 1, 2019. The pro forma information includes adjustments to amortization expense for the intangible assets acquired and interest expense for the additional debt used to partially fund the acquisition price.

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 acquisition of OptaSense 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.

| | For the three months ended |
|-----------------------------------|---------------------------------------|
| | March 31, 2020 |
| <i>(in thousands)</i> | |
| Revenue | \$ 24,866 |
| Income from continuing operations | \$ 760 |

3. Intangible assets, net

Intangible assets, net at March 31, 2021 and December 31, 2020 consisted of the following:

| | March 31, 2021 | December 31, 2020 |
|-----------------------------------|-----------------------|--------------------------|
| <i>(in thousands)</i> | | |
| Patent costs | \$ 5,780 | \$ 5,702 |
| Developed technology | 17,559 | 17,344 |
| In-process research & development | 1,580 | 1,580 |
| Customer base | 1,302 | 1,302 |
| Trade names | 3,122 | 3,122 |
| Backlog | 696 | 696 |
| | <u>30,039</u> | <u>29,746</u> |
| Accumulated amortization | (10,397) | (9,637) |
| | <u>\$ 19,642</u> | <u>\$ 20,109</u> |

Amortization expense for the three months ended March 31, 2021 was \$0.8 million. Estimated aggregate amortization, based on the net value of intangible assets at March 31, 2021, for each of the next five years and beyond is as follows (amounts in thousands):

| Year Ending December 31, | | |
|---------------------------------|----|---------------|
| 2021 - remaining 9 months | \$ | 2,545 |
| 2022 | | 2,906 |
| 2023 | | 2,807 |
| 2024 | | 2,316 |
| 2025 | | 2,293 |
| 2026 & beyond | | 6,775 |
| Total | \$ | <u>19,642</u> |

4. Goodwill

Goodwill was \$18.3 million and \$18.1 million at March 31, 2021 and December 31, 2020, respectively, and has been allocated to the Lightwave segment. The change in goodwill during the three months ended March 31, 2021 related to foreign currency translation.

5. 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 were as follows:

| | March 31, 2021 | December 31, 2020 |
|-----------------------|---------------------------|------------------------------|
| <i>(in thousands)</i> | | |
| Finished goods | \$ 10,382 | \$ 11,547 |
| Work-in-process | 2,536 | 1,425 |
| Raw materials | 12,632 | 10,625 |
| Total inventory | <u>\$ 25,550</u> | <u>\$ 23,597</u> |

6. Accrued Liabilities

Accrued liabilities at March 31, 2021 and December 31, 2020 consisted of the following:

| | March 31, 2021 | December 31, 2020 |
|-----------------------------|-----------------------|--------------------------|
| <i>(in thousands)</i> | | |
| Accrued compensation | \$ 8,309 | \$ 9,103 |
| Contingent consideration | 225 | 225 |
| Accrued professional fees | 679 | 825 |
| Accrued income tax | 112 | 281 |
| Accrued interest | 24 | 42 |
| Accrued royalties | 454 | 456 |
| Accrued liabilities - other | 929 | 1,227 |
| Total accrued liabilities | <u>\$ 10,732</u> | <u>\$ 12,159</u> |

7. Debt

Long-term debt consisted of the following:

| <i>(in thousands)</i> | March 31, 2021 | December 31, 2020 |
|--|----------------|-------------------|
| Term Loan (net of debt issuance costs of \$61 and \$66, 2.48% and 2.48% at March 31, 2021 and December 31, 2020, respectively) | \$ 11,398 | \$ 12,434 |
| Revolving Loan (2.48% at March 31, 2021 and December 31, 2020) | 7,550 | 7,550 |
| | 18,948 | 19,984 |
| Less: Current portion of long-term debt obligations | (4,167) | (4,167) |
| Long-term debt obligations | \$ 14,781 | \$ 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 March 31, 2021.

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.

Maturities on debt are as follows *(in thousands)*:

| Year Ending December 31, | Amount |
|---------------------------------|---------------|
| 2021 - remaining 9 months | \$ 3 |
| 2022 | 4 |
| 2023 | 11 |
| Total | \$ 18 |

Interest expense, net for the three months ended March 31, 2021 and 2020 consisted of the following:

| <i>(in thousands)</i> | Three Months Ended March 31, | |
|-------------------------------------|-------------------------------------|-------------|
| | 2021 | 2020 |
| Interest expense on Term Loan | \$ 76 | \$ |
| Interest expense on Revolving Line | 30 | |
| Amortization of debt issuance costs | 11 | |
| Other interest expense | 26 | |
| Interest income | — | |
| Total interest expense, net | \$ 143 | \$ |

8. Leases

We recognize right-of-use ("ROU") assets and lease liabilities on the balance sheet for those leases classified as operating or finance leases with terms greater than twelve months.

We have operating leases for our facilities, which have remaining terms ranging from 1 to 10 years. Most of our leases do not have an option to extend the lease period beyond the stated term unless the new term is agreed to 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 3 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 statements 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 March 31, 2021, 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> | Three Months Ended March 31, | |
|-----------------------|-------------------------------------|-------------|
| | 2021 | 2020 |
| Operating lease costs | \$ 709 | \$ 412 |
| Variable rent costs | (29) | (39) |
| Total rent expense | \$ 680 | \$ 373 |

Future minimum lease payments under non-cancelable operating and finance leases were as follows as of March 31, 2021 (amounts in thousands):

| | Operating Leases | Finance Leases |
|-------------------------------------|------------------|----------------|
| Year Ending December 31, | | |
| 2021 - remaining 9 months | \$ 2,374 | \$ 39 |
| 2022 | 2,614 | 53 |
| 2023 | 2,351 | 53 |
| 2024 | 1,880 | 53 |
| 2025 | 1,196 | 47 |
| 2026 and beyond | 3,882 | — |
| Total future minimum lease payments | 14,297 | 245 |
| Less: interest | 2,400 | 13 |
| Total lease liabilities | \$ 11,897 | \$ 232 |
| | | |
| Current lease liability | \$ 2,195 | \$ 48 |
| Long-term lease liability | 9,702 | 184 |
| Total lease liabilities | \$ 11,897 | \$ 232 |

Other information related to leases is as follows:

| | Three Months Ended March 31, | |
|--|------------------------------|--------|
| <i>(in thousands, except weighted-average data)</i> | 2021 | 2020 |
| Finance lease cost: | | |
| Amortization of right-of-use assets | \$ 14 | \$ 14 |
| Interest on lease liabilities | 1 | 1 |
| Total finance lease cost | \$ 15 | \$ 15 |
| | | |
| Other information: | | |
| Cash paid for amounts included in the measurement of lease liabilities: | | |
| Operating cash flows from operating leases | \$ 709 | \$ 378 |
| Finance cash flows from finance leases | \$ 12 | \$ 13 |
| Right-of-use assets obtained in exchange for new operating lease liabilities | \$ — | \$ — |
| Right-of-use assets obtained in exchange for new finance lease liabilities | \$ — | \$ — |
| Weighted-average remaining lease term (years) - operating leases | 6.2 | 3.7 |
| Weighted-average remaining lease term (years) - finance leases | 4.7 | 1.9 |
| Weighted-average discount rate - operating leases | 6 % | 7 % |
| Weighted-average discount rate - finance leases | 2 % | 7 % |

9. Capital Stock and Share-Based Compensation

Stock Options

During the three months ended March 31, 2021, we granted options to purchase 80,735 shares of our common stock. The general terms of the stock options are similar to awards previously granted by us.

The fair values of stock options granted were estimated using the following weighted-average assumptions:

| | Three Months Ended March 31, 2021 | |
|--------------------------|-----------------------------------|---|
| Risk-free rate | 0.98 | % |
| Expected volatility | 55.22 | % |
| Expected term (in years) | | 7 |

The weighted average fair value of stock options granted during the three months ended March 31, 2021 was \$5.24 per share. The fair value of each stock option was determined using the Black-Scholes model.

For each of the three months ended March 31, 2021 and 2020 we recognized \$0.3 million in share-based compensation expense related to stock options, which is included in our selling, general and administrative expense in the accompanying consolidated interim financial statements. We expect to recognize \$2.2 million in share-based compensation expense over the weighted-average remaining service period of 2.2 years for stock options outstanding as of March 31, 2021.

Restricted Stock Units

During the three months ended March 31, 2021, we granted 79,250 time-based restricted stock units ("RSUs"). The general terms of the RSUs are similar to awards previously granted by us.

The weighted average fair value of the time-based RSUs granted during the three months ended March 31, 2021 was \$11.40 per share. The fair value of each RSU was determined based on the market price of our stock on the date of grant.

In addition, pursuant to our Deferred Compensation Plan, non-employee directors can elect to defer the receipt of some or all of the equity compensation that they receive for board and committee service. During the three months ended March 31, 2021, we granted 4,658 RSUs pursuant to the Deferred Compensation Plan. The general terms of the RSUs are similar to awards previously granted by us. The weighted average fair value of the RSUs granted during the three months ended March 31, 2021 was \$9.42 per share. The fair value of each RSU was determined based on the market price of our stock on the date of grant.

For each of the three months ended March 31, 2021 and 2020 we recognized \$0.3 million in share-based compensation expense related to RSUs, which is included in our selling, general and administrative expense in the accompanying consolidated interim financial statements. We expect to recognize \$1.8 million in share-based compensation expense over the weighted-average remaining service period of 2.2 years for RSUs outstanding as of March 31, 2021.

Employee Stock Purchase Plan ("ESPP")

For the three months ended March 31, 2021 we recognized \$0.1 million in share-based compensation expense related to the ESPP, which is included in our selling, general and administrative expense in the accompanying statement of operations. There was no share-based compensation expense related to the ESPP for the three months ended March 31, 2020.

10. 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 three months ended March 31, 2021 and 2020:

| (in thousands) | Three Months Ended March 31, | | | | | |
|---|------------------------------|-----------------|------------------|------------------|-----------------|------------------|
| | 2021 | | | 2020 | | |
| | Lightwave | Luna Labs | Total | Lightwave | Luna Labs | Total |
| | (unaudited) | | | | | |
| Total Revenue by Geographic Location | | | | | | |
| United States | \$ 10,579 | \$ 5,263 | \$ 15,842 | \$ 5,852 | \$ 5,587 | \$ 11,439 |
| Asia | 3,672 | — | 3,672 | 3,756 | — | 3,756 |
| Europe | 3,977 | 27 | 4,004 | 1,713 | — | 1,713 |
| Canada, Central and South America | 2,769 | 12 | 2,781 | 206 | — | 206 |
| All Others | — | — | — | 27 | — | 27 |
| Total | \$ 20,997 | \$ 5,302 | \$ 26,299 | \$ 11,554 | \$ 5,587 | \$ 17,141 |
| Total Revenue by Major Customer Type | | | | | | |
| Sales to the U.S. government | \$ 2,414 | \$ 4,927 | \$ 7,341 | \$ 1,825 | \$ 5,011 | \$ 6,836 |
| U.S. direct commercial sales and other | 8,165 | 337 | 8,502 | 4,027 | 576 | 4,603 |
| Foreign commercial sales & other | 10,418 | 38 | 10,456 | 5,702 | — | 5,702 |
| Total | \$ 20,997 | \$ 5,302 | \$ 26,299 | \$ 11,554 | \$ 5,587 | \$ 17,141 |
| Total Revenue by Contract Type | | | | | | |
| Fixed-price contracts | \$ 20,405 | \$ 3,232 | \$ 23,637 | \$ 11,554 | \$ 2,540 | \$ 14,094 |
| Cost-type contracts | 592 | 2,070 | 2,662 | — | 3,047 | 3,047 |
| Total | \$ 20,997 | \$ 5,302 | \$ 26,299 | \$ 11,554 | \$ 5,587 | \$ 17,141 |
| Total Revenue by Timing of Recognition | | | | | | |
| Goods transferred at a point in time | \$ 16,839 | \$ 310 | \$ 17,149 | \$ 9,761 | \$ 480 | \$ 10,241 |
| Goods/services transferred over time | 4,158 | 4,992 | 9,150 | 1,793 | 5,107 | 6,900 |
| Total | \$ 20,997 | \$ 5,302 | \$ 26,299 | \$ 11,554 | \$ 5,587 | \$ 17,141 |
| Total Revenue by Major Products/Services | | | | | | |
| Technology development | \$ 2,140 | \$ 4,992 | \$ 7,132 | \$ 1,708 | \$ 5,107 | \$ 6,815 |
| Test, measurement and sensing systems | 18,519 | — | 18,519 | 9,761 | — | 9,761 |
| Other | 338 | 310 | 648 | 85 | 480 | 565 |
| Total | \$ 20,997 | \$ 5,302 | \$ 26,299 | \$ 11,554 | \$ 5,587 | \$ 17,141 |

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 return 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. For the three months ended March 31, 2021, net contract assets/(liabilities) increased \$1.7 million, due primarily to an increase in our Fixed-Price contracts that have not yet reached milestones as designated in their respective contracts but for which revenue has been recognized. The increase is also attributable to subcontractor work that has been performed but not yet invoiced.

The following table shows the components of our contract balances as of March 31, 2021 and December 31, 2020:

| <i>(in thousands)</i> | March 31, 2021 | December 31, 2020 |
|-----------------------|-----------------------|--------------------------|
| Contract assets | \$ 8,328 | \$ 7,517 |
| Contract liabilities | 6,228 | 7,095 |
| Net contract assets | \$ 2,100 | \$ 422 |

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 \$36.1 million at March 31, 2021. We expect to satisfy 65% of the performance obligations in 2021, 29% in 2022 and the remainder by 2025. The approximate value of our Luna Labs segment's unfulfilled performance obligations was \$19.4 million at March 31, 2021. We expect to satisfy 59% of the performance obligations in 2021, 36% in 2022 and the remainder by 2023.

11. Reportable Segments

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

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 March 31, 2021, our Chief Executive Officer and his direct reports (collectively represented our chief operating decision maker, or 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 (see Note 1 to our Financial Statements, "Organization and Summary of Significant Accounting Policies," presented in our Annual Report on Form 10-K as filed with the SEC on March 12, 2021).

The table below presents revenues and operating income/(loss) for reportable segments:

| <i>(in thousands)</i> | Three Months Ended March 31, | |
|-----------------------------------|------------------------------|------------------|
| | 2021 | 2020 |
| | (unaudited) | |
| Revenues: | | |
| Lightwave | \$ 20,997 | \$ 11,554 |
| Luna Labs | 5,302 | 5,587 |
| Total revenues | <u>\$ 26,299</u> | <u>\$ 17,141</u> |
| Lightwave operating loss | \$ (309) | \$ (22) |
| Luna Labs operating (loss)/income | (485) | 412 |
| Total operating (loss)/income | <u>\$ (794)</u> | <u>\$ 390</u> |
| Depreciation, Lightwave | \$ 354 | \$ 200 |
| Depreciation, Luna Labs | \$ 34 | \$ 47 |
| Amortization, Lightwave | \$ 826 | \$ 405 |
| Amortization, Luna Labs | \$ 17 | \$ 27 |

The table below presents assets for reportable segments:

| <i>(in thousands)</i> | March 31, | December 31, |
|--|-------------------|-------------------|
| | 2021 | 2020 |
| | (unaudited) | |
| Total segment assets: | | |
| Lightwave | \$ 111,434 | \$ 110,446 |
| Luna Labs | 17,472 | 20,556 |
| Total assets | <u>\$ 128,906</u> | <u>\$ 131,002</u> |
| Property plant and equipment, and intangible assets, Lightwave | \$ 40,561 | \$ 40,995 |
| Property plant and equipment, and intangible assets, Luna Labs | \$ 719 | \$ 543 |

The U.S. government accounted for 28% and 40% of total consolidated revenues for the three months ended March 31, 2021 and 2020, respectively.

International revenues (customers outside the United States) accounted for 40% and 33% of total consolidated revenues for the three months ended March 31, 2021 and 2020, respectively. Customers in China represented 11% of total revenues for the three months ended March 31, 2020, while no other single country, outside of the United States, represented more than 10% of total revenues for the three months ended March 31, 2021 and 2020.

12. Commitments and Contingencies

We are from time to time involved in certain legal proceedings in the ordinary course of conducting our business. While the ultimate liability pursuant to these actions cannot currently be determined, we believe it is not reasonably possible that these legal proceedings will have a material adverse effect on our financial position or results of operations.

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 had been received with \$2.5 million remaining in escrow pending resolution of the dispute. In March 2020, we settled the dispute resulting in us receiving \$0.6 million and Macom receiving \$1.9 million. For the three months ended March 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.

We executed non-cancelable purchase orders totaling \$1.5 million in the third quarter of 2020 and \$1.6 million in the fourth quarter of 2020 for multiple shipments of tunable lasers to be delivered over an 12-month period. At March 31, 2021, approximately \$2.2 million of these commitments remained and are expected to be delivered by December 31, 2021.

We have entered into indemnification agreements with our officers and directors, to the extent permitted by law, pursuant to which we have agreed to reimburse the officers and directors for legal expenses in the event of litigation and regulatory matters. The terms of these indemnification agreements provide for no limitation to the maximum potential future payments. We have a directors and officers insurance policy that may, in certain instances, mitigate the potential liability and payments.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

CAUTIONARY NOTE REGARDING FORWARD LOOKING STATEMENTS

This Quarterly Report on Form 10-Q, including the sections entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Quantitative and Qualitative Disclosures About Market Risk" under Items 2 and 3, respectively, of Part I of this report, and the section entitled "Risk Factors" under Item 1A of Part II of this report, may 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 fact are "forward-looking statements" for purposes of these statutes, 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 and plans for growth and future operations, the potential impacts of the COVID-19 pandemic on our business, operations and financial results, 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 Quarterly Report on Form 10-Q and elsewhere within this report.

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.

Overview of Our Business

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 ("PIC"s) 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, the Lightwave segment and the Luna Labs segment.

Our Lightwave segment consists of our fiber optics testing, measurement and sensing solutions. Our Lightwave segment revenues represented approximately 80% and 67% of our total revenues for the three months ended March 31, 2021 and 2020, respectively.

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. Revenues from product sales are mostly derived from the sales of our sensing and test, measurement and control 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.

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, these revenues will reflect a broader and more diversified mix of products. 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 in December 2020 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 Luna Labs segment performs applied research principally in the areas of sensing and instrumentation, advanced materials and health sciences. Our Luna Labs segment comprised 20% and 33% of our total revenues for the three months ended March 31, 2021 and 2020, 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 \$36.1 million and \$35.9 million at March 31, 2021 and December 31, 2020, respectively. The approximate value of our Luna Labs segment backlog was \$19.4 million and \$19.0 million at March 31, 2021 and December 31, 2020, respectively.

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.

Description of Revenues, Costs and Expenses

Impact of COVID-19 Pandemic

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 adverse material impacts from the 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, and represented 80% and 67% of our total revenues for the three months ended March 31, 2021 and 2020, respectively.

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 and in collaboration agreements. 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. The Luna Labs segment revenues represented 20% and 33% of total revenues for the three months ended March 31, 2021 and 2020, respectively.

Cost of Revenues

Cost of revenues associated with our 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 our 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 expenses, 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

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

Our discussion and analysis of our financial condition and results of operations are based on our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires us to make estimates, assumptions and judgments that affect the amounts reported in our financial statements and the accompanying notes. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. Actual results may differ from these estimates under different assumptions or judgments.

The COVID-19 pandemic has resulted and is expected to continue to result in a slowdown of economic activity that is likely to interrupt business operations across the globe. Estimates and assumptions about future events and their effects cannot be determined with certainty and therefore require the exercise of judgment. As of the date of issuance of our financial statements included in this report, we are not aware of any specific event or circumstance that would require us to update our estimates, assumptions and judgments or revise the reported amounts of assets and liabilities or the disclosure of contingent assets and liabilities. These estimates, however, may change as new events occur and additional information is obtained, and are recognized in the financial statements as soon as they become known.

Our critical accounting policies are described in the Management's Discussion and Analysis section and the notes to our audited consolidated financial statements previously included in our Annual Report on Form 10-K for the year ended December 31, 2020, as filed with the Securities and Exchange Commission ("SEC") on March 12, 2021.

Results of Operations

Three Months Ended March 31, 2021 Compared to Three Months Ended March 31, 2020

Revenues

| (in thousands) | Three Months Ended March 31, | | \$ Difference | % Difference |
|----------------|------------------------------|-----------|---------------|--------------|
| | 2021 | 2020 | | |
| Revenues: | | | | |
| Lightwave | \$ 20,997 | \$ 11,554 | \$ 9,443 | 82 % |
| Luna Labs | 5,302 | 5,587 | (285) | (5)% |
| Total revenues | \$ 26,299 | \$ 17,141 | \$ 9,158 | 53 % |

Lightwave segment revenues for the three months ended March 31, 2021 increased \$9.4 million, or 82%, to \$21.0 million compared to \$11.6 million for the three months ended March 31, 2020. The vast majority of the increase in revenues for the three months ended March 31, 2021, compared to the three months ended March 31, 2020, was due to the revenues from OptaSense which was acquired on December 3, 2020. Excluding OptaSense, we also experienced growth in sales of our sensing and communications testing products. Revenues from our Luna Labs segment for the three months ended March 31, 2021 decreased \$0.3 million, or 5%, to \$5.3 million compared to \$5.6 million for the three months ended March 31, 2020.

Cost of Revenues and Gross Profit

| <i>(in thousands)</i> | Three Months Ended March 31, | | \$ Difference | % Difference |
|--------------------------|-------------------------------------|-----------------|----------------------|---------------------|
| | 2021 | 2020 | | |
| Cost of revenues: | | | | |
| Lightwave | \$ 8,771 | \$ 4,885 | \$ 3,886 | 80 % |
| Luna Labs | 4,099 | 3,892 | 207 | 5 % |
| Total cost of revenues | 12,870 | 8,777 | 4,093 | 47 % |
| Gross profit | \$ 13,429 | \$ 8,364 | \$ 5,065 | 61 % |

The cost of revenues for the Lightwave segment increased by \$3.9 million, or 80%, to \$8.8 million for the three months ended March 31, 2021, compared to \$4.9 million for the three months ended March 31, 2020. This increase in cost of revenues resulted from the OptaSense business and higher sales volume in our sensing and communications testing products. The cost of revenues for the Luna Labs segment for the three months ended March 31, 2021 increased \$0.2 million, or 5%, to \$4.1 million compared to \$3.9 million for the three months ended March 31, 2020.

Our overall gross margin increased to 51% for the three months ended March 31, 2021, compared to 49% for the three months ended March 31, 2020, primarily as a result of a higher mix of sales from our Lightwave segment.

Operating Expense

| <i>(in thousands)</i> | Three Months Ended March 31, | | \$ Difference | % Difference |
|---------------------------------------|-------------------------------------|-------------|----------------------|---------------------|
| | 2021 | 2020 | | |
| Operating expense: | | | | |
| Selling, general and administrative | \$ 11,290 | \$ 6,377 | \$ 4,913 | 77 % |
| Research, development and engineering | 2,933 | 1,597 | 1,336 | 84 % |
| Total operating expense | \$ 14,223 | \$ 7,974 | \$ 6,249 | 78 % |

Our selling, general and administrative expense increased \$4.9 million, or 77%, to \$11.3 million for the three months ended March 31, 2021, compared to \$6.4 million for the three months ended March 31, 2020. Selling, general and administrative expense increased primarily due to the acquired OptaSense operations and integration costs.

Research, development and engineering expense increased \$1.3 million, or 84%, to \$2.9 million for the three months ended March 31, 2021, compared to \$1.6 million for the three months ended March 31, 2020. Research, development and engineering expense increased primarily due to the acquired OptaSense operations.

(Loss)/Income from Continuing Operations Before Income Tax

During the three months ended March 31, 2021, we recognized a loss from continuing operations before income taxes of \$0.9 million compared to income from continuing operations before income taxes of \$0.5 million for the three months ended March 31, 2020.

Income Tax (Benefit)/Expense

For the three months ended March 31, 2021, we recognized an income tax benefit from continuing operations of \$0.6 million, compared to an income tax expense from continuing operations of \$0.1 million for the three months ended March 31, 2020, respectively. The income tax benefit for the three months ended March 31, 2021 is primarily related to the pre-tax loss for the quarter and deductions on vested RSUs and stock option exercises.

Liquidity and Capital Resources

At March 31, 2021, our total cash and cash equivalents were \$11.8 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 March 31, 2021 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 Quarterly Report on Form 10-Q. 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

| <i>(in thousands)</i> | Three Months Ended March 31, | | \$ Difference |
|--|-------------------------------------|-----------------|----------------------|
| | 2021 | 2020 | |
| Net cash used in operating activities | \$ (2,933) | \$ (302) | \$ (2,631) |
| Net cash (used in)/provided by investing activities | (409) | 435 | (844) |
| Net cash (used in)/provided by financing activities | (405) | 1,185 | (1,590) |
| Net (decrease)/increase in cash and cash equivalents | <u>\$ (3,747)</u> | <u>\$ 1,318</u> | <u>\$ (5,065)</u> |

During the first three months of 2021, the \$2.9 million of net cash used in operating activities consisted of our net loss of \$0.3 million, which included non-cash charges for depreciation and amortization of \$1.2 million, share-based compensation of \$0.7 million, and deferred tax asset of \$0.3 million offset by a net cash outflow of \$4.8 million from changes in working capital. The changes in working capital include a decrease in accounts payable and accrued expenses of \$1.9 million, a decrease in contract liabilities of \$1.0 million, a decrease in accounts receivable of \$1.4 million, an increase in inventory of \$1.6 million, an increase in other current assets of \$0.8 million, and an increase in contract assets of \$0.7 million.

During the first three months of 2020, the \$0.3 million of net cash used in operating activities consisted of our net loss of \$1.1 million, which included non-cash charges for depreciation and amortization of \$0.7 million, share-based compensation of \$0.2 million, a net cash outflow of \$1.4 million from changes in working capital all partially reduced by a net loss from discontinued operations of \$1.4 million. The changes in working capital include a decrease in accounts payable and accrued expenses of accounts receivable of \$0.8 million, a decrease in contract liabilities of \$0.3 million and an increase in inventory of \$0.9 million, all partially offset by a decrease in accounts receivable of \$0.7 million.

Cash used in investing activities during the three months ended March 31, 2021 included \$0.4 million of fixed asset additions. Net cash provided by investing activities during the three months ended March 31, 2020 included \$0.6 million in proceeds from sale of discontinued operations, partially offset by \$0.1 million of fixed asset additions and \$0.1 million of capitalized intellectual property costs.

Cash used in financing activities during the three months ended March 31, 2021 consisted primarily of \$1.0 million in payments towards our debt obligations and \$0.2 million to repurchase our common stock, partially offset by proceeds from the exercise of stock options of \$0.8 million. Net cash provided by financing activities during the three months ended March 31, 2020 consisted primarily of \$1.2 million in proceeds received from the exercise of options.

Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements as of March 31, 2021.

ITEM 3. 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 March 31, 2021, we had outstanding borrowings under our Term Loan and Revolving Loan of \$11.4 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 March 31, 2021, our exposure to foreign currency rate fluctuations is not material to our financial condition or results of operations.

ITEM 4. 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 also include, without limitation, controls and procedures 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 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 quarterly 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 March 31, 2021, 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

No change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) occurred during the three months ended March 31, 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting. March 31, 2021.

PART II. OTHER INFORMATION

ITEM 1. 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.

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 SEC 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.

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 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.
 - 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.

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 three months ended March 31, 2021 and 2020, revenues generated under the SBIR program represented 35% and 38%, 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 March 31, 2021, we had approximately 412 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 20% and 33% of our consolidated total revenues for the three months ended March 31, 2021 and 2020, 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.

Our amended and restated bylaws provide that the Court of Chancery of the State of Delaware and the U.S. federal district courts will be the exclusive forums for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated bylaws provide that the Court of Chancery of the State of Delaware is the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law:

- any derivative claim or cause of action brought on our behalf;
- any claim or cause of action asserting a breach of fiduciary duty;
- any claim or cause of action against us arising under DGCL;
- any claim or cause of action arising under or seeking to interpret our amended and restated certificate of incorporation or our amended and restated bylaws; and
- any claim or cause of action against us that is governed by the internal affairs doctrine.

The provisions would not apply to suits brought to enforce a duty or liability created by the Exchange Act. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our amended and restated bylaws further provide that, unless we consent to the selection of an alternate forum, the U.S. federal district courts will be the exclusive forum for resolving any complaint asserting a cause or causes of action arising under the Securities Act.

While the Delaware courts have determined that such choice of forum provisions are facially valid, a stockholder may nevertheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our amended and restated bylaws. This may require significant additional costs associated with resolving such action in other jurisdictions and there can be no assurance that the provisions will be enforced by a court in those other jurisdictions.

These exclusive forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage lawsuits against us and our directors, officers and other employees. If a court were to find either exclusive-forum provision in our amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur further significant additional costs associated with resolving the dispute in other jurisdictions, all of which could seriously harm our business.

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 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS*(a) Unregistered Sales of Equity Securities during the Three Months Ended March 31, 2021*

Not applicable.

(b) Use of Proceeds from Sale of Registered Equity Securities

Not applicable.

(c) Purchases of Equity Securities by the Registrant

The following table summarizes repurchases of our common stock during January 2021. There were no purchases during February 2021 or March 2021.

| Period | Total Number of Shares Purchased | Average Price Paid per Share | Total Number of Shares Purchased as Part of a Publicly Announced Program | Approximate Dollar Value of Shares that May Yet be Purchased Under the Program |
|----------------------|---|-------------------------------------|---|---|
| 1/1/2021 - 1/31/2021 | 20,810 (1) | \$ 9.72 | — | \$ |

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

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

None.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

ITEM 5. OTHER INFORMATION

Not applicable.

ITEM 6. EXHIBITS

| Exhibit Number | Description |
|---------------------------|---|
| 3.1 | 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 with the Commission on March 4, 2021). |
| 31.1 | 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. |
| 31.2 | 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. |
| 32.1* | 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. |
| 32.2* | 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. |
| 101 | The following materials from the Registrant's Quarterly Report on Form 10-Q for the three months ended March 31, 2021, formatted in inline XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets at March 31, 2021 and December 31, 2020, (ii) Consolidated Statements of Operations for the three months ended March 31, 2021 and 2020, (iii) Consolidated Statements of Cash Flows for the three months ended March 31, 2021 and 2020 and (iv) Notes to Unaudited Consolidated Financial Statements. |
| 104 | Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101) |

* These certifications are being furnished solely to accompany this quarterly 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.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

Date: May 17, 2021

Luna Innovations Incorporated

By: _____ /s/ Eugene J. Nestro

Eugene J. Nestro
Chief Financial Officer
(Principal Financial and Accounting Officer)

**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 quarterly report on Form 10-Q 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: May 17, 2021

/s/ Scott A. Graeff

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 quarterly report on Form 10-Q 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: May 17, 2021

/s/ Eugene J. Nestro

Eugene J. Nestro
Chief Financial Officer
(Principal Financial and Accounting Officer)

**CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the quarterly report of Luna Innovations Incorporated (the "Company") on Form 10-Q for the quarter ended March 31, 2021 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

Scott A. Graeff
President and Chief Executive Officer
(Principal Executive Officer)

May 17, 2021

**CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the quarterly report of Luna Innovations Incorporated (the "Company") on Form 10-Q for the quarter ended March 31, 2021 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

Eugene J. Nestro
Chief Financial Officer
(Principal Financial and Accounting Officer)

May 17, 2021