

**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 June 30, 2022

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:

Title of each class	Trading Symbol	Name of each exchange on which registered
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 August 10, 2022, there were 32,809,755 shares of the registrant's common stock outstanding.

**LUNA INNOVATIONS INCORPORATED
QUARTERLY REPORT ON FORM 10-Q
FOR THE QUARTER ENDED JUNE 30, 2022**

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PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

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

	June 30, 2022	December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	\$ 4,864	\$ 17,128
Accounts receivable, net	30,422	20,913
Contract assets	3,369	5,166
Inventory	30,754	22,493
Prepaid expenses and other current assets	6,535	3,793
Assets held for sale	—	12,952
Total current assets	75,944	82,445
Property and equipment, net	4,499	2,988
Intangible assets, net	20,399	17,177
Goodwill	28,441	18,984
Operating lease right-of-use assets	4,774	5,075
Other non-current assets	3,214	247
Deferred tax asset	4,612	3,321
Total assets	\$ 141,883	\$ 130,237
Liabilities and stockholders' equity		
Liabilities:		
Current liabilities:		
Current portion of long-term debt obligations	\$ 2,000	\$ 4,167
Accounts payable	3,881	2,809
Accrued and other current liabilities	16,413	9,258
Contract liabilities	4,816	4,649
Current portion of operating lease liabilities	2,449	2,101
Liabilities associated with assets held for sale	—	9,703
Total current liabilities	29,559	32,687
Long-term debt obligations, net of current portion	19,218	11,673
Long-term portion of operating lease liabilities	2,767	3,509
Deferred tax liability	1,357	—
Other long-term liabilities	421	445
Total liabilities	53,322	48,314
Commitments and contingencies (Note 13)		
Stockholders' equity:		
Common stock, par value \$0.001, 100,000,000 shares authorized, 34,528,065 and 33,855,725 shares issued, 32,752,348 and 32,116,270 shares outstanding at June 30, 2022 and December 31, 2021, respectively	35	34
Treasury stock at cost, 1,784,957 and 1,744,026 shares at June 30, 2022 and December 31, 2021, respectively	(5,542)	(5,248)
Additional paid-in capital	102,043	98,745
Accumulated deficit	(4,345)	(11,575)
Accumulated other comprehensive loss	(3,630)	(33)
Total stockholders' equity	88,561	81,923
Total liabilities and stockholders' equity	\$ 141,883	\$ 130,237

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 June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Revenue	\$ 26,162	\$ 21,965	\$ 48,642	\$ 42,962
Cost of revenue	10,199	9,384	18,400	18,110
Gross profit	15,963	12,581	30,242	24,852
Operating expense:				
Selling, general and administrative	15,760	12,805	29,862	23,739
Research, development and engineering	2,665	1,810	5,207	4,727
Total operating expense	18,425	14,615	35,069	28,466
Operating loss	(2,462)	(2,034)	(4,827)	(3,614)
Other income/(expense):				
Other income	53	—	73	—
Interest expense, net	(111)	(122)	(224)	(265)
Total other expense, net	(58)	(122)	(151)	(265)
Loss from continuing operations before income taxes	(2,520)	(2,156)	(4,978)	(3,879)
Income tax expense/(benefit)	422	(995)	(693)	(1,659)
Net loss from continuing operations	(2,942)	(1,161)	(4,285)	(2,220)
Income from discontinued operations, net of income tax expense (benefit) of (\$856), \$101, \$166 and \$146	591	931	594	1,672
Gain on sale of discontinued operations, net of tax of \$3,117	—	—	10,921	—
Net income from discontinued operations	591	931	11,515	1,672
Net (loss)/income	(2,351)	(230)	7,230	(548)
Net loss per share from continuing operations:				
Basic	\$ (0.09)	\$ (0.04)	\$ (0.13)	\$ (0.07)
Diluted	\$ (0.09)	\$ (0.04)	\$ (0.13)	\$ (0.07)
Net income per share from discontinued operations:				
Basic	\$ 0.02	\$ 0.03	\$ 0.36	\$ 0.05
Diluted	\$ 0.02	\$ 0.03	\$ 0.36	\$ 0.05
Net (loss)/income per share attributable to common stockholders:				
Basic	\$ (0.07)	\$ (0.01)	\$ 0.22	\$ (0.02)
Diluted	\$ (0.07)	\$ (0.01)	\$ 0.22	\$ (0.02)
Weighted average shares:				
Basic	32,478,736	31,494,563	32,361,560	31,413,451
Diluted	32,478,736	31,494,563	32,361,560	31,413,451

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Net (loss)/income	\$ (2,351)	\$ (230)	\$ 7,230	\$ (548)
Other comprehensive (loss)/income	(3,227)	(247)	(3,597)	876
Total other comprehensive (loss)/income	<u>\$ (5,578)</u>	<u>\$ (477)</u>	<u>\$ 3,633</u>	<u>\$ 328</u>

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

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

Three Months Ended June 30, 2022

	Common Stock		Treasury Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total
	Shares	\$	Shares	\$	\$	\$	\$	\$
Balance, March 31, 2022	32,361,122	34	1,782,289	(5,526)	99,906	(1,994)	(403)	92,017
Exercise of stock options	217,040	1	—	—	937	—	—	938
Share-based compensation	75,400	—	—	—	679	—	—	679
ESPP issuance	101,454	—	—	—	521	—	—	521
Purchase of treasury stock	(2,668)	—	2,668	(16)	—	—	—	(16)
Net loss	—	—	—	—	—	(2,351)	—	(2,351)
Foreign currency translation adjustment	—	—	—	—	—	—	(3,227)	(3,227)
Balance, June 30, 2022	<u>32,752,348</u>	<u>\$ 35</u>	<u>1,784,957</u>	<u>\$ (5,542)</u>	<u>\$ 102,043</u>	<u>\$ (4,345)</u>	<u>\$ (3,630)</u>	<u>\$ 88,561</u>

Three Months Ended June 30, 2021

	Common Stock		Treasury Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive (Loss)/Income	Total
	Shares	\$	Shares	\$	\$	\$	\$	\$
Balance at March 31, 2021	31,392,989	33	1,720,785	(4,991)	93,904	(13,275)	875	76,546
Exercise of stock options	263,484	—	—	—	645	—	—	645
Share-based compensation	71,448	—	—	—	857	—	—	857
ESPP issuance	63,193	—	—	—	530	—	—	530
Purchase of treasury stock	(18,670)	—	18,670	(218)	—	—	—	(218)
Net loss	—	—	—	—	—	(230)	—	(230)
Foreign currency translation adjustment	—	—	—	—	—	—	(247)	(247)
Balance, June 30, 2021	<u>31,772,444</u>	<u>\$ 33</u>	<u>1,739,455</u>	<u>\$ (5,209)</u>	<u>\$ 95,936</u>	<u>\$ (13,505)</u>	<u>\$ 628</u>	<u>\$ 77,883</u>

Six Months Ended June 30, 2022

	Common Stock		Treasury Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total
	Shares	\$	Shares	\$	\$	\$	\$	\$
Balance, December 31, 2021	32,116,270	34	1,744,026	(5,248)	98,745	(11,575)	(33)	81,923
Exercise of stock options	360,432	1	—	—	1,157	—	—	1,158
Share-based compensation	215,123	—	—	—	1,620	—	—	1,620
ESPP issuance	101,454	—	—	—	521	—	—	521
Purchase of treasury stock	(40,931)	—	40,931	(294)	—	—	—	(294)
Net income	—	—	—	—	—	7,230	—	7,230
Foreign currency translation adjustment	—	—	—	—	—	—	(3,597)	(3,597)
Balance, June 30, 2022	<u>32,752,348</u>	<u>\$ 35</u>	<u>1,784,957</u>	<u>\$ (5,542)</u>	<u>\$ 102,043</u>	<u>\$ (4,345)</u>	<u>\$ (3,630)</u>	<u>\$ 88,561</u>

Six Months Ended June 30, 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	578,181	—	—	—	1,489	—	—	1,489
Share-based compensation	146,013	—	—	—	1,514	—	—	1,514
ESPP issuance	63,193	—	—	—	530	—	—	530
Purchase of treasury stock	(39,480)	—	39,480	(420)	—	—	—	(420)
Net loss	—	—	—	—	—	(548)	—	(548)
Foreign currency translation adjustment	—	—	—	—	—	—	876	876
Balance at June 30, 2021	<u>31,772,444</u>	<u>\$ 33</u>	<u>1,739,455</u>	<u>\$ (5,209)</u>	<u>\$ 95,936</u>	<u>\$ (13,505)</u>	<u>\$ 628</u>	<u>\$ 77,883</u>

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

	Six Months Ended June 30,	
	2022	2021
Cash flows used in operating activities		
Net income/(loss)	\$ 7,230	\$ (548)
Adjustments to reconcile net income/(loss) to net cash used in operating activities		
Depreciation and amortization	2,694	2,360
Share-based compensation	2,177	1,514
Gain on sale of discontinued operations, net of tax	(10,921)	—
Deferred taxes	(124)	—
Tax benefit from release of valuation allowance	—	475
Change in assets and liabilities		
Accounts receivable	(6,555)	(473)
Contract assets	140	763
Inventory	(4,281)	(1,562)
Other current assets	(3,870)	(2,399)
Other long-term assets	646	—
Accounts payable and accrued and other current liabilities	6,123	(2,185)
Contract liabilities	1,196	(826)
Other long-term liabilities	(1,523)	—
Net cash used in operating activities	(7,068)	(2,881)
Cash flows used in investing activities		
Acquisition of property and equipment	(1,657)	(551)
Intangible property costs	4	(141)
Proceeds from sale of property and equipment	25	—
Proceeds from sale of discontinued operations	12,973	—
Acquisition of Lios	(22,085)	—
Net cash used in investing activities	(10,740)	(692)
Cash flows provided by/(used in) financing activities		
Payments on finance lease obligations	(24)	(24)
Proceeds from borrowings under debt obligations	21,150	—
Payments of debt obligations	(15,772)	(2,072)
Repurchase of common stock	(294)	(420)
Proceeds from ESPP	521	530
Proceeds from the exercise of options	1,158	1,490
Net cash provided by/(used in) financing activities	6,739	(496)
Effect of exchange rate changes on cash and cash equivalents	(1,195)	673
Net decrease in cash and cash equivalents	(12,264)	(3,396)
Cash and cash equivalents—beginning of period	17,128	15,366
Cash and cash equivalents—end of period	<u>\$ 4,864</u>	<u>\$ 11,970</u>
Supplemental disclosure of cash flow information		
Cash paid for interest	\$ 183	\$ 125
Cash received for income tax refund, net	\$ 787	\$ 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 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. 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, primarily under federally funded development programs, that leverage our sensing and instrumentation technologies to meet the specific needs and applications of our customers.

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 adjustments considered necessary to present fairly our financial position at June 30, 2022, results of operations, comprehensive income/(loss) and changes in stockholders' equity for the three and six months ended June 30, 2022 and 2021, and cash flows for the six months ended June 30, 2022 and 2021. The results of operations for the three and six months ended June 30, 2022 are not necessarily indicative of the results that may be expected for the year ending December 31, 2022. The consolidated balance sheet as of December 31, 2021 was derived from our audited 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, 2021, included in our Annual Report on Form 10-K as filed with the Securities and Exchange Commission (“SEC”) on March 14, 2022.

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. We analyze the reasonableness of the remaining useful life whenever events or circumstances indicate that the carrying amount may not be recoverable to determine whether the carrying value has been impaired.

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 and other 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 floating per annum interest rate of the daily simple secured overnight financing rate ("SOFR"), plus an SOFR adjustment, plus a margin ranging from 1.75% to 2.50%, to be at market based upon similar instruments that would be available to us. The Company has certain assets and liabilities that have been recorded at fair value on a non-recurring basis following an acquisition. Refer to Note 3, *Business Acquisition*, for the allocation of the total consideration based upon the fair value of the assets acquired and liabilities assumed as of the acquisition date.

Reportable Segments

Prior to September 30, 2021, we were organized into two main reporting segments, our Lightwave segment and our Luna Labs segment. We now have one reportable segment, Lightwave, following the determination that our Luna Labs segment met held-for-sale and discontinued operations accounting criteria at the end of the third quarter of 2021. On March 8, 2022, we completed the sale of substantially all of our equity interests in Luna Labs. Prior to the sale, our Luna Labs segment performed applied research principally in the areas of sensing and instrumentation, advanced materials, optical technologies and health sciences. See Note 2, *Sale of Discontinued Operations*, for additional disclosure related to discontinued operations and assets held for sale.

The remaining segment, Lightwave, develops, manufactures and markets distributed fiber optic sensing products and fiber optic communications test and control products.

Net Income/(Loss) Per Share

Basic per share data is computed by dividing our net income/(loss) by the weighted average number of shares outstanding during the period. Diluted per share data is computed by dividing net income/(loss) 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. For the three and six months ended June 30, 2022 and 2021, all potentially dilutive securities for stock options and restricted stock unites were excluded as their impact would be anti-dilutive.

Foreign Currency

For our non-U.S. dollar functional currency subsidiaries, assets and liabilities are translated into U.S. dollars using fiscal period 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 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 to have a material impact on our consolidated financial statements.

2. Sale of Discontinued Operations

On March 8, 2022, we completed the sale of substantially all of our equity interests in our Luna Labs business to certain members of Luna Labs' senior management team and a group of outside investors for an initial purchase price of \$20.4 million before working capital and escrow adjustments and transaction expenses. Total consideration included \$13.0 million of cash received at closing, \$2.5 million in the form of a convertible note and \$1.7 million in the form of 60-day promissory notes. We can earn up to \$1.0 million in future payments from Luna Labs upon the achievement by Luna Labs of certain financial goals. The 60-day promissory notes and earn out receivable are included within the prepaid expenses and other current assets line item and the convertible note is included in other non-current assets line item of the consolidated balance sheet. The gain on the transaction was \$10.9 million, net of taxes of \$3.1 million.

We have separately reported the financial results of Luna Labs as discontinued operations in our consolidated statements of operations for the three and six months ended June 30, 2022 and 2021, respectively, and presented the related assets and liabilities as held for sale in the consolidated balance sheet as of December 31, 2021. These changes have been applied to all periods presented. The operating results of the discontinued operations only reflect revenues and expenses that are directly attributable to the Luna Labs segment that will be eliminated from continuing operations. Previously reported expenses for the Luna Labs segment have been restated to exclude certain allocated expenses that are not directly attributable to the Luna Labs segment.

The key components from discontinued operations related to the Luna Labs business are as follows (*in thousands*):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Revenues	\$ —	\$ 5,972	\$ 5,108	\$ 11,274
Cost of revenues	—	4,603	3,692	8,747
Gross profit	—	1,369	1,416	2,527
Selling, general and administrative expenses	265	337	656	709
Operating (loss)/income	(265)	1,032	760	1,818
Income tax (benefit)/expense	(856)	101	166	146
Net income from discontinued operations, net of tax	\$ 591	\$ 931	\$ 594	\$ 1,672

Assets and liabilities of discontinued operations classified as held for sale in the consolidated balance sheet as of December 31, 2021 consist of the following (*in thousands*):

	December 31, 2021
Accounts receivable, net	\$ 2,967
Inventory	282
Contract assets	4,051
Prepaid expenses and other current	132
Property and equipment, net	330
Intangible assets, net	165
Operating lease ROU asset	4,884
Other assets	141
Assets held for sale	\$ 12,952
Accounts payable	1,042
Accrued and other current liabilities	821
Contract liabilities	2,626
Current portion of operating lease liabilities	388
Long-term portion of operating lease liabilities	4,826
Liabilities associated with assets held for sale	\$ 9,703

The cash flows related to discontinued operations have not been segregated and are included in the consolidated statements of cash flows. The following table presents cash flow and non-cash information related to discontinued operations for the six months ended June 30, 2022 and 2021 (*in thousands*):

	Six Months Ended June 30,	
	2022	2021
Depreciation and amortization	\$ 23	\$ 31
Share-based compensation	177	10
Acquisition of property and equipment	34	50

3. Business Acquisition

On March 10, 2022, we entered into and closed a Share Purchase Agreement (the "Share Purchase Agreement") with NKT Photonics A/S ("NKT Photonics") to purchase all of the shares of NKT Photonics GmbH and LIOS Technologies Inc. (collectively "Lios") for aggregate consideration of \$22.1 million (€20.0 million). Lios is a provider of distributed fiber optic monitoring solutions for power cable, pipelines, oilfield services, security, highways, railways and industrial fire detection systems. The acquisition of Lios provides us with long range, fully distributed temperature and strain sensing capabilities, intellectual property, products and expertise that are highly complementary to Luna, which we believe will accelerate our technology and overall growth roadmap. The Share Purchase Agreement contains customary representations and warranties and indemnities.

The Lios acquisition has 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. Due to the timing of the acquisition relative to the interim balance sheet date, the purchase price allocation of Lios is based on a preliminary valuation and is subject to revision as final valuation of acquired intangible assets and evaluation of working capital values and related reserves are completed.

The following table summarizes the preliminary allocation of the purchase consideration of the Lios acquisition:

	<i>(in thousands)</i>	
Accounts receivable	\$	3,001
Inventory		5,388
Prepaid expenses and other current assets		92
Property and equipment		858
Intangible assets		5,994
Goodwill		10,533
Operating lease right-of-use asset		512
Accounts payable		(1,217)
Accrued and other current liabilities		(1,026)
Current portion of operating lease liability		(322)
Deferred income tax liability		(1,537)
Long-term portion of operating lease liability		(191)
Total purchase consideration	\$	<u>22,085</u>

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

	Estimated Useful Life	(in thousands)
Developed technology	6 years	1,998
Customer relationships	8 years	3,330
Trade names and trademarks	7 years	333
Backlog	1 year	333
		\$ 5,994

Lios's developed technology primarily consists of its distributed fiber optic monitoring solutions that provide a wide range of applications using fully distributed temperature and strain sensing. The developed technologies 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 14.5% 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 Lios 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 14.5% was used to discount the cash flows to the present value.

Backlog arises from unfulfilled purchase or sales order contracts. The value of Lios's backlog as of the acquisition date was calculated using the "multi-period excess earnings" method under the income approach. A discount rate of 13.5% 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. Lios's customer relationships were valued using the "multi-period excess earnings" method under the income approach. This method reflects the present value of the projected cash flows that are expected by the existing customers less charges representing the contribution of other assets to those cash flows. A discount rate of 15.5% 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. We do not expect this goodwill to be deductible for tax purposes.

4. Intangible assets, net

Intangible assets, net at June 30, 2022 and December 31, 2021 consisted of the following:

(in thousands)	Estimated Life	June 30, 2022	December 31, 2021
Patent costs	1 - 18 years	\$ 8,731	\$ 9,230
Developed technology	6 - 10 years	16,202	14,440
In-process research and development	N/A	2,684	2,732
Customer base	5 - 8 years	3,719	700
Trade names	7 - 15 years	883	550
Backlog	1 - 3 years	333	—
		32,552	27,652
Accumulated amortization		(12,153)	(10,475)
		\$ 20,399	\$ 17,177

Amortization expense for the three and six months ended June 30, 2022 was \$0.8 million and \$1.7 million, respectively. Estimated aggregate amortization, based on the net value of intangible assets at June 30, 2022, for each of the next five years and beyond is as follows (*in thousands*):

Year Ending December 31,	
2022 (remaining 6 months)	\$ 2,377
2023	3,926
2024	3,248
2025	2,914
2026	2,798
2027 & beyond	5,136
Total	\$ 20,399

5. Goodwill

The change in the carrying value of goodwill during the six months ended June 30, 2022 was as follows:

<i>(in thousands)</i>	
Balance as of December 31, 2021	18,984
Acquisition of Lios	10,533
Foreign currency translation	(1,076)
Balance as of June 30, 2022	\$ 28,441

6. 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:

<i>(in thousands)</i>	June 30, 2022	December 31, 2021
Finished goods	\$ 10,997	\$ 10,087
Work-in-process	2,901	2,318
Raw materials	16,856	10,088
Total inventory	30,754	22,493

7. Accrued Liabilities

Accrued liabilities consisted of the following:

<i>(in thousands)</i>	June 30, 2022	December 31, 2021
Accrued compensation	\$ 7,794	\$ 6,798
Contingent consideration	100	225
Accrued professional fees	1,343	503
Accrued income tax	4,071	328
Current portion of finance lease liability	49	48
Accrued liabilities - other	3,056	1,356
Total accrued and other current liabilities	\$ 16,413	\$ 9,258

8. Debt

Long-term debt consisted of the following:

<i>(in thousands)</i>	June 30, 2022	December 31, 2021
Term Loan (net of debt issuance costs of \$82 and \$44, 4.05% and 2.48% at June 30, 2022 and December 31, 2021, respectively)	\$ 19,918	\$ 8,290
Revolving Loan (4.05% and 2.43% at June 30, 2022 and December 31, 2021)	1,300	7,550
	21,218	15,840
Less: Current portion of long-term debt obligations	(2,000)	(4,167)
Long-term debt obligations	\$ 19,218	\$ 11,673

PNC Bank Facility

On June 21, 2022 (the “Effective Date”), the Company entered into a Loan Modification Agreement (the “Second Amendment”) in respect of its Loan Agreement, dated as of December 1, 2020 (the “Original Loan Agreement” and as amended by that certain First Amendment to Loan Agreement, dated as of March 10, 2022, and the Second Amendment, the “Loan Agreement”) with PNC Bank, National Association, as lender (the “Lender”) and certain of the Company’s domestic subsidiaries as guarantors, to, among other things, extend the maturity date of the Term Loan and Revolving Line (each as defined below) to June 21, 2027 and increase the total commitments to the Company.

The Loan Agreement provides a \$15.0 million revolving credit facility (the “Revolving Line”) and a \$20 million term loan facility (the “Term Loan”). On the Effective Date, we borrowed the full amount of the Term Loan from the Lender according to a term note (the “Term Note”), a portion of the proceeds of which were used to refinance the remaining principal amount of the \$12.5 million in term loans issued under the Original Loan Agreement, and the remainder of which were used to pay down approximately \$13.7 million of the \$15.0 million in revolving loans outstanding under the Revolving Line (the “Revolving Loan”) according 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 according to the Revolving Line of Credit Note.

The Term Loan matures on June 21, 2027, which was extended from December 1, 2023 as part of the loan modification. The Term Loan amortizes at a rate equal to 10% for the first year, 15% for years two and three and 20% in years four and five, in each case payable on a quarterly basis. Accrued interest is 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 June 21, 2027. The Term Loan bears interest at a floating per annum rate equal to the sum of (a) the daily simple secured overnight finance rate (“Daily Simple SOFR”), plus (b) an SOFR adjustment of ten basis points (0.10%), plus (c) an applicable margin. The applicable margin ranges from 1.75% to 2.50% per annum, depending on our Net Leverage Ratio (as defined in the Loan Agreement). We may prepay the Term Loan without penalty or premium.

The Revolving Line expires on June 21, 2027, which was extended from December 1, 2023 as part of the loan modification. Borrowings under the Revolving Line bear interest at a floating per annum rate equal to the sum of (a) the Daily Simple SOFR, plus (b) an SOFR adjustment of ten basis points (0.10%), plus (c) an applicable margin. The applicable margin ranges from 1.75% to 2.50% per annum, depending on our Net Leverage Ratio. Accrued interest is due and payable on the first day of each month and the outstanding principal balance and any accrued but unpaid interest is due and payable on June 21, 2027. The unused portion of the Revolving Line accrues a fee equal to 0.20% per annum multiplied by the quarterly average unused amount. The unused Revolving Line totaled \$13.7 million at June 30, 2022.

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 (beginning in the third quarter ended September 30, 2022), 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. For the quarter ended June 30, 2022, we were initially subject to a minimum adjusted EBITDA level which was not met as of June 30, 2022 but was subsequently waived. We expect to be in compliance with the minimum net leverage and fixed charge coverage financial covenants for the next twelve months.

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
2022 (remaining 6 months)	992
2023	2,484
2024	2,984
2025	3,484
2026	3,984
2027 and thereafter	7,290
Total	<u>\$ 21,218</u>

9. 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 5 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 statement of operations. The finance lease ROU assets are included within the other non-current assets line item of the consolidated balance sheets. The current and long-term portion of the ROU lease liabilities are included within the accrued and other current liabilities and other long-term liabilities line items of the consolidated balance sheets, respectively.

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 June 30, 2022, 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 for operating leases consists of the following:

<i>(in thousands)</i>	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Operating lease costs	\$ 788	\$ 529	1,363	\$ 1,058
Variable rent costs	(60)	(29)	(110)	(57)
Total rent expense	<u>\$ 728</u>	<u>\$ 500</u>	<u>\$ 1,253</u>	<u>\$ 1,001</u>

Future minimum lease payments under non-cancelable operating and finance leases were as follows as of June 30, 2022 (*in thousands*):

	Operating Leases	Finance Leases
Year Ending December 31,		
2022 (remaining 6 months)	\$ 1,339	\$ 26
2023	2,061	53
2024	1,349	53
2025	673	48
2026	137	—
2027 and beyond	—	—
Total future minimum lease payments	5,559	180
Less: imputed interest	343	7
Total lease liabilities	\$ 5,216	\$ 173
Current lease liability	\$ 2,449	\$ 49
Long-term lease liability	2,767	124
Total lease liabilities	\$ 5,216	\$ 173

Other information related to leases is as follows:

<i>(in thousands, except weighted-average data)</i>	Three Months Ended June 30,		Six months ended June 30,	
	2022	2021	2022	2021
Finance lease cost:				
Amortization of right-of-use assets	\$ 13	\$ 13	\$ 26	\$ 27
Interest on lease liabilities	(1)	(1)	(2)	(3)
Total finance lease cost	\$ 12	\$ 12	\$ 24	\$ 24

Other information:

Cash paid for amounts included in the measurement of lease liabilities:

Operating cash flows from operating leases	\$ 511	\$ 571	\$ 1,040	\$ 1,109
Finance cash flows from finance leases	\$ 12	\$ 12	\$ 24	\$ 24
Right-of-use assets obtained in exchange for new operating lease liabilities	\$ 33	\$ —	\$ 33	\$ —

Other weighted average information related to leases is as follows:

	Six Months Ended June 30,	
	2022	2021
Weighted-average remaining lease term (years) - operating leases	5.8	3.7
Weighted-average remaining lease term (years) - finance leases	3.2	4.2
Weighted-average discount rate - operating leases	6 %	6 %
Weighted-average discount rate - finance leases	3 %	3 %

10. Capital Stock and Share-Based Compensation

Stock Options

For the three and six months ended June 30, 2022, we recognized \$0.2 million and \$0.4 million, respectively, in share-based compensation expense related to stock options, which is included in our selling, general and administrative expense in the accompanying consolidated statement of operations. Share-based compensation expense related to stock options for the three and six months ended June 30, 2021 totaled \$0.3 million and \$0.5 million, respectively. We expect to recognize \$0.6 million in share-based compensation expense over the weighted-average remaining service period of 1.2 years for stock options outstanding as of June 30, 2022.

Restricted Stock Units

During the three and six months ended June 30, 2022, we granted 376,436 and 623,842 time-based restricted stock units ("RSUs"), respectively. RSU grants for the three and six months ended June 30, 2021 totaled 55,000 and 134,250, respectively. 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 and six months ended June 30, 2022 was \$5.48 and \$6.39 per share, respectively. 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 and six months ended June 30, 2022 we granted 89,825 and 98,261 RSUs, respectively, pursuant to the Deferred Compensation Plan. RSU grants pursuant to the Deferred Compensation Plan for the three and six months ended June 30, 2021 totaled 4,259 and 8,917, respectively. The general terms of these RSUs are similar to awards previously granted by us. The weighted average fair value of these RSUs granted during the three and six months ended June 30, 2022, was \$5.56 and \$5.81 per share, respectively. The fair value of each RSU was determined based on the market price of our stock on the date of grant.

For the three and six months ended June 30, 2022, we recognized \$0.5 million and \$1.2 million, respectively, in share-based compensation expense related to RSUs, which is included in our selling, general and administrative expense in the accompanying consolidated statement of operations. Share-based compensation related to RSUs for the three and six months ended June 30, 2021 totaled \$0.3 million and \$0.6 million, respectively. We expect to recognize \$5.6 million in share-based compensation expense over the weighted-average remaining service period of 2.3 years for RSUs outstanding as of June 30, 2022.

Employee Stock Purchase Plan ("ESPP")

For the three and six months ended June 30, 2022, we recognized \$0.1 million and \$0.2 million, respectively, in share-based compensation expense related to the ESPP, which is included in our selling, general and administrative expense in the accompanying consolidated statement of operations. Share-based compensation related to the ESPP for the three and six months ended June 30, 2021 totaled \$0.1 million and \$0.2 million, respectively.

11. 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, 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 and six months ended June 30, 2022 and 2021:

<i>(in thousands)</i>	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
	<i>(unaudited)</i>		<i>(unaudited)</i>	
Total Revenue by Geographic Location				
United States	\$ 10,249	\$ 11,536	20,764	\$ 22,115
Asia	4,187	3,596	9,017	7,268
Europe	7,558	4,509	12,465	8,486
Canada, Central and South America	3,957	2,324	6,185	5,093
All Others	211	—	211	—
Total	\$ 26,162	\$ 21,965	\$ 48,642	\$ 42,962
Total Revenue by Major Customer Type				
Sales to the U.S. government	\$ 2,156	\$ 2,502	\$ 3,791	\$ 4,916
U.S. direct commercial sales and other	8,093	9,033	16,974	17,199
Foreign commercial sales & other	15,913	10,430	27,877	20,847
Total	\$ 26,162	\$ 21,965	\$ 48,642	\$ 42,962
Total Revenue by Contract Type				
Fixed-price contracts	\$ 25,501	\$ 20,732	\$ 47,354	\$ 41,778
Cost-type contracts	661	1,233	1,289	1,184
Total	\$ 26,162	\$ 21,965	\$ 48,642	\$ 42,962
Total Revenue by Timing of Recognition				
Goods transferred at a point in time	\$ 22,885	\$ 18,099	41,494	\$ 34,939
Goods/services transferred over time	3,277	3,866	7,149	8,023
Total	\$ 26,162	\$ 21,965	\$ 48,642	\$ 42,962
Total Revenue by Major Products/Services				
Technology development	\$ 1,539	\$ 2,027	3,136	\$ 4,167
Test, measurement and sensing systems	24,022	19,485	44,117	38,003
Other	601	—	1,389	—
Total	\$ 26,162	\$ 21,965	\$ 48,642	\$ 42,962

Contract Balances

Our contract assets consist of unbilled amounts for research contracts as well as custom product contracts. Contract liabilities include excess billings, subcontractor accruals, warranty expense, extended warranty revenue, and customer deposits. During the three and six months ended June 30, 2022, we recognized \$1.4 million and \$2.9 million, respectively, of revenue that was included in contract liabilities as of December 31, 2021.

The following table shows the components of our contract balances as of June 30, 2022 and December 31, 2021:

<i>(in thousands)</i>	June 30, 2022	December 31, 2021
Contract assets	\$ 3,369	\$ 5,166
Contract liabilities	4,816	4,649
Net contract (liabilities) assets	\$ (1,447)	\$ 517

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 unfulfilled performance obligations was \$47.6 million at June 30, 2022. We expect to satisfy \$36.4 million of the performance obligations in 2022, \$8.3 million in 2023 and the remainder by 2026.

12. Income Taxes

Our provision for income taxes is based upon the estimated annual effective tax rate for the year applied to the current period income plus the tax effect of any significant or unusual items, discrete events or changes in tax law. Fluctuations in the distribution of pre-tax income among our operating subsidiaries can lead to fluctuations of the effective tax rate in the consolidated financial statements. We and our subsidiaries file U.S. federal income tax returns and income tax returns in various state, local, and foreign jurisdictions.

For the six months ended June 30, 2022, our effective income tax rate was 13.9% compared to 42.8% for the six months ended June 30, 2021. The effective tax rate for 2022 differed from the federal statutory rate of 21%, primarily as a result of unfavorable impact from the net Global Intangible Low Taxed Inclusion ("GILTI") and losses for which no benefit can be recorded partially offset by Research & Development ("R&D") tax credits. The effective tax rate for 2021 differed from the federal statutory rate of 21% primarily as a result of the excess tax benefit on stock compensation vesting and exercises.

13. 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.

We executed non-cancelable purchase orders totaling \$4.8 million as of June 30, 2022 for multiple shipments of tunable lasers to be delivered over a 9-15 month period. At June 30, 2022, approximately \$4.4 million of these commitments remained and are expected to be delivered by August 22, 2023.

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 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. 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, primarily under federally funded development programs, that leverage Luna's sensing and instrumentation technologies to meet the specific needs and applications of our customers.

Prior to September 30, 2021, we were organized into two main reporting segments, our Lightwave segment and our Luna Labs segment. Our Lightwave segment develops, manufactures and markets distributed fiber optic sensing products and solutions and fiber optic communications test and control products. Our Luna Labs segment performed applied research principally in the areas of sensing and instrumentation, advanced materials and health sciences. Most of the government funding for our Luna Labs segment was derived from the Small Business Innovation Research ("SBIR"), program coordinated by the U.S. Small Business Administration. We now have one reportable segment, Lightwave, following the determination that our Luna Labs segment met held-for-sale and discontinued operations accounting criteria at the end of the third quarter of 2021 and the sale of substantially all of our equity interests in Luna Labs on March 8, 2022.

As we develop and commercialize new products, our 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. Recent acquisitions have added strategic technologies and products that complement 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. Additional product offerings from these strategic acquisitions have helped us fill a gap for long range, fully distributed acoustic, temperature and strain measurement.

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. The approximate value of our backlog was \$47.6 million and \$38.4 million at June 30, 2022 and December 31, 2021, respectively.

Acquisitions

On March 10, 2022, we acquired NKT Photonics GmbH and LIOS Technology Inc. (collectively, “Lios”) for €20.0 million, or \$22.1 million. Lios, based in Cologne, Germany and formerly owned by NKT Photonics A/S, provides temperature and strain sensing products which are highly complementary to our existing portfolio of fiber optic offerings.

Discontinued Operations

On March 8, 2022, we completed the sale of substantially all of our equity interests in our Luna Labs business to certain members of Luna Labs’ senior management team and a group of outside investors for an initial purchase price of \$20.4 million before working capital and escrow adjustments and transaction fees. We had been actively marketing our Luna Labs segment to prospective buyers during 2021 as part of our growth strategy for our Lightwave segment. We have separately reported the results of our Luna Labs segment as discontinued operations in our consolidated statement of operations for the three and six months ended June 30, 2022 and 2021, and presented the related assets and liabilities as held for sale in the consolidated balance sheet as of December 31, 2021.

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. 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. During 2022, we have experienced and expect to continue experiencing some disruption in our supply chain and delays in revenue from certain customers as a result of shut-downs in China. While we believe these disruptions are temporary, there is no guarantee we will be able to manage through these disruptions. See “Risk Factors” for further discussion of the potential adverse impacts of the COVID-19 pandemic on our business.

Revenues

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

We derived Luna Labs segment revenues, which are presented as discontinued operations, 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 completed 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. Following our sale of Luna Labs in March 2022, we will no longer derive revenues from Luna Labs.

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, which are presented as discontinued operations, consisted 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, amortization of intangible assets and costs related to merger and acquisition activities. 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 historical Luna Labs segment, product development activities not provided under contracts with third parties, and overhead costs related to these activities. The operating expense of our Luna Labs segment is presented in discontinued operations.

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 and revolving 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.

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, 2021, as filed with the Securities and Exchange Commission ("SEC") on March 14, 2022.

Results of Operations**Three Months Ended June 30, 2022 Compared to Three Months Ended June 30, 2021***Revenues*

Revenues for the three months ended June 30, 2022 increased \$4.2 million, or 19%, to \$26.2 million compared to \$22.0 million for the three months ended June 30, 2021. The majority of the increase in revenues for the three months ended June 30, 2022, compared to the three months ended June 30, 2021, was due to the revenues from Lios which was acquired on March 10, 2022 and growth in our sensing product sales.

Cost of Revenues and Gross Profit

Cost of revenues increased by \$0.8 million, or 9%, to \$10.2 million for the three months ended June 30, 2022, compared to \$9.4 million for the three months ended June 30, 2021. The increase in cost of revenues was in line with our sales growth. Our overall gross margin for three months ended June 30, 2022 was 61%, compared to 57% for the three months ended June 30, 2021. The increase in gross margin was primarily due to a favorable sales mix.

Operating Expense

<i>(in thousands)</i>	Three Months Ended June 30,		\$ Difference	% Difference
	2022	2021		
Operating expense:				
Selling, general and administrative	\$ 15,760	\$ 12,805	\$ 2,955	23 %
Research, development and engineering	2,665	1,810	855	47 %
Total operating expense	<u>\$ 18,425</u>	<u>\$ 14,615</u>	<u>\$ 3,810</u>	26 %

Our selling, general and administrative expense increased \$3.0 million, or 23%, to \$15.8 million for the three months ended June 30, 2022, compared to \$12.8 million for the three months ended June 30, 2021. Selling, general and administrative expense increased primarily due to the acquired Lios operations.

Research, development and engineering expense increased \$0.9 million, or 42%, to \$2.7 million for the three months ended June 30, 2022, compared to \$1.8 million for the three months ended June 30, 2021. Research, development and engineering expense increased primarily due to the timing of expenses from OptaSense last year and the acquired Lios operations.

Loss from Continuing Operations Before Income Taxes

During the three months ended June 30, 2022, we recognized a loss from continuing operations before income taxes of \$2.5 million compared to loss from continuing operations before income taxes of \$2.2 million for the three months ended June 30, 2021.

Income Tax Expense/(Benefit)

For the three months ended June 30, 2022, we recognized income tax expense from continuing operations of \$0.4 million, compared to an income tax benefit from continuing operations of \$1.0 million for the three months ended June 30, 2021. The income tax expense for the three months ended June 30, 2022 was primarily due to an unfavorable impact from the net Global Intangible Low Taxed Inclusion ("GILTI") and losses for which no benefit can be recorded partially offset by Research & Development ("R&D") tax credits. The income tax benefit for the three months ended June 30, 2021 was primarily related to the pre-tax loss and deductions on vested RSUs and stock option exercises.

Income from Discontinued Operations, net

For the three months ended June 30, 2022 and 2021, we recognized income from discontinued operations, net of income taxes, of \$0.6 million and \$0.9 million, respectively. The results of our discontinued operations for the three months ended June 30, 2021 include the operations of our Luna Labs segment that were held for sale.

Six Months Ended June 30, 2022 Compared to Six Months Ended June 30, 2021*Revenues*

Revenues for the six months ended June 30, 2022 increased \$5.6 million, or 13%, to \$48.6 million compared to \$43.0 million for the six months ended June 30, 2021. The majority of the increase in revenues for the six months ended June 30, 2022, compared to the six months ended June 30, 2021, was due to the revenues from Lios which was acquired on March 10, 2022. Excluding Lios, we also experienced growth in sales of our sensing products.

Cost of Revenues and Gross Profit

Cost of revenues increased \$0.3 million, or 2%, to \$18.4 million for the six months ended June 30, 2022, compared to \$18.1 million for the six months ended June 30, 2021. This increase in cost of revenues primarily resulted from the Lios business. Our overall gross margin for the six months ended June 30, 2022 was 62%, compared to 58% for the six months ended June 30, 2021. The increase in gross margin was primarily due to a favorable sales mix.

Operating Expense

<i>(in thousands)</i>	Six months ended June 30,		\$ Difference	% Difference
	2022	2021		
Operating expense:				
Selling, general and administrative	\$ 29,862	\$ 23,739	\$ 6,123	26 %
Research, development and engineering	5,207	4,727	480	10 %
Total operating expense	\$ 35,069	\$ 28,466	\$ 6,603	23 %

Selling, general and administrative expense increased \$6.1 million, or 26%, to \$29.9 million for the six months ended June 30, 2022, compared to \$23.7 million for the six months ended June 30, 2021. Selling, general and administrative expense increased primarily due to the acquired Lios operations and higher integration costs, amortization of intangible assets and share-based compensation.

Research, development and engineering expense increased \$0.5 million, or 10%, to \$5.2 million for the six months ended June 30, 2022, compared to \$4.7 million for the six months ended June 30, 2021. Research, development and engineering expense increased primarily due to the acquired Lios operations.

Loss from Continuing Operations Before Income Taxes

During the six months ended June 30, 2022, we recognized a loss from continuing operations before income taxes of \$5.0 million compared to a loss of \$3.9 million for the six months ended June 30, 2021.

Income Tax Benefit

For the six months ended June 30, 2022 and 2021 we recognized an income tax benefit from continuing operations of \$0.7 million and \$1.7 million, respectively. The income tax benefit for the six months ended June 30, 2022 was primarily due to the pre-tax loss and R&D tax credits, which was partially offset by an unfavorable impact from the net ("GILTI") and losses for which no benefit can be recorded due to valuation allowances. The income tax benefit for the six months ended June 30, 2021 was primarily related to the pre-tax loss and deductions on vested RSUs and stock option exercises.

Net Income from Discontinued Operations

For the six months ended June 30, 2022 and 2021, we recognized income from discontinued operations, net of income taxes, of \$11.5 million and \$1.7 million, respectively. The results of our discontinued operations for both six month periods include the operations of our Luna Labs segment that were held for sale. The results of our discontinued operations for the six months ended June 30, 2022 included a gain of \$10.9 million, net of tax, on the sale of Luna Labs.

Liquidity and Capital Resources

At June 30, 2022, our total cash and cash equivalents were \$4.9 million. We require cash to: (i) fund our operating expenses, working capital requirements, and outlays for strategic acquisitions and investments; (ii) service our debt, including principal and interest; (iii) conduct research and development; (iv) incur capital expenditures; and (v) repurchase our common stock. As part of our business strategy, we review acquisition and divestiture opportunities on a regular basis. In March 2022, we completed the disposition of Luna Labs and the acquisition of Lios, which are discussed elsewhere in this Form 10-Q. The Lios acquisition price of \$22.1 million was funded from \$13.0 million of initial cash proceeds from the disposition of Luna Labs with the remainder of funding coming from availability under our revolver and operating cash. In June 2022, we completed a refinancing of our previous credit facility to, among other things, extend the maturity date of our Term Loan and Revolving Line and increase our total borrowing capacity.

We believe that the key factors that could affect our internal and external sources of cash include:

- Changes in demand for our products, including as a result of the COVID-19 pandemic, competitive pricing pressures, supply chain constraints, effective management of our manufacturing capacity, our ability to achieve further reductions in operating expenses, our ability to make progress on the achievement of our business strategy goals, and our ability to make the research and development expenditures required to remain competitive in our business.
- Our access to bank financing and the debt and equity capital markets that could impair our ability to obtain needed financing on acceptable terms or to respond to business opportunities and developments as they arise, including interest rate fluctuations, macroeconomic conditions, sudden reductions in the general availability of lending from banks or the related increase in cost to obtain bank financing and our ability to maintain compliance with covenants under our debt agreements in effect from time to time.

As of June 30, 2022, we had outstanding borrowings under our Term Loan and Revolving Line of \$19.9 million and \$1.3 million, respectively. 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 June 21, 2027. The Term Loan amortizes at a rate equal to 10% for the first year, 15% for years two and three and 20% in years four and five, in each case paid on a quarterly basis. Accrued interest is 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 June 21, 2027. The Term Loan bears interest at a floating per annum rate equal to the sum of (a) the daily simple secured overnight financing rate, or Daily Simple SOFR, plus (b) an SOFR adjustment of ten basis points (0.10%), plus (c) an applicable margin. The applicable margin ranges from 1.75% to 2.50% per annum, 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 June 21, 2027. Borrowings under the Revolving Line bear interest at a floating per annum rate equal to the sum of (a) Daily Simple SOFR, plus (b) a SOFR adjustment of ten basis points (0.10%), plus (c) an applicable margin. The applicable margin ranges from 1.75% to 2.50% per annum, depending on the Net Leverage Ratio. Accrued interest is due and payable on the first day of each month and the outstanding principal balance and any accrued but unpaid interest is due and payable on June 21, 2027. The unused portion of the Revolving Line accrues a fee equal to 0.20% per annum multiplied by the quarterly average unused amount. The unused Revolving Line totaled \$13.7 million at June 30, 2022.

Additional details of our Loan Agreement can be found in Note 8, "Debt" in the notes to our unaudited condensed consolidated financial statements included elsewhere in this Form 10-Q.

We believe that our cash and cash equivalents and availability under our revolver as of June 30, 2022 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, 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 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>	Six months ended June 30,	
	2022	2021
Net cash used in operating activities	\$ (7,068)	\$ (2,881)
Net cash used in investing activities	(10,740)	(692)
Net cash provided/(used in) by financing activities	6,739	(496)
Effect of exchange rate changes on cash and cash equivalents	(1,195)	673
Net decrease in cash and cash equivalents	<u>\$ (12,264)</u>	<u>\$ (3,396)</u>

During the six months ended June 30, 2022, net cash used in operating activities was \$7.1 million compared to \$2.9 million for the comparable period of 2021. Overall, this net increase in use of operating cash was driven by lower income from continuing operations and an increase in working capital.

During the six months ended June 30, 2022, cash used in investing activities was \$10.7 million which increased by \$10.0 million from 2021. The increase in net cash used in investing activities was primarily due to the acquisition of LIOS totaling \$22.1 million, partially offset from the proceeds from the sale of Luna Labs totaling \$13.0 million. Excluding acquisitions and sales transactions, cash used in investing increased by \$0.9 million primarily due to increased capital expenditures for normal business needs.

During the six months ended June 30, 2022, cash provided by financing activities was \$6.7 million, compared to cash used in financing activities of \$0.5 million in 2021, primarily due to net proceeds of \$5.4 million from new borrowings used to partially fund the acquisition of Lios in March 2022. The remaining change in borrowing activity was due to the refinancing of our credit facility in the second quarter.

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 Line with interest rates at a floating per annum rate equal to the sum of (a) Daily Simple SOFR, plus (b) a SOFR adjustment of ten basis points (0.10%), plus (c) an applicable margin. The applicable margin ranges from 1.75% to 2.50% per annum, depending on the Net Leverage Ratio as defined in the credit agreement governing the Term Loan and Revolving Line. As of June 30, 2022, we had outstanding borrowings under our Term Loan and Revolving Line of \$19.9 million and \$1.3 million, respectively, at the weighted-average variable interest rate of 4.05%. 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 approximately \$55 thousand.

Foreign Currency Exchange Rate Risk

Our foreign currency exposure is primarily related to our net investment in foreign subsidiaries. Foreign exchange rate gains or losses resulting from the translation of our foreign operations into U.S. dollars are reflected as a cumulative translation adjustment and do not affect our 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. Based on this evaluation, our President and Chief Executive Officer and our Chief Financial Officer have concluded that, as of June 30, 2022, our disclosure controls and procedures were effective.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the three months ended June 30, 2022 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

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.
 - 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.
 - We are experiencing impacts from inflationary pressures, including with respect to labor and materials costs, which could adversely impact our profitability and cash flow.
 - 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 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.

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, international conflicts, such as the current hostilities between Russia and Ukraine, 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. 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, 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 these 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 Lios in March 2022. 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 diversion 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, particularly following our sale of Luna Labs in March 2022. 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;
- potential changes in a specific country's or region's political or economic climate, including the current hostilities between Russia and Ukraine;
- 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.

We are experiencing impacts from inflationary pressures, including with respect to labor and materials costs, which could adversely impact our profitability and cash flow.

We are experiencing, and may continue to experience, the general impact of inflationary market pressures on our business, particularly with respect to labor and materials costs. We are experiencing pressures on materials and certain labor costs as a result of the inflationary environment and current general labor shortage, which has resulted in increased competition for skilled labor and wage inflation. It is possible that our labor, fuel and materials costs could continue to increase as we expand our operations and volume of work. We have not been, and may not be able to, fully adjust our contract pricing to compensate for these cost increases, which has affected, and may continue to affect, our profitability and cash flows. Inflationary pressures and related recessionary concerns in light of governmental and central bank efforts to mitigate inflation could also cause uncertainties for our customers and affect the level of their project activity, which could also adversely affect our profitability and cash flows.

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.

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. 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. During 2021, and continuing in 2022, we experienced an increased level of disruption in our supply chain and from certain customers all of which have resulted in delayed revenue. While we believe these disruptions are temporary, there is no guarantee we will be able to manage through these disruptions. 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.

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.

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 constantly evolving federal and state privacy and data security laws and regulations governing the collection, use, disclosure and protection of personal information. Each of these laws can be subject to varying interpretations.

Certain federal regulators have been focusing on cybersecurity as an area of concern for several years. For example, in guidance from the SEC since at least 2011, cybersecurity has been raised as an area where companies, which would include global investment firms, must disclose both threats to the company and material cyber events that have been experienced by that company. In at least three cases from the latter half of 2021, the SEC brought enforcement actions against registered companies that failed to report such cyber events. We expect increasing SEC enforcement activity related to cybersecurity matters, including by the SEC's Office of Compliance Inspections and Examinations (OCIE) in its examination programs, where cybersecurity has been prioritized with an emphasis on, among other things, proper configuration of network storage devices, information security governance, and policies and procedures related to retail trading information security. Further, the SEC has indicated in recent remarks that areas of focus for potential new policies and initiatives could include cyber hygiene and preparedness, cyber incident reporting to the government and, in certain circumstances disclosure to the public.

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, which took effect on January 1, 2020, is an example of a trend toward increasingly comprehensive privacy legislation being introduced 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 Colorado, 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. 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.

Certain jurisdictions have enacted data localization laws and cross-border personal data transfer laws, which could make it more difficult to transfer information across jurisdictions (such as transferring or receiving personal data that originates in the EU). Existing mechanisms that may facilitate cross-border personal data transfers may change or be invalidated. For example, absent appropriate safeguards or other circumstances, the EU GDPR generally restricts the transfer of personal data to countries outside of the EEA, such as the United States, which the European Commission does not consider to provide an adequate level of data privacy and security. The European Commission released a set of “Standard Contractual Clauses” in June 2021 that are designed to be a valid mechanism by which entities can transfer personal data out of the EEA to jurisdictions that the European Commission has not found to provide an adequate level of protection. Currently, these Standard Contractual Clauses are a valid mechanism to transfer personal data outside of the EEA. The Standard Contractual Clauses, however, require parties that rely upon that legal mechanism to comply with additional obligations, such as conducting transfer impact assessments to determine whether additional security measures are necessary to protect the at-issue personal data. Moreover, due to potential legal challenges, there exists some uncertainty regarding whether the Standard Contractual Clauses will remain a valid mechanism for transfers of personal data out of the EEA. In addition, laws in Switzerland and the UK similarly restrict transfers of personal data outside of those jurisdictions to countries such as the United States that do not provide an adequate level of personal data protection.

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. On June 28, 2021, the European Commission announced a decision of “adequacy” concluding that the UK ensures an equivalent level of data protection to the GDPR, which provides some relief regarding the legality of continued personal data flows from the EEA to the UK. Some uncertainty remains, however, as this adequacy determination must be renewed after four years and may be modified or revoked in the interim. We cannot fully predict how the Data Protection Act, the UK GDPR, and other UK data protection laws or regulations may develop in the medium to longer term nor the effects of divergent laws and guidance regarding how data transfers to and from the UK will be regulated.

All of these evolving compliance and operational requirements may impose significant costs that are likely to increase over time, and may require us to (a) modify our data processing practices and policies, (b) put in place additional mechanisms ensuring compliance with the new data protection rules, (c) divert resources from other initiatives and projects, and (d) 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, compliance with these and any other applicable privacy and data security laws and regulations is a rigorous and time-intensive process. 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. 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;
- 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;
- political, economic and social instability, including, for example, the military incursion of Russia into Ukraine, terrorist activities and any disruption these events may cause to the broader global industrial economy;
- 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.

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 June 30, 2022*

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 April, May and June 2022.

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
4/1/2022 - 4/30/2022	—	\$ —	—	\$ —
5/1/2022 - 5/31/2022	2,668 (1)	\$ 5.95	—	\$ —
6/1/2022 - 6/30/2022	—	\$ —	—	\$ —

(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
10.1	Amended and Restated Employment Agreement, dated as of April 1, 2022 by and between Luna Innovations Incorporated and Scott Gr (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K (File No. 000-52008 filed on April 7, 2022).
10.2	Amended and Restated Employment Agreement, dated as of April 1, 2022 by and between Luna Innovations Incorporated and Eugene Nestro (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K (File No. 000-52008 filed on April 7, 2022).
10.3	Amended and Restated Employment Agreement, dated as of April 1, 2022 by and between Luna Innovations Incorporated and Brian So (incorporated by reference to Exhibit 10.3 to the Registrant's Current Report on Form 8-K (File No. 000-52008 filed on April 7, 2022).
10.4*	First Amendment to Loan Agreement, dated as of March 10, 2022, by and between the Company and PNC Bank, National Association.
10.5*	Second Amendment to Loan Agreement, dated as of June 21, 2022, by and between the Company and PNC Bank, National Association
10.6*	Amended and Restated Revolving Line of Credit Note, dated June 21, 2022, by and between the Company and PNC Bank, National Association.
10.7*	Amended and Restated Term Loan Agreement, dated June 21, 2022, by and between the Company and PNC Bank, National Association
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, 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, 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 June 30, 2022, formatted in inline XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets at June 30, 2022 and December 31, 2021, (ii) Consolidated Statements of Operations for the three and six months ended June 30, 2022 and 2021, (iii) Consolidated Statements of Comprehensive Income/(Loss) for the three and six months ended June 30, 2022 and 2021, (iv) Consolidated Statements of Cash Flows for the six months ended June 30, 2022 and 2021 and (v) Notes to Unaudited Consolidated Financial Statements.
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

* Filed herewith.

** 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: August 12, 2022

Luna Innovations Incorporated

By: _____ /s/ Eugene J. Nestro

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



Amendment to Loan Documents

THIS AMENDMENT TO LOAN DOCUMENTS (this “**Amendment**”) is made as of March 10, 2022, by and between **LUNA INNOVATIONS INCORPORATED**, a Delaware corporation (the “**Borrower**”), and **PNC BANK, NATIONAL ASSOCIATION** (the “**Bank**”).

BACKGROUND

A. The Borrower or another obligor has executed and delivered to the Bank (or a predecessor which is now known by the Bank’s name as set forth above), one or more promissory notes, letter agreements, loan agreements, security agreements, mortgages, pledge agreements, collateral assignments, and other agreements, instruments, certificates and documents, some or all of which are more fully described on attached Exhibit A, which is made a part of this Amendment (collectively as amended from time to time, the “**Loan Documents**”) which evidence or secure some or all of the indebtedness and other obligations of the Borrower to the Bank for one or more loans or other extensions of credit (as used herein, collectively, together with the Obligations, if and as defined in the Loan Documents, the “**Obligations**”). Any initially capitalized terms used in this Amendment without definition shall have the meanings assigned to those terms in the Loan Documents.

B. The Borrower and the Bank desire to amend the Loan Documents as provided for in this Amendment.

NOW, THEREFORE, in consideration of the mutual covenants herein contained and intending to be legally bound hereby, the parties hereto agree as follows:

1. Certain of the Loan Documents are amended as set forth in Exhibit A. Any and all references to any Loan Document in any other Loan Document shall be deemed to refer to such Loan Document as amended by this Amendment. This Amendment is deemed incorporated into each of the Loan Documents. To the extent that any term or provision of this Amendment is or may be inconsistent with any term or provision in any Loan Document, the terms and provisions of this Amendment shall control.

2. The Borrower hereby certifies that: (a) all of its representations and warranties in the Loan Documents, as amended by this Amendment, are, except as may otherwise be stated in this Amendment: (i) true and correct in all material respects as of the date of this Amendment, (ii) ratified and confirmed without condition as if made anew, and (iii) incorporated into this Amendment by reference (it being understood that (x) any representation or warranty which by its terms is made as of a specified date shall be true and correct in all material respects only as of such specified date and (y) any other representation or warranty is true and correct in all material respects), (b) no Event of Default or event which, with the passage of time or the giving of notice or both, would constitute an Event of Default, exists under any Loan Document which will not be cured by the execution and effectiveness of this Amendment, (c) as of the date hereof, it has no defenses, set offs, counterclaims, discounts or charges of any kind against the Bank, its officers, directors, employees, agents or attorneys with respect to the Loan or Loan Documents, (d) no consent, approval, order or authorization of, or registration or filing with, any third party is required in connection with the execution, delivery and carrying out of this Amendment or, if required, has been obtained, and (e) this Amendment has been duly authorized, executed and delivered so that it constitutes the legal, valid and binding obligation of the Borrower, enforceable in accordance with its terms. The Borrower confirms that the Obligations remain outstanding without defense, set off, counterclaim, discount or charge of any kind as of the date of this Amendment.

3. The Borrower hereby confirms that any collateral for the Obligations, including liens, security interests, mortgages, and pledges granted by the Borrower or third parties (if applicable), shall continue unimpaired and in full force and effect, and shall cover and secure all of the Borrower’s existing and future Obligations to the Bank, as modified by this Amendment.

4. As a condition precedent to the effectiveness of this Amendment, the Borrower shall comply with the terms and conditions (if any) specified in Exhibit A.

5. This Amendment may be signed in any number of counterpart copies and by the parties to this Amendment on separate counterparts, but all such copies shall constitute one and the same instrument. Delivery

of an executed counterpart of a signature page to this Amendment by facsimile transmission shall be effective as delivery of a manually executed counterpart. Upon written request by the other party (which may be made by electronic mail), any party so executing this Amendment by facsimile transmission shall promptly deliver a manually executed counterpart, provided that any failure to do so shall not affect the validity of the counterpart executed by facsimile transmission.

6. Notwithstanding any other provision herein or in the other Loan Documents, the Borrower agrees that this Amendment, the Loan Documents, any other amendments thereto and any other information, notice, signature card, agreement or authorization related thereto (each, a “**Communication**”) may, at the Bank’s option, be in the form of an electronic record. Any Communication may, at the Bank’s option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention. The Borrower and the Bank acknowledge and agree that the methods for delivering Communications, including notices, under the Loan Documents include electronic transmittal to any electronic address provided by either party to the other party from time to time.

7. The Bank may modify this Amendment for the purposes of completing missing content or correcting erroneous content, without the need for a written amendment, provided that the Bank shall send a copy of any such modification to the Borrower (which notice may be given by electronic mail).

8. This Amendment will be binding upon and inure to the benefit of the Borrower and the Bank and their respective heirs, executors, administrators, successors and assigns.

9. This Amendment will be interpreted and the rights and liabilities of the parties hereto determined in accordance with the laws of the State of New York, excluding its conflict of laws rules, including without limitation the Electronic Transactions Act (or equivalent) in such state (or, to the extent controlling, the laws of the United States of America, including without limitation the Electronic Signatures in Global and National Commerce Act). This Amendment has been delivered to and accepted by the Bank and will be deemed to be made in the State.

10. Except as amended hereby, the terms and provisions of the Loan Documents remain unchanged, are and shall remain in full force and effect unless and until modified or amended in writing in accordance with their terms, and are hereby ratified and confirmed. Except as expressly provided herein, this Amendment shall not constitute an amendment, waiver, consent or release with respect to any provision of any Loan Document, a waiver of any default or Event of Default under any Loan Document, or a waiver or release of any of the Bank’s rights and remedies (all of which are hereby reserved). The Borrower expressly ratifies and confirms the dispute resolution, waiver of jury trial or arbitration provisions, as applicable, contained in the Loan Documents, all of which are incorporated herein by reference.

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Amendment to Loan Documents

[SIGNATURE PAGE]

WITNESS the due execution of this Amendment as a document under seal as of the date first written above.

BORROWER:

LUNA INNOVATIONS INCORPORATED,
a Delaware corporation

By: /s/ Scott A. Graeff
Scott A. Graeff,
Chief Executive Officer

SIGNATURES CONTINUE ON FOLLOWING PAGE

Amendment to Loan Documents

[SIGNATURE PAGE]

WITNESS the due execution of this Amendment as a document under seal as of the date first written above.

BANK:

PNC BANK, NATIONAL ASSOCIATION

By: _____
Name: _____
Title: _____

SIGNATURES CONTINUE ON FOLLOWING PAGE

EXHIBIT A

Amendment to Loan Documents
DATED AS OF MARCH 10, 2022

A. **Loan Documents.** The Loan Documents that are the subject of this Amendment include the following (as each of such documents has been amended, modified or otherwise supplemented previously):

1. Term Note dated as of December 1, 2020 made by Borrower payable to the order of Bank in the original principal amount of \$12,500,000.00;
2. Revolving Line of Credit Note dated as of December 1, 2020 made by Borrower payable to the order of Bank in the maximum principal amount of \$15,000,000.00;
3. Loan Agreement dated as of December 1, 2020 among Borrower, Guarantors and Bank; and
4. Guaranty and Suretyship Agreement dated as of December 1, 2020 among Guarantors and Bank.

B. **Amendments.** The Loan Documents are amended as follows:

1. The following text is hereby added as a new Section 6.9(c) of the Loan Agreement:

(c) Notwithstanding the foregoing or any provision contained herein to the contrary, the Net Leverage Ratio set forth in the preceding clause (a) and the Fixed Charge Coverage Ratio set forth in the preceding clause (b) shall not be tested for the fiscal quarters ending March 31, 2022 and June 30, 2022. Instead, Borrower shall maintain (i) a minimum EBITDA which is not less than Six Million Dollars (\$6,000,000.00) for the fiscal quarter ending March 31, 2022, calculated on a trailing twelve-month basis, and (ii) a minimum EBITDA which is not less than Seven and One Half Million Dollars (\$7,500,000.00) for the fiscal quarter ending June 30, 2022, calculated on a trailing twelve-month basis. For the avoidance of doubt, testing of the Net Leverage Ratio and Fixed Charge Coverage Ratio shall resume with the fiscal quarter ending September 30, 2022.

2. Section 7.3 of the Loan Agreement entitled “Mergers or Acquisitions” is hereby amended to (i) remove “or” at the end of clause (d) and (ii) insert the following immediate after clause (d):

(e) the Project Merkel Acquisition.

For the avoidance of doubt, notwithstanding any contrary provision contained herein or in any other Loan Document, including, without limitation, those set forth in this Section 7.3 or in Sections 6.14, 7.1, 7.2 or 7.5 hereof, the Bank (1) has consented to the Project Hoya Sale under terms and conditions set forth in the Project Hoya Consent and Release Agreement, (2) hereby consents to the Project Merkel Acquisition, and (3) agrees that neither the consummation of the Project Hoya Sale nor the consummation of the Project Merkel Acquisition shall, by themselves, constitute a breach or violation of this Agreement or any other Loan Document.

3. The following defined terms are hereby added to Section 13.1 of the Loan Agreement:

“Project Hoya Sale” means, as set forth in that certain Equity Purchase Agreement, dated as of March 8, 2022, the sale of substantially all of Borrower’s equity interests in Luna Labs USA, LLC, to which Bank has consented by virtue of the Project Hoya Consent and Release Agreement.

“Project Hoya Consent and Release Agreement” means that certain Limited Consent and Release Agreement dated as of March 8, 2022 by and among Bank and Borrower, pursuant to which, among other things, Bank has consented to the

consummation of Project Hoya Sale subject to certain terms and conditions more specifically set forth therein.

“Project Merkel Acquisition” means, as set forth in that certain Share Purchase Agreement dated as of March 10, 2022, the acquisition of all of the ownership interests of NKT Photonics GmbH, a Gesellschaft mit beschränkter Haftung organized under the laws of Germany, by Borrower, along with certain other transactions contemplated thereunder.

4. The following definitions contained within Section 13.1 of the Loan Agreement are hereby deleted in their entirety and replaced with the following text:

“EBITDA” means net income, plus interest expense, plus income tax expense, plus depreciation, plus amortization, plus stock-based compensation, plus one-time transaction and integration costs associated with the Project Owen Acquisition, Project Hoya Sale, and Project Merkel Acquisition, plus losses related to discontinued operations, plus costs associated to the closure of the Ann Arbor, Michigan facility, plus or minus non-cash items as may have been approved by Bank from time to time in its reasonable discretion. Commencing with the fiscal quarter ending March 31, 2022, “EBITDA” shall, on a proforma basis: (i) specifically exclude EBITDA deriving from Borrower’s “Luna Labs” division sold pursuant to the Project Hoya Sale; (ii) specifically include EBITDA deriving from the businesses, divisions or entities acquired pursuant to the Project Merkel Acquisition; and (iii) specifically exclude any income tax expense directly attributable to the Project Hoya Sale.

“Fixed Charge Coverage Ratio” means (i) EBITDA minus Unfunded Capital Expenditures, divided by (ii) the sum of Current Maturities, plus interest expense, plus cash taxes paid (but specifically excluding taxes directly attributable to the Project Hoya Sale), plus dividends.

4. In Section 12(b) of each of the Term Note and the Revolving Line of Credit Note entitled “Events of Default”, the text which reads “*if an Event of Default specified in clause (iii) or (iv) above shall occur*” is hereby deleted and replaced with the following text:

if an Event of Default specified in Section 8.5(b) or (c) of the Loan Agreement shall occur

5. In each of the Term Note and the Revolving Line of Credit Note, Section 14 entitled “Anti-Money Laundering/International Trade Law Compliance” is hereby deleted and replaced with the following text:

14. Anti-Money Laundering/International Trade Law Compliance. The Borrower represents, warrants and covenants to the Bank, as of the date hereof, the date of each advance of proceeds under the Facility, the date of any renewal, extension or modification of the Facility, and at all times until the Facility has been terminated and all amounts thereunder have been indefeasibly paid in full, that: (a) no Covered Entity (i) is a Sanctioned Person; (ii) has any of its assets in a Sanctioned Jurisdiction or in the possession, custody or control of a Sanctioned Person; or (iii) does business in or with, or derives any of its operating income from investments in or transactions with, any Sanctioned Jurisdiction or Sanctioned Person; (b) the proceeds of the Facility will not be used to fund any operations in, finance any investments or activities in, or, make any payments to, a Sanctioned Jurisdiction or Sanctioned Person; (c) the funds used to repay the Facility are not derived from any unlawful activity; (d) each Covered Entity is in compliance with, and no Covered Entity engages in any dealings or transactions prohibited by, any laws of the United States, including but not limited to any Anti-Terrorism Laws; and (e) no Collateral is or will become Embargoed Property. The Borrower covenants and agrees that (a) it shall immediately notify the Bank in writing upon the occurrence of a Reportable Compliance Event; and (b) if, at any time, any Collateral becomes Embargoed Property, in addition to

all other rights and remedies available to the Bank, upon request by the Bank, the Borrower shall provide substitute Collateral acceptable to the Bank that is not Embargoed Property.

As used in this provision, the following terms shall have the following meanings: "Anti-Terrorism Laws" means any laws relating to terrorism, trade sanctions programs and embargoes, import/export licensing, money laundering, or bribery, all as amended, supplemented or replaced from time to time; "Bank" means PNC Bank, National Association; "Collateral" means any collateral securing any debt, liabilities or other obligations of any Obligor to the Bank; "Compliance Authority" means each and all of the (a) U.S. Treasury Department/Office of Foreign Assets Control, (b) U.S. Treasury Department/Financial Crimes Enforcement Network, (c) U.S. State Department/Directorate of Defense Trade Controls, (d) U.S. Commerce Department/Bureau of Industry and Security, (e) U.S. Internal Revenue Service, (f) U.S. Justice Department, and (g) U.S. Securities and Exchange Commission; "Covered Entity" means the Borrower, its affiliates and subsidiaries, all guarantors, pledgors of collateral, all owners of the foregoing, and all brokers or other agents of the Borrower acting in any capacity in connection with the Facility; "Embargoed Property" means any property (a) in which a Sanctioned Person holds an interest; (b) beneficially owned, directly or indirectly, by a Sanctioned Person; (c) that is due to or from a Sanctioned Person; (d) that is located in a Sanctioned Jurisdiction; or (e) that would otherwise cause any actual or possible violation by the Bank of any applicable Anti-Terrorism Law if the Bank were to obtain an encumbrance on, lien on, pledge of or security interest in such property or provide services in consideration of such property; "Facility" means the loan evidenced by this Note; "Obligor" means the Borrower and any guarantor of, or any pledgor, mortgagor or other person or entity providing collateral support for, the Borrower's obligations to the Bank existing on the date of this Note or arising in the future; "Reportable Compliance Event" means (1) any Covered Entity becomes a Sanctioned Person, or is indicted, arraigned, investigated or custodially detained, or receives an inquiry from regulatory or law enforcement officials, in connection with any Anti-Terrorism Law or any predicate crime to any Anti-Terrorism Law, or self-discovers facts or circumstances implicating any aspect of its operations with the actual or possible violation of any Anti-Terrorism Law; (2) any Covered Entity engages in a transaction that has caused or may cause the Bank to be in violation of any Anti-Terrorism Laws, including a Covered Entity's use of any proceeds of the Facility to fund any operations in, finance any investments or activities in, or make any payments to, directly or indirectly, a Sanctioned Jurisdiction or Sanctioned Person; or (3) any Collateral becomes Embargoed Property; "Sanctioned Jurisdiction" means a country subject to a sanctions program maintained by any Compliance Authority; and "Sanctioned Person" means any individual person, group, regime, entity or thing listed or otherwise recognized as a specially designated, prohibited, sanctioned or debarred person or entity, or subject to any limitations or prohibitions (including but not limited to the blocking of property or rejection of transactions), under any order or directive of any Compliance Authority or otherwise subject to, or specially designated under, any sanctions program maintained by any Compliance Authority.

6. In the Guaranty, Section 18 entitled "Anti-Money Laundering/International Trade Law Compliance" is hereby deleted and replaced with the following text:

18. Anti-Money Laundering/International Trade Law Compliance. The Guarantor represents, warrants, and covenants to the Bank, as of the date of this Guaranty, the date of each disbursement of loan proceeds, the date of any renewal, extension or modification of any loan, and at all times any Obligations exist that: (a) no Guarantor (i) is a Sanctioned Person; (ii) has any of its assets in a Sanctioned Jurisdiction or in the possession, custody or control of a Sanctioned Person; or (iii) does business in or with, or derives any of its operating income from investments in or transactions with, any Sanctioned

Jurisdiction or Sanctioned Person; (b) the proceeds of any loan will not be used to fund any operations in, finance any investments or activities in, or make any payments to, a Sanctioned Jurisdiction or Sanctioned Person; (c) the funds used to repay the loan proceeds are not derived from any unlawful activity; (d) each Guarantor is in compliance with, and no Guarantor engages in any dealings or transactions prohibited by, any laws of the United States including but not limited to any Anti-Terrorism Laws; and (e) no Collateral is or will become Embargoed Property. The Guarantor covenants and agrees that (A) it shall immediately notify the Bank in writing upon the occurrence of a Reportable Compliance Event; and (B) if, at any time, any Collateral becomes Embargoed Property, in addition to all other rights and remedies available to the Bank, upon request by the Bank, the Guarantor shall provide substitute Collateral acceptable to the Bank that is not Embargoed Property.

As used in this provision, the following terms shall have the following meanings: "Anti-Terrorism Laws" means any laws relating to terrorism, trade sanctions programs and embargoes, import/export licensing, money laundering, or bribery, all as amended, supplemented or replaced from time to time; "Bank" means PNC Bank, National Association; "Collateral" means any collateral securing any debt, liabilities or other obligations of any Obligor to the Bank; "Compliance Authority" means each and all of the (a) U.S. Treasury Department/Office of Foreign Assets Control, (b) U.S. Treasury Department/Financial Crimes Enforcement Network, (c) U.S. State Department/Directorate of Defense Trade Controls, (d) U.S. Commerce Department/Bureau of Industry and Security, (e) U.S. Internal Revenue Service, (f) U.S. Justice Department, and (g) U.S. Securities and Exchange Commission; "Covered Entity" means the Borrower, its affiliates and subsidiaries, all guarantors, pledgors of Collateral, all owners of the foregoing, and all brokers or other agents of the Borrower acting in any capacity in connection with any loan, loan proceeds or other Obligations; "Embargoed Property" means any property (a) in which a Sanctioned Person holds an interest; (b) beneficially owned, directly or indirectly, by a Sanctioned Person; (c) that is due to or from a Sanctioned Person; (d) that is located in a Sanctioned Jurisdiction; or (e) that would otherwise cause any actual or possible violation by the Bank of any applicable Anti-Terrorism Law if the Bank were to obtain an encumbrance on, lien on, pledge of or security interest in such property or provide services in consideration of such property; "Obligations" means all loans, advances, debts, liabilities, obligations, covenants and duties owing by the Borrower to the Bank or to any other direct or indirect subsidiary of The PNC Financial Services Group, Inc., of any kind or nature, present or future; "Obligor" means the Guarantor, the Borrower, any other guarantor of, or any pledgor, mortgagor or other person or entity providing collateral support for, the Obligations; "Reportable Compliance Event" means (a) any Covered Entity becomes a Sanctioned Person, or is indicted, arraigned, investigated or custodially detained, or receives an inquiry from regulatory or law enforcement officials, in connection with any Anti-Terrorism Law or any predicate crime to any Anti-Terrorism Law, or self-discovers facts or circumstances implicating any aspect of its operations with the actual or possible violation of any Anti-Terrorism Law; (b) any Covered Entity engages in a transaction that has caused or may cause the Bank to be in violation of any Anti-Terrorism Laws, including a Covered Entity's use of any proceeds of any loan to fund any operations in, finance any investments or activities in, or, make any payments to, directly or indirectly, a Sanctioned Jurisdiction or Sanctioned Person; or (c) any Collateral becomes Embargoed Property; "Sanctioned Jurisdiction" means a country subject to a sanctions program maintained by any Compliance Authority; and "Sanctioned Person" means any individual person, a group, regime, entity or thing listed or otherwise recognized as a specially designated, prohibited, sanctioned or debarred person or entity, or subject to any limitations or prohibitions (including but not limited to the blocking of property or rejection of transactions), under any order or directive of any Compliance Authority or otherwise subject to, or

especially designated under, any sanctions program maintained by any Compliance Authority.

- C. **Conditions to Effectiveness of Amendment.** The Bank's willingness to agree to the amendments set forth in this Amendment is subject to the prior satisfaction of the following conditions:
1. Execution by all parties and delivery to the Bank of this Amendment, including the attached Consent of Guarantors; and
 2. Payment by the Borrower to the Bank of all fees and expenses required by the Bank in connection with this Amendment.

**CONSENT OF GUARANTORS TO
AMENDMENT TO LOAN DOCUMENTS**

Each of the undersigned guarantors (each, jointly and severally, a “**Guarantor**”) consents to the provisions of the foregoing Amendment and all prior amendments, if any, and confirms and agrees that: (a) each Guarantor’s obligations under the Guaranty and Suretyship Agreement dated as of December 1, 2020 (the “**Guaranty**”), relating to the Obligations mentioned in the Amendment, shall be unimpaired by the Amendment; (b) each Guarantor has no defenses, set offs, counterclaims, discounts or charges of any kind against the Bank, its officers, directors, employees, agents or attorneys with respect to the Guaranty; and (c) all of the terms, conditions and covenants in the Guaranty remain unaltered (except as expressly modified by the Amendment) and in full force and effect, are hereby ratified and confirmed, and continue to apply to the Obligations, as modified by the Amendment. Each Guarantor certifies that all representations and warranties made in the Guaranty are true and correct.

Each Guarantor hereby confirms that any collateral for the Obligations, including liens, security interests, mortgages, and pledges granted by such Guarantor or third parties (if applicable), shall continue unimpaired and in full force and effect, shall cover and secure all of such Guarantor’s existing and future Obligations to the Bank, as modified by this Amendment. Each Guarantor ratifies and confirms the indemnification, waiver of jury trial or arbitration provisions contained in the Guaranty, all of which are incorporated herein by reference.

By signing below, each Guarantor agrees that this Consent, the Guaranty, the other Loan Documents, any amendments thereto and any other information, notice, signature card, agreement or authorization related thereto (each, a “**Communication**”) may, at the Bank’s option, be in the form of an electronic record. Any Communication may, at the Bank’s option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention. Each Guarantor acknowledges and agrees that the methods for delivering Communications, including notices, under the Guaranty and the other Loan Documents include electronic transmittal to any electronic address provided by any party to the other party from time to time.

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**CONSENT OF GUARANTORS TO
AMENDMENT TO LOAN DOCUMENTS**

WITNESS the due execution of this Consent as a document under seal as of the date of this Amendment, intending to be legally bound hereby.

GUARANTORS:

LUNA TECHNOLOGIES, INC.,
a Delaware corporation, successor by merger to
Former Luna Subsidiary, Inc., a Delaware corporation, and
Terametrix LLC, a Delaware limited liability company

By: /s/ Scott A. Graeff
Scott A. Graeff,
Chief Executive Officer

GENERAL PHOTONICS CORP.,
a California corporation

By: /s/ Scott A. Graeff
Scott A. Graeff,
President



Second Amendment to Loan Documents

THIS SECOND AMENDMENT TO LOAN DOCUMENTS (this “**Amendment**”) is made as of June 21, 2022, by and between **LUNA INNOVATIONS INCORPORATED**, a Delaware corporation (the “**Borrower**”), and **PNC BANK, NATIONAL ASSOCIATION** (the “**Bank**”).

BACKGROUND

A. The Borrower or another obligor has executed and delivered to the Bank (or a predecessor which is now known by the Bank’s name as set forth above), one or more promissory notes, letter agreements, loan agreements, security agreements, mortgages, pledge agreements, collateral assignments, and other agreements, instruments, certificates and documents, some or all of which are more fully described on attached Exhibit A, which is made a part of this Amendment (collectively as amended from time to time, the “**Loan Documents**”) which evidence or secure some or all of the indebtedness and other obligations of the Borrower to the Bank for one or more loans or other extensions of credit (as used herein, collectively, together with the Obligations, if and as defined in the Loan Documents, the “**Obligations**”). Any initially capitalized terms used in this Amendment without definition shall have the meanings assigned to those terms in the Loan Documents.

B. The Borrower and the Bank desire to amend the Loan Documents as provided for in this Amendment.

NOW, THEREFORE, in consideration of the mutual covenants herein contained and intending to be legally bound hereby, the parties hereto agree as follows:

1. Certain of the Loan Documents are amended as set forth in Exhibit A. Any and all references to any Loan Document in any other Loan Document shall be deemed to refer to such Loan Document as amended by this Amendment. This Amendment is deemed incorporated into each of the Loan Documents. To the extent that any term or provision of this Amendment is or may be inconsistent with any term or provision in any Loan Document, the terms and provisions of this Amendment shall control.

2. The Borrower hereby certifies that: (a) all of its representations and warranties in the Loan Documents, as amended by this Amendment, are, except as may otherwise be stated in this Amendment: (i) true and correct in all material respects as of the date of this Amendment, (ii) ratified and confirmed without condition as if made anew, and (iii) incorporated into this Amendment by reference (it being understood that (x) any representation or warranty which by its terms is made as of a specified date shall be true and correct in all material respects only as of such specified date and (y) any other representation or warranty is true and correct in all material respects), (b) no Event of Default or event which, with the passage of time or the giving of notice or both, would constitute an Event of Default, exists under any Loan Document which will not be cured by the execution and effectiveness of this Amendment, (c) as of the date hereof, it has no defenses, set offs, counterclaims, discounts or charges of any kind against the Bank, its officers, directors, employees, agents or attorneys with respect to the Loan or Loan Documents, (d) no consent, approval, order or authorization of, or registration or filing with, any third party is required in connection with the execution, delivery and carrying out of this Amendment or, if required, has been obtained, and (e) this Amendment has been duly authorized, executed and delivered so that it constitutes the legal, valid and binding obligation of the Borrower, enforceable in accordance with its terms. The Borrower confirms that the Obligations remain outstanding without defense, set off, counterclaim, discount or charge of any kind as of the date of this Amendment.

3. The Borrower hereby confirms that any collateral for the Obligations, including liens, security interests, mortgages, and pledges granted by the Borrower or third parties (if applicable), shall continue unimpaired and in full force and effect, and shall cover and secure all of the Borrower’s existing and future Obligations to the Bank, as modified by this Amendment.

4. As a condition precedent to the effectiveness of this Amendment, the Borrower shall comply with the terms and conditions (if any) specified in Exhibit A.

5. This Amendment may be signed in any number of counterpart copies and by the parties to this Amendment on separate counterparts, but all such copies shall constitute one and the same instrument. Delivery

of an executed counterpart of a signature page to this Amendment by facsimile transmission shall be effective as delivery of a manually executed counterpart. Upon written request by the other party (which may be made by electronic mail), any party so executing this Amendment by facsimile transmission shall promptly deliver a manually executed counterpart, provided that any failure to do so shall not affect the validity of the counterpart executed by facsimile transmission.

6. Notwithstanding any other provision herein or in the other Loan Documents, the Borrower agrees that this Amendment, the Loan Documents, any other amendments thereto and any other information, notice, signature card, agreement or authorization related thereto (each, a “**Communication**”) may, at the Bank’s option, be in the form of an electronic record. Any Communication may, at the Bank’s option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention. The Borrower and the Bank acknowledge and agree that the methods for delivering Communications, including notices, under the Loan Documents include electronic transmittal to any electronic address provided by either party to the other party from time to time.

7. The Bank may modify this Amendment for the purposes of completing missing content or correcting erroneous content, without the need for a written amendment, provided that the Bank shall send a copy of any such modification to the Borrower (which notice may be given by electronic mail).

8. This Amendment will be binding upon and inure to the benefit of the Borrower and the Bank and their respective heirs, executors, administrators, successors and assigns.

9. This Amendment will be interpreted and the rights and liabilities of the parties hereto determined in accordance with the laws of the State of New York, excluding its conflict of laws rules, including without limitation the Electronic Transactions Act (or equivalent) in such state (or, to the extent controlling, the laws of the United States of America, including without limitation the Electronic Signatures in Global and National Commerce Act). This Amendment has been delivered to and accepted by the Bank and will be deemed to be made in the State.

10. Except as amended hereby, the terms and provisions of the Loan Documents remain unchanged, are and shall remain in full force and effect unless and until modified or amended in writing in accordance with their terms, and are hereby ratified and confirmed. Except as expressly provided herein, this Amendment shall not constitute an amendment, waiver, consent or release with respect to any provision of any Loan Document, a waiver of any default or Event of Default under any Loan Document, or a waiver or release of any of the Bank’s rights and remedies (all of which are hereby reserved). The Borrower expressly ratifies and confirms the dispute resolution, waiver of jury trial or arbitration provisions, as applicable, contained in the Loan Documents, all of which are incorporated herein by reference.

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Amendment to Loan Documents

[SIGNATURE PAGE]

WITNESS the due execution of this Amendment as a document under seal as of the date first written above.

BORROWER:

LUNA INNOVATIONS INCORPORATED,
a Delaware corporation

By: /s/ Scott A. Graeff
Scott A. Graeff,
Chief Executive Officer

SIGNATURES CONTINUE ON FOLLOWING PAGE

Amendment to Loan Documents

[SIGNATURE PAGE]

WITNESS the due execution of this Amendment as a document under seal as of the date first written above.

BANK:

PNC BANK, NATIONAL ASSOCIATION

By: _____
Name: _____
Title: _____

SIGNATURES CONTINUE ON FOLLOWING PAGE

EXHIBIT A

Second Amendment to Loan Documents

DATED AS OF JUNE 21, 2022

- A. **Loan Documents.** The Loan Documents that are the subject of this Amendment include the following (as each of such documents has been amended, modified or otherwise supplemented previously):
1. Loan Agreement dated as of December 1, 2020 among Borrower, Guarantors and Bank, as amended by that certain Amendment to Loan Documents as of March 10, 2022.
- B. **Amendments.** The Loan Documents are amended as follows:
1. The following text is hereby added to the end of Section 2.4(a) of the Loan Agreement:

In addition, a fully earned, non-refundable extension fee of Fifty Thousand Dollars (\$50,000.00) shall be due, earned and payable contemporaneously with the amendment and extension occurring in June 2022.
 1. Section 6.9(a) of the Loan Agreement is hereby deleted and replaced with the following text:

(a) Maintain at all times, commencing with the fiscal quarter ending September 30, 2022 and tested as of each fiscal quarter end, a Net Leverage Ratio which is less than 2.00 to 1.00; and
 2. The definition of “Term Loan” set forth in Section 13.1 of the Loan Agreement is hereby deleted and replaced with the following text:

“Term Loan” is the term loan evidenced by the Term Loan Note in the original principal amount of Twenty Million Dollars (\$20,000,000.00).
- C. **Conditions to Effectiveness of Amendment.** The Bank’s willingness to agree to the amendments set forth in this Amendment is subject to the prior satisfaction of the following conditions:
1. Execution by all parties and delivery to the Bank of this Amendment, including the attached Consent of Guarantors; and
 2. Payment by the Borrower to the Bank of all fees and expenses required by the Bank in connection with this Amendment.

**CONSENT OF GUARANTORS TO
AMENDMENT TO LOAN DOCUMENTS**

Each of the undersigned guarantors (each, jointly and severally, a “**Guarantor**”) consents to the provisions of the foregoing Amendment and all prior amendments, if any, and confirms and agrees that: (a) each Guarantor’s obligations under the Guaranty and Suretyship Agreement dated as of December 1, 2020 (the “**Guaranty**”), relating to the Obligations mentioned in the Amendment, shall be unimpaired by the Amendment; (b) each Guarantor has no defenses, set offs, counterclaims, discounts or charges of any kind against the Bank, its officers, directors, employees, agents or attorneys with respect to the Guaranty; and (c) all of the terms, conditions and covenants in the Guaranty remain unaltered (except as expressly modified by the Amendment) and in full force and effect, are hereby ratified and confirmed, and continue to apply to the Obligations, as modified by the Amendment. Each Guarantor certifies that all representations and warranties made in the Guaranty are true and correct.

Each Guarantor hereby confirms that any collateral for the Obligations, including liens, security interests, mortgages, and pledges granted by such Guarantor or third parties (if applicable), shall continue unimpaired and in full force and effect, shall cover and secure all of such Guarantor’s existing and future Obligations to the Bank, as modified by this Amendment. Each Guarantor ratifies and confirms the indemnification, waiver of jury trial or arbitration provisions contained in the Guaranty, all of which are incorporated herein by reference.

By signing below, each Guarantor agrees that this Consent, the Guaranty, the other Loan Documents, any amendments thereto and any other information, notice, signature card, agreement or authorization related thereto (each, a “**Communication**”) may, at the Bank’s option, be in the form of an electronic record. Any Communication may, at the Bank’s option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention. Each Guarantor acknowledges and agrees that the methods for delivering Communications, including notices, under the Guaranty and the other Loan Documents include electronic transmittal to any electronic address provided by any party to the other party from time to time.

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**CONSENT OF GUARANTORS TO
AMENDMENT TO LOAN DOCUMENTS**

WITNESS the due execution of this Consent as a document under seal as of the date of this Amendment, intending to be legally bound hereby.

GUARANTORS:

LUNA TECHNOLOGIES, INC.,
a Delaware corporation, successor by merger to
Former Luna Subsidiary, Inc., a Delaware corporation, and
Terametrix LLC, a Delaware limited liability company

By: /s/ Scott A. Graeff
Scott A. Graeff,
Chief Executive Officer

GENERAL PHOTONICS CORP.,
a California corporation

By: /s/ Scott A. Graeff
Scott A. Graeff,
President

100363652.2



Amended and Restated Revolving Line of Credit Note

\$15,000,000.00 June 21, 2022

THIS AMENDED AND RESTATED REVOLVING LINE OF CREDIT NOTE HEREBY AMENDS AND RESTATES, IN ALL RESPECTS, THAT CERTAIN REVOLVING LINE OF CREDIT NOTE DATED DECEMBER 1, 2020 MADE BY BORROWER PAYABLE TO THE ORDER OF BANK IN THE ORIGINAL PRINCIPAL AMOUNT OF UP TO FIFTEEN MILLION AND NO/100 DOLLARS (\$15,000,000.00), AS THE SAME MAY HAVE BEEN MODIFIED OR AMENDED FROM TIME TO TIME. NO NOVATION IS INTENDED HEREBY.

FOR VALUE RECEIVED, LUNA INNOVATIONS INCORPORATED, a Delaware corporation (the “**Borrower**”), with an address at 1 Riverside Circle, Suite 400, Roanoke, VA 24016, promises to pay to the order of **PNC BANK, NATIONAL ASSOCIATION** (the “**Bank**”), in lawful money of the United States of America in immediately available funds at its offices located at 1001 Haxall Point, Suite 706, Richmond, VA 23219, or at such other location as the Bank may designate from time to time, the principal sum of FIFTEEN MILLION AND NO/100 DOLLARS (\$15,000,000.00) (the “**Facility**”) or such lesser amount as may be advanced to or for the benefit of the Borrower hereunder, together with interest accruing on the outstanding principal balance from the date hereof, all as provided below. All capitalized terms used herein and not otherwise defined shall have the meanings assigned to such terms in the Loan Agreement (as defined below).

1. Revolving Line of Credit Advances. This Note evidences a revolving line of credit. The Borrower may borrow, repay and reborrow hereunder and the Bank may advance and readvance under this Note from time to time (each an “advance” and together the “advances”) until the Expiration Date, subject to the terms and conditions of this Note and the Loan Documents. The “**Expiration Date**” shall mean June 21, 2027, or such later date as may be designated by the Bank by written notice from the Bank to the Borrower. The Borrower acknowledges and agrees that in no event will the Bank be under any obligation to extend or renew the Facility or this Note beyond the Expiration Date. In no event shall the aggregate unpaid principal amount of advances under this Note exceed the face amount of this Note.

2. Interest Rate and Payments. Amounts outstanding under this Note will bear interest at a rate per annum which is at all times equal to the sum of (a) Daily Simple SOFR (as defined below), plus (B) a SOFR adjustment of ten basis points (0.10%), plus (C) the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof). Accrued interest will be due and payable on the first day of each month, beginning with the payment due on July 1, 2022. The outstanding principal balance and any accrued but unpaid interest shall be due and payable on the Expiration Date.

3. Certain Definitions. If the following terms are used in this Note, such terms shall have the meanings set forth below:

“**Alternate Rate**” shall mean the sum of (A) the Base Rate plus (B) the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof).

“**Base Rate**” shall mean the higher of (A) the Prime Rate in effect on such day, and (B) the sum of the Overnight Bank Funding Rate in effect on such day plus 50 basis points (0.50%). If and when the Base Rate (or any component thereof) changes, the rate of interest with respect to any amounts hereunder to which the Base Rate applies will change automatically without notice to the Borrower, effective on the date of any such change.

“**Business Day**” shall mean any day other than (A) a Saturday or Sunday or (B) a legal holiday on which commercial banks are authorized or required by law to be closed for business in Pittsburgh, Pennsylvania; provided that, when used in connection with an amount that bears interest at a rate based on SOFR or any direct or indirect calculation or determination involving SOFR, the term “Business Day” means any such day that is also a U.S. Government Securities Business Day.

“**Daily Simple SOFR**” means, for any day (a “**SOFR Rate Day**”), the interest rate per annum determined by the Bank by dividing (the resulting quotient rounded upwards, at the Bank’s discretion, to the nearest 1/100th of 1%) (A) SOFR for the day (the “**SOFR Determination Date**”) that is 2 Business Days prior to (i) such SOFR Rate Day if such SOFR Rate Day is a Business Day or (ii) the Business Day immediately preceding such SOFR Rate Day if such SOFR Rate Day is not a Business Day, by (B) a number equal to 1.00 minus the SOFR Reserve Percentage, in each case, as such SOFR is published by the NYFRB (or a successor administrator of the secured overnight financing rate) on the website of the NYFRB, currently at <http://www.newyorkfed.org>, or any successor source identified by the NYFRB or its successor administrator for the secured overnight financing rate from time to time. If Daily Simple SOFR as determined above would be less than the Floor, then Daily Simple SOFR shall be deemed to be the Floor. If SOFR for any SOFR Determination Date has not been published or replaced with a Benchmark Replacement by 5:00 p.m. (Pittsburgh, Pennsylvania time) on the second Business Day immediately following such SOFR Determination Date, then SOFR for such SOFR Determination Date will be SOFR for the first Business Day preceding such SOFR Determination Date for which SOFR was published in accordance with the definition of “SOFR”; provided that SOFR determined pursuant to this sentence shall be used for purposes of calculating Daily Simple SOFR for no more than 3 consecutive SOFR Rate Days. If and when Daily Simple SOFR as determined above changes, any applicable rate of interest based on Daily Simple SOFR will change automatically without notice to the Borrower, effective on the date of any such change.

“**Default Rate**” shall mean the rate per annum (based on the actual number of days that principal is outstanding over a year of 360 days) equal to the lesser of (A) the sum of 3% plus the interest rate otherwise in effect from time to time under this Note, and (B) the Maximum Rate.

“**Floor**” means a rate of interest per annum equal to zero percent (0.00%).

“**Loan Agreement**” shall mean that certain Loan Agreement by and among, the Borrower, the guarantors from time to time party thereto and Bank dated as of December 1, 2020, as the same may have been modified or amended from time to time.

“**Maximum Rate**” shall mean the maximum rate of interest allowed by applicable law.

“**Overnight Bank Funding Rate**” shall mean, for any day, the rate comprised of both overnight federal funds and overnight Eurocurrency borrowings by U.S.-managed banking offices of depository institutions, as such composite rate shall be determined by the NYFRB, as set forth on its public website from time to time, and as published on the next succeeding Business Day as the overnight bank funding rate by the NYFRB (or by such other recognized electronic source (such as Bloomberg) selected by the Bank for the purpose of displaying such rate); provided, that if such day is not a Business Day, the Overnight Bank Funding Rate for such day shall be such rate on the immediately preceding Business Day; provided, further, that if such rate shall at any time, for any reason, no longer exist, a comparable replacement rate determined by the Bank at such time (which determination shall be conclusive absent manifest error). If the Overnight Bank Funding Rate determined as above would be less than zero, then such rate shall be deemed to be zero. The rate of interest charged shall be adjusted as of each Business Day based on changes in the Overnight Bank Funding Rate without notice to the Borrower.

“**Prime Rate**” shall mean the rate publicly announced by the Bank from time to time as its prime rate. The Prime Rate is determined from time to time by the Bank as a means of pricing some loans to its borrowers. The Prime Rate is not tied to any external rate of interest or index, and does not necessarily reflect the lowest rate of interest actually charged by the Bank to any particular class or category of customers.

“**SOFR**” shall mean a rate equal to the secured overnight financing rate as administered by the NYFRB (or a successor administrator of the secured overnight financing rate).

“**SOFR Reserve Percentage**” shall mean, for any day, the maximum effective percentage in effect on such day, if any, as prescribed by the Board of Governors of the Federal Reserve System (or any successor) for determining the reserve requirements (including, without limitation, supplemental, marginal and emergency reserve requirements) with respect to SOFR funding.

“**U.S. Government Securities Business Day**” means any day except for (A) a Saturday or Sunday or (B) a day on which the Securities Industry and Financial Markets Association recommends that the fixed

income departments of its members be closed for the entire day for purposes of trading in United States government securities.

4. **Advance Procedures.** Advances hereunder shall be permitted in the manner set forth in Section 3.4 of the Loan Agreement.

5. **Interest Calculation; Maximum Rate.** Interest will be calculated based on the actual number of days that principal is outstanding over a year of 360 days. In no event will the rate of interest hereunder exceed the Maximum Rate. Regardless of any other provision of this Note or the other Loan Documents, if for any reason the effective interest rate should exceed the Maximum Rate, the effective interest rate shall be deemed reduced to, and shall be, the Maximum Rate, and (i) the amount which would be excessive interest shall be deemed applied to the reduction of the principal balance of this Note and not to the payment of interest, and (ii) if the loan evidenced by this Note has been or is thereby paid in full, the excess shall be returned to the party paying same, such application to the principal balance of this Note or the refunding of such excess to be a complete settlement and acquittance thereof.

6. **Conforming Changes; Benchmark Replacement Provisions.** The Bank shall have the right to make any technical, administrative or operational changes from time to time that the Bank decides may be appropriate to reflect the adoption and implementation of SOFR or any other Benchmark (as defined below) or to permit the use and administration thereof by the Bank in a manner substantially consistent with market practice or in such other manner as the Bank decides is reasonably necessary. Notwithstanding anything to the contrary herein or in any other Loan Document, any amendments implementing such technical, administrative or operational changes will become effective without any further action or consent of the Borrower. The Bank shall provide notice to the Borrower of any such amendment reasonably promptly after such amendment becomes effective.

If the applicable rate under this Note is based on a Benchmark and the Bank determines (which determination shall be final and conclusive) that (A) such Benchmark cannot be determined pursuant to its definition other than as a result of a Benchmark Transition Event (as defined below), or (B) any enactment, promulgation or adoption of or any change in any applicable law, rule or regulation, or any change in the interpretation or administration thereof by a governmental authority, central bank or comparable agency charged with the interpretation or administration thereof, or compliance by the Bank with any guideline, request or directive (whether or not having the force of law) of any such authority, central bank or comparable agency shall make it unlawful or impracticable for the Bank to make or maintain or fund loans based on that Benchmark, then the Bank shall give notice thereof to the Borrower. Thereafter, until the Bank notifies the Borrower that the circumstances giving rise to such determination no longer exist, the interest rate on all amounts outstanding under this Note shall be the Alternate Rate.

Notwithstanding anything to the contrary herein or in any other Loan Document, if the Bank determines (which determination shall be final and conclusive) that a Benchmark Transition Event has occurred with respect to a Benchmark, the Bank may amend this Note to replace such Benchmark with a Benchmark Replacement (as defined below); and any such amendment shall be in writing, shall specify the date that the Benchmark Replacement is effective and will not require any further action or consent of the Borrower. Until the Benchmark Replacement is effective, amounts bearing interest with reference to a Benchmark will continue to bear interest with reference to such Benchmark as long as such Benchmark is available, and otherwise such amounts automatically will bear interest at the Alternate Rate.

For purposes of this Section, the following terms have the meanings set forth below:

“**Benchmark**” means, at any time, any interest rate index then used in the determination of an interest rate under the terms of this Note. Once a Benchmark Replacement becomes effective under this Note, it is a Benchmark. The initial Benchmark under this Note is Daily Simple SOFR.

“**Benchmark Replacement**” means, for any Benchmark, the sum of (a) an alternate benchmark rate and (b) an adjustment (which may be a positive or negative value or zero), in each case that has been selected by the Bank as the replacement for such Benchmark giving due consideration to any evolving or then-prevailing market convention, including any applicable recommendations made by the official sector or any official sector-sponsored committee or working group, for U.S. dollar-denominated credit facilities at such time; provided that, if the Benchmark Replacement as determined pursuant to the foregoing would be less than the Floor, the Benchmark Replacement will be deemed to be the Floor for the purposes of this Note and the other Loan Documents.

“**Benchmark Transition Event**” shall mean a public statement or publication by or on behalf of the administrator of a Benchmark, the regulatory supervisor of such administrator, the Board of Governors of the Federal Reserve System, NYFRB, an insolvency official or resolution authority with jurisdiction over the administrator for such Benchmark or a court or an entity with similar insolvency or resolution authority over the administrator for such Benchmark, announcing or stating that (a) such administrator has ceased or will cease to provide such Benchmark permanently or indefinitely, provided that at the time of such statement or publication there is no successor administrator that will continue to provide such Benchmark or (b) such Benchmark is or will no longer be representative.

7. **Other Payment Terms.** If any payment under this Note is due on a day of a calendar month for which there is no numerically corresponding day in certain other months (each, a “**Non-Conforming Month**”), then the payment in a Non-Conforming Month shall be due on the last Business Day of such Non-Conforming Month. If any payment under this Note shall become due on a day other than a Business Day, such payment shall be due on the next succeeding Business Day, except that if such day falls in the next succeeding calendar month, such payment shall be due on the next preceding day that is a Business Day. Interest shall be computed to, but excluding, the date of payment. The Borrower hereby authorizes the Bank to charge the Borrower’s deposit account at the Bank for any payment when due under this Note or any other Loan Document. Payments received will be applied to charges, fees and expenses (including attorneys’ fees), accrued interest and principal in any order the Bank may choose, in its sole discretion.

8. **Late Payments; Default Rate.** If the Borrower fails to make any payment of principal, interest or other amount coming due pursuant to the provisions of this Note within 15 calendar days of the date due and payable, the Borrower also shall pay to the Bank a late charge equal to the lesser of 3% of the amount of such payment or \$100.00 (the “**Late Charge**”). Such 15-day period shall not be construed in any way to extend the due date of any such payment. Upon maturity, whether by acceleration, demand or otherwise, and at the Bank’s option upon the occurrence of any Event of Default (as hereinafter defined) and during the continuance thereof, amounts outstanding under this Note shall bear interest at the Default Rate. The Default Rate shall continue to apply whether or not judgment shall be entered on this Note. Both the Late Charge and the Default Rate are imposed as liquidated damages for the purpose of defraying the Bank’s expenses incident to the handling of delinquent payments, but are in addition to, and not in lieu of, the Bank’s exercise of any rights and remedies hereunder, under the other Loan Documents or under applicable law, and any fees and expenses of any agents or attorneys which the Bank may employ. In addition, the Default Rate reflects the increased credit risk to the Bank of carrying a loan that is in default. The Borrower agrees that the Late Charge and Default Rate are reasonable forecasts of just compensation for anticipated and actual harm incurred by the Bank, and that the actual harm incurred by the Bank cannot be estimated with certainty and without difficulty.

9. **Prepayment.** The indebtedness evidenced by this Note may be prepaid in whole or in part at any time without penalty or premium.

10. **Increased Costs; Yield Protection.** On written demand, together with written evidence of the justification therefor, the Borrower agrees to pay the Bank all direct costs incurred, any losses suffered or payments made by the Bank as a result of any Change in Law (hereinafter defined), imposing any reserve, deposit, allocation of capital or similar requirement (including without limitation, Regulation D of the Board of Governors of the Federal Reserve System) on the Bank, its holding company or any of their respective assets relative to the Facility. “**Change in Law**” means the occurrence, after the date of this Note, of any of the following: (a) the adoption or taking effect of any law, rule, regulation or treaty, (b) any change in any law, rule, regulation or treaty or in the administration, interpretation, implementation or application thereof by any governmental authority or (c) the making or issuance of any request, rule, guideline or directive (whether or not having the force of law) by any governmental authority; provided that notwithstanding anything herein to the contrary, (x) the Dodd-Frank Wall Street Reform and Consumer Protection Act and all requests, rules, guidelines or directives thereunder or issued in connection therewith and (y) all requests, rules, guidelines or directives promulgated by the Bank for International Settlements, the Basel Committee on Banking Supervision (or any successor or similar authority) or the United States or foreign regulatory authorities, in each case pursuant to Basel III, shall in each case be deemed to be a “Change in Law”, regardless of the date enacted, adopted or issued.

11. **Other Loan Documents.** This Note is issued in connection with the Loan Agreement and the other Loan Documents (as the same may be amended, modified or renewed from time to time), and is secured by the property (if any) described in the Loan Documents and by any and all mortgages, security agreements, assignments, loan agreements, pledge agreements and other documents or instruments evidencing a security interest or other lien in favor of the Bank and delivered by the Borrower in connection with the Loan Agreement and the other Loan

Documents. Such documents may be executed contemporaneously with the execution of this Note, or they may be executed and delivered at another time.

12. Events of Default. The occurrence of any “Event of Default” under the Loan Agreement shall constitute an “**Event of Default**” under this Note. Upon the occurrence and during the continuance of an Event of Default: subject to any cure periods in the Loan Agreement, (a) the Bank shall be under no further obligation to make advances hereunder; (b) if an Event of Default specified in clause (iii) or (iv) above shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder shall be immediately due and payable without demand or notice of any kind; (c) if any other Event of Default shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder, at the Bank’s option and without demand or notice of any kind, may be accelerated and become immediately due and payable; (d) at the Bank’s option, this Note will bear interest at the Default Rate from the date of the occurrence of the Event of Default; and (e) the Bank may exercise from time to time any of the rights and remedies available under the Loan Documents or under applicable law.

13. Right of Setoff. In addition to all liens upon and rights of setoff against the Borrower’s money, securities or other property given to the Bank by law, the Bank shall have, with respect to the Borrower’s obligations to the Bank under this Note and to the extent permitted by law, a contractual possessory security interest in and a contractual right of setoff against, and the Borrower hereby grants the Bank a security interest in, and hereby assigns, conveys, delivers, pledges and transfers to the Bank, all of the Borrower’s right, title and interest in and to, all of the Borrower’s deposits, moneys, securities and other property now or hereafter in the possession of or on deposit with, or in transit to, the Bank or any other direct or indirect subsidiary of The PNC Financial Services Group, Inc., whether held in a general or special account or deposit, whether held jointly with someone else, or whether held for safekeeping or otherwise, excluding, however, all IRA, Keogh, and trust accounts. Every such security interest and right of setoff may be exercised without demand upon or notice to the Borrower. Every such right of setoff shall be deemed to have been exercised immediately upon the occurrence of an Event of Default hereunder without any action of the Bank, although the Bank may enter such setoff on its books and records at a later time.

14. Anti-Money Laundering/International Trade Law Compliance. The Borrower represents and warrants to the Bank, as of the date hereof, the date of each advance of proceeds under the Facility, the date of any renewal, extension or modification of the Facility, and at all times until the Facility has been terminated and all amounts thereunder have been indefeasibly paid in full, that: (a) no Covered Entity (i) is a Sanctioned Person; (ii) has any of its assets in a Sanctioned Country or in the possession, custody or control of a Sanctioned Person; or (iii) does business in or with, or derives any of its operating income from investments in or transactions with, any Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (b) the proceeds of the Facility will not be used to fund any operations in, finance any investments or activities in, or, make any payments to, a Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (c) the funds used to repay the Facility are not derived from any unlawful activity; and (d) each Covered Entity is in compliance with, and no Covered Entity engages in any dealings or transactions prohibited by, any laws of the United States, including but not limited to any Anti-Terrorism Laws. Borrower covenants and agrees that it shall immediately notify the Bank in writing upon the occurrence of a Reportable Compliance Event. Notwithstanding anything to the contrary herein or in any of the other Loan Documents, the collateral securing any debt, liabilities or other obligations of any Obligor to the Bank shall not include any Embargoed Property, but only to the extent and for so long as such collateral is or remains Embargoed Property.

As used herein: “**Anti-Terrorism Laws**” means any laws relating to terrorism, trade sanctions programs and embargoes, import/export licensing, money laundering, or bribery, all as amended, supplemented or replaced from time to time; “**Compliance Authority**” means each and all of the (a) U.S. Treasury Department/Office of Foreign Assets Control, (b) U.S. Treasury Department/Financial Crimes Enforcement Network, (c) U.S. State Department/Directorate of Defense Trade Controls, (d) U.S. Commerce Department/Bureau of Industry and Security, (e) U.S. Internal Revenue Service, (f) U.S. Justice Department, and (g) U.S. Securities and Exchange Commission; “**Covered Entity**” means the Borrower, its affiliates and subsidiaries, all guarantors, pledgors of collateral, all owners of the foregoing, and all brokers or other agents of the Borrower acting in any capacity in connection with the Facility; “**Embargoed Property**” means any property (a) in which a Sanctioned Person holds an interest; (b) beneficially owned, directly or indirectly, by a Sanctioned Person; (c) that is due to or from a Sanctioned Person; (d) that is located in a Sanctioned Country; or (e) that would otherwise cause any actual or possible violation by Bank of any applicable Anti-Terrorism Law if the Bank were to obtain an encumbrance on, lien on, pledge of or security interest in such property or provide services in consideration of such property; “**Reportable Compliance Event**” means that any Covered Entity becomes a Sanctioned Person, or is indicted, arraigned, investigated or

custodially detained, or receives an inquiry from regulatory or law enforcement officials, in connection with any Anti-Terrorism Law or any predicate crime to any Anti-Terrorism Law, or self-discovers facts or circumstances implicating any aspect of its operations with the actual or possible violation of any Anti-Terrorism Law; “**Sanctioned Country**” means a country subject to a sanctions program maintained by any Compliance Authority; and “**Sanctioned Person**” means any individual person, group, regime, entity or thing listed or otherwise recognized as a specially designated, prohibited, sanctioned or debarred person or entity, or subject to any limitations or prohibitions (including but not limited to the blocking of property or rejection of transactions), under any order or directive of any Compliance Authority or otherwise subject to, or specially designated under, any sanctions program maintained by any Compliance Authority.

15. **[Reserved]**

16. **Miscellaneous.** All notices, demands, requests, consents, approvals and other communications required or permitted hereunder (“**Notices**”) must be in writing (except as may be agreed otherwise above with respect to borrowing requests or as otherwise provided in this Note) and will be effective upon receipt. Notices may be given in any manner to which the parties may agree. Without limiting the foregoing, first-class mail, postage prepaid, facsimile transmission and commercial courier service are hereby agreed to as acceptable methods for giving Notices. In addition, the parties agree that Notices may be sent electronically to any electronic address provided by a party from time to time. Notices may be sent to a party’s address as set forth above or to such other address as any party may give to the other for such purpose in accordance with this paragraph. No delay or omission on the Bank’s part to exercise any right or power arising hereunder will impair any such right or power or be considered a waiver of any such right or power, nor will the Bank’s action or inaction impair any such right or power. The Bank’s rights and remedies hereunder are cumulative and not exclusive of any other rights or remedies which the Bank may have under other agreements, at law or in equity. No modification, amendment or waiver of, or consent to any departure by the Borrower from, any provision of this Note will be effective unless made in a writing signed by the Bank, and then such waiver or consent shall be effective only in the specific instance and for the purpose for which given. Notwithstanding the foregoing, the Bank may modify this Note for the purposes of completing missing content or correcting erroneous content, without the need for a written amendment, provided that the Bank shall send a copy of any such modification to the Borrower (which notice may be given by electronic mail). The Borrower agrees to pay on demand, to the extent permitted by law, all costs and expenses incurred by the Bank in the enforcement of its rights in this Note and in any security therefor, including without limitation reasonable fees and expenses of the Bank’s counsel. If any provision of this Note is found to be invalid, illegal or unenforceable in any respect by a court, all the other provisions of this Note will remain in full force and effect. The Borrower and all other makers and indorsers of this Note hereby forever waive presentment, protest, notice of dishonor, notice of non-payment, notice of intent to accelerate and notice of acceleration, and any other notice of any kind. The Borrower also waives all defenses based on suretyship or impairment of collateral. If this Note is executed by more than one Borrower, the obligations of such persons or entities hereunder will be joint and several. This Note shall bind the Borrower and its heirs, executors, administrators, successors and assigns, and the benefits hereof shall inure to the benefit of the Bank and its successors and assigns; provided, however, that the Borrower may not assign this Note in whole or in part without the Bank’s written consent and the Bank at any time may assign this Note in whole or in part.

17. **Governing Law and Venue.** This Note has been delivered to and accepted by the Bank and will be deemed to be made in the State of New York (the “**State**”). **This Note will be interpreted and the rights and liabilities of the Bank and the Borrower determined in accordance with the laws of the state, excluding its conflict of laws rules, including without limitation the Electronic Transactions Act (or equivalent) in effect in the state (or, to the extent controlling, the laws of the United States Of America, including without limitation the Electronic Signatures in Global and National Commerce Act).** The Borrower hereby irrevocably consents to the exclusive jurisdiction of any state or federal court in the county or judicial district in the State; provided that nothing contained in this Note will prevent the Bank from bringing any action, enforcing any award or judgment or exercising any rights against the Borrower individually, against any security or against any property of the Borrower within any other county, state or other foreign or domestic jurisdiction. The Borrower acknowledges and agrees that the venue provided above is the most convenient forum for both the Bank and the Borrower. The Borrower waives any objection to venue and any objection based on a more convenient forum in any action instituted under this Note.

18. **Commercial Purpose.** The Borrower represents that the indebtedness evidenced by this Note is being incurred by the Borrower solely for the purpose of acquiring or carrying on a business, professional or commercial activity, and not for personal, family or household purposes.

19. USA PATRIOT Act Notice. To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify and record information that identifies each Borrower that opens an account. What this means: when the Borrower opens an account, the Bank will ask for the business name, business address, taxpayer identifying number and other information that will allow the Bank to identify the Borrower, such as organizational documents. For some businesses and organizations, the Bank may also need to ask for identifying information and documentation relating to certain individuals associated with the business or organization.

20. Representation by Counsel. The Borrower hereby represents that it has been represented by competent counsel of its choice, or has knowingly waived its right to use and retain counsel, in the negotiation and execution of this Note and the other Loan Documents; that it has read and fully understood the terms hereof; that the Borrower and any retained counsel have been afforded an opportunity to review, negotiate and modify the terms of this Note and the other Loan Documents; and that it intends to be bound hereby. In accordance with the foregoing, the general rule of construction to the effect that any ambiguities in a contract are to be resolved against the party drafting the contract shall not be employed in the construction and interpretation of this Note or any other Loan Document.

21. Authorization to Obtain Credit Reports. By signing below, each person, who is signing in his or her individual capacity, requests and provides written authorization to the Bank or its designee (and any assignee or potential assignee hereof) to obtain such individual's personal credit profile from one or more national credit bureaus. This authorization extends to obtaining a credit profile in (i) considering an application for credit that is evidenced, guaranteed or secured by this document, (ii) assessing creditworthiness and (iii) considering extensions of credit, including on an ongoing basis, as necessary for the purposes of (a) update, renewal or extension of such credit or additional credit, (b) reviewing, administering or collecting the resulting account and (c) reporting on the repayment and satisfaction of such credit obligations. By signing below, such individual further ratifies and confirms his or her prior requests and authorizations with respect to the matters set forth herein. For the avoidance of doubt, this provision does not apply to persons signing below in their capacities as officers or other authorized representatives of entities, organizations or governmental bodies.

22. Counterparts; Electronic Signatures and Records. This Note and any other Loan Document may be signed in any number of counterpart copies and by the parties hereto on separate counterparts, but all such copies shall constitute one and the same instrument. Notwithstanding any other provision herein, the Borrower agrees that this Note, the Loan Documents, any amendments thereto, and any other information, notice, signature card, agreement or authorization related thereto (each, a "**Communication**") may, at the Bank's option, be in the form of an electronic record. Any Communication may, at the Bank's option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention.

23. WAIVER OF JURY TRIAL. The Borrower irrevocably waives any and all rights the Borrower may have to a trial by jury in any action, proceeding or claim of any nature relating to this Note, any documents executed in connection with this Note or any transaction contemplated in any of such documents. The Borrower acknowledges that the foregoing waiver is knowing and voluntary.

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Amended and Restated Revolving Line of Credit Note

[SIGNATURE PAGE]

The Borrower acknowledges that it has read and understands all the provisions of this Note, including the waiver of jury trial, and has been advised by counsel as necessary or appropriate.

WITNESS the due execution hereof as a document under seal, as of the date first written above, with the intent to be legally bound hereby.

LUNA INNOVATIONS INCORPORATED,
a Delaware corporation

By: _____
Name: _____
Title: _____

EXHIBIT A

As used herein, the term “**Applicable Margin**” shall mean, beginning on the date hereof, two and one half percent (2.50%) per annum and, thereafter, the Applicable Margin shall be subject to adjustment as of the end of Borrower’s fiscal quarter ending after the Effective Date, based on the Net Leverage Ratio as of such quarter end and for each successive quarter thereafter. Any increase or decrease in the Applicable Margin computed as of a quarter end shall be effective on the date on which the Compliance Certificate evidencing such computation is due to be delivered under Section 6.2(d) of the Loan Agreement. For the avoidance of doubt, if the Net Leverage Ratio, measured as of the end of each fiscal quarter, is as described below, the Applicable Margin shall be the Applicable Margin appearing opposite the corresponding Net Leverage Ratio:

Fiscal Quarter End Net Leverage Ratio	Applicable Margin
Net Leverage Ratio less than or equal to 0.50 to 1.00	1.75%
Net Leverage Ratio greater than 0.50 to 1.00 and less than 1.25 to 1.00	2.00%
Net Leverage Ratio greater than or equal to 1.25 to 1.00 and less than 1.75 to 1.00	2.25%
Net Leverage Ratio greater than or equal to 1.75 to 1.00	2.50%

Bank shall determine whether any adjustment to the Applicable Margin is to be made quarterly, based on the Compliance Certificate delivered to Bank pursuant to the Loan Agreement; provided, however, that if such Compliance Certificate is not timely delivered to Bank, then, at the option of Bank, an adjustment to the Applicable Margin shall be made based on an assumed delivery of said Compliance Certificate reflecting a Net Leverage Ratio which is greater than 1.75 to 1.00; provided, further, at the option of the Bank, on and after receipt of a notice that an Event of Default has occurred, the Default Rate may then apply as of the date of such Event of Default (as reasonably determined by Bank) and shall continue to apply to but excluding the date on which such Event of Default shall cease to be continuing (and thereafter, in each case, the Applicable Margin otherwise determined in accordance with this Exhibit A shall apply). Each such adjustment shall apply to all Advances then existing and any made during the period for which such adjustment becomes effective.

100363641.2



Amended and Restated

Term Note (Daily Simple SOFR)

\$20,000,000.00 June 21, 2022

THIS AMENDED AND RESTATED REVOLVING LINE OF CREDIT NOTE HEREBY AMENDS AND RESTATES, IN ALL RESPECTS, THAT CERTAIN REVOLVING LINE OF CREDIT NOTE DATED DECEMBER 1, 2020 MADE BY BORROWER PAYABLE TO THE ORDER OF BANK IN THE ORIGINAL PRINCIPAL AMOUNT OF TWELVE MILLION FIVE HUNDRED THOUSAND AND NO/100 DOLLARS (\$12,500,000.00), AS THE SAME MAY HAVE BEEN MODIFIED OR AMENDED FROM TIME TO TIME. NO NOVATION IS INTENDED HEREBY.

FOR VALUE RECEIVED, LUNA INNOVATIONS INCORPORATED, a Delaware corporation (the “**Borrower**”), with an address at 1 Riverside Circle, Suite 400, Roanoke, VA 24016, promises to pay to the order of **PNC BANK, NATIONAL ASSOCIATION** (the “**Bank**”), in lawful money of the United States of America in immediately available funds at its offices located at 1001 Haxall Point, Suite 706, Richmond, VA 23219, or at such other location as the Bank may designate from time to time, the principal sum of TWENTY MILLION AND NO/100 DOLLARS (\$20,000,000.00) (the “**Facility**”), together with interest accruing on the outstanding principal balance from the date hereof, all as provided below. All capitalized terms used herein and not otherwise defined shall have the meanings assigned to such terms in the Loan Agreement (as defined below).

1. Interest Rate. Amounts outstanding under this Note will bear interest at a rate per annum equal to the sum of (A) Daily Simple SOFR (as defined below), plus (B) a SOFR adjustment of ten basis points (0.10%), plus (C) the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof).

2. Payments. Principal shall be due and payable in equal consecutive installments (A) in the amount of \$500,000.00 each commencing on September 1, 2022 and continuing on each succeeding Reset Date thereafter until and including June 1, 2023, (B) in the amount of \$750,000.00 each commencing on September 1, 2023 and continuing on each succeeding Reset Date thereafter until and including June 1, 2025, and (C) in the amount of \$1,000,000.00 each commencing on September 1, 2025 and continuing on each succeeding Reset Date thereafter. Interest shall be payable at the same times as the principal payments; provided that if the Reset Dates occur less frequently than every three (3) months, then interest shall also be paid every three (3) months. Any outstanding principal and accrued interest shall be due and payable in full on the Maturity Date (as defined below).

3. Certain Definitions. If the following terms are used in this Note, such terms shall have the meanings set forth below:

“**Alternate Rate**” shall mean the sum of (A) the Base Rate plus (B) the Applicable Margin (as such term is defined in Exhibit A attached hereto and made a part hereof).

“**Base Rate**” shall mean the higher of (A) the Prime Rate, and (B) the sum of the Overnight Bank Funding Rate plus 50 basis points (0.50%); provided, however, if the Base Rate as determined above would be less than zero, then such rate shall be deemed to be zero. If and when the Base Rate as determined above changes, the rate of interest with respect to any amount to which the Base Rate applies will change automatically without notice to the Borrower, effective on the date of any such change.

“**Business Day**” shall mean any day other than (A) a Saturday or Sunday or (B) a legal holiday on which commercial banks are authorized or required by law to be closed for business in Pittsburgh, Pennsylvania; provided that, when used in connection with an amount that bears interest at a rate based on SOFR or any direct or indirect calculation or determination involving SOFR, the term “**Business Day**” means any such day that is also a U.S. Government Securities Business Day.

“**Daily Simple SOFR**” means, for any day (a “**SOFR Rate Day**”), the interest rate per annum determined by the Bank by dividing (the resulting quotient rounded upwards, at the Bank’s discretion, to the nearest

1/100th of 1%) (A) SOFR for the day (the “**SOFR Determination Date**”) that is 2 Business Days prior to (i) such SOFR Rate Day if such SOFR Rate Day is a Business Day or (ii) the Business Day immediately preceding such SOFR Rate Day if such SOFR Rate Day is not a Business Day, by (B) a number equal to 1.00 minus the SOFR Reserve Percentage, in each case, as such SOFR is published by the NYFRB (or a successor administrator of the secured overnight financing rate) on the website of the NYFRB, currently at <http://www.newyorkfed.org>, or any successor source identified by the NYFRB or its successor administrator for the secured overnight financing rate from time to time. If Daily Simple SOFR as determined above would be less than the Floor, then Daily Simple SOFR shall be deemed to be the Floor. If SOFR for any SOFR Determination Date has not been published or replaced with a Benchmark Replacement by 5:00 p.m. (Pittsburgh, Pennsylvania time) on the second Business Day immediately following such SOFR Determination Date, then SOFR for such SOFR Determination Date will be SOFR for the first Business Day preceding such SOFR Determination Date for which SOFR was published in accordance with the definition of “SOFR”; provided that SOFR determined pursuant to this sentence shall be used for purposes of calculating Daily Simple SOFR for no more than 3 consecutive SOFR Rate Days. If and when Daily Simple SOFR as determined above changes, any applicable rate of interest based on Daily Simple SOFR will change automatically without notice to the Borrower, effective on the date of any such change.

“**Default Rate**” shall mean the rate per annum (based on the actual number of days that principal is outstanding over a year of 360 days) equal to the lesser of (A) the sum of 3% plus the interest rate otherwise in effect from time to time under this Note, and (B) the Maximum Rate.

“**Floor**” means a rate of interest per annum equal to zero percent (0.00%).

“**Loan Agreement**” shall mean that certain Loan Agreement by and among, the Borrower, the guarantors from time to time party thereto and Bank of even date herewith, as the same may have been modified or amended from time to time.

“**Maturity Date**” shall mean June 21, 2027.

“**Maximum Rate**” shall mean the maximum rate of interest allowed by applicable law.

“**NYFRB**” shall mean the Federal Reserve Bank of New York.

“**Overnight Bank Funding Rate**” shall mean, for any day, the rate comprised of both overnight federal funds and overnight Eurocurrency borrowings by U.S.-managed banking offices of depository institutions, as such composite rate shall be determined by the NYFRB, as set forth on its public website from time to time, and as published on the next succeeding Business Day as the overnight bank funding rate by the NYFRB (or by such other recognized electronic source (such as Bloomberg) selected by the Bank for the purpose of displaying such rate); provided, that if such day is not a Business Day, the Overnight Bank Funding Rate for such day shall be such rate on the immediately preceding Business Day; provided, further, that if such rate shall at any time, for any reason, no longer exist, a comparable replacement rate determined by the Bank at such time (which determination shall be conclusive absent manifest error). If the Overnight Bank Funding Rate determined as above would be less than zero, then such rate shall be deemed to be zero. The rate of interest charged shall be adjusted as of each Business Day based on changes in the Overnight Bank Funding Rate without notice to the Borrower.

“**Prime Rate**” shall mean the rate publicly announced by the Bank from time to time as its prime rate. The Prime Rate is determined from time to time by the Bank as a means of pricing some loans to its borrowers. The Prime Rate is not tied to any external rate of interest or index and does not necessarily reflect the lowest rate of interest actually charged by the Bank to any particular class or category of customers.

“**Reset Date**” shall mean (i) the date of this Note, and (ii) subject to the proviso below, the first day of every third month thereafter, provided that: (a) if any such day is not a Business Day, then the first succeeding day that is a Business Day shall instead apply, unless that day falls in the next succeeding calendar month, in which case the next preceding day that is a Business Day shall instead apply, and (b) if any such day is a day of a calendar month for which there is no numerically corresponding day in certain

other months (each, a “**Non-Conforming Month**”), then any Reset Date that falls within a Non-Conforming Month shall be the last Business Day of such Non-Conforming Month.

“**SOFR**” shall mean a rate equal to the secured overnight financing rate as administered by the NYFRB (or a successor administrator of the secured overnight financing rate).

“**SOFR Reserve Percentage**” shall mean, for any day, the maximum effective percentage in effect on such day, if any, as prescribed by the Board of Governors of the Federal Reserve System (or any successor) for determining the reserve requirements (including, without limitation, supplemental, marginal and emergency reserve requirements) with respect to SOFR funding.

“**U.S. Government Securities Business Day**” means any day except for (A) a Saturday or Sunday or (B) a day on which the Securities Industry and Financial Markets Association recommends that the fixed income departments of its members be closed for the entire day for purposes of trading in United States government securities.

4. Interest Calculation; Maximum Rate. Interest will be calculated based on the actual number of days that principal is outstanding over a year of 360 days. In no event will the rate of interest hereunder exceed the Maximum Rate. Regardless of any other provision of this Note or the other Loan Documents, if for any reason the effective interest rate should exceed the Maximum Rate, the effective interest rate shall be deemed reduced to, and shall be, the Maximum Rate, and (i) the amount which would be excessive interest shall be deemed applied to the reduction of the principal balance of this Note and not to the payment of interest, and (ii) if the loan evidenced by this Note has been or is thereby paid in full, the excess shall be returned to the party paying same, such application to the principal balance of this Note or the refunding of such excess to be a complete settlement and acquittance thereof.

5. Conforming Changes; Benchmark Replacement Provisions. The Bank shall have the right to make any technical, administrative or operational changes from time to time that the Bank decides may be appropriate to reflect the adoption and implementation of SOFR or any other Benchmark (as defined below) or to permit the use and administration thereof by the Bank in a manner substantially consistent with market practice or in such other manner as the Bank decides is reasonably necessary. Notwithstanding anything to the contrary herein or in any other Loan Document, any amendments implementing such technical, administrative or operational changes will become effective without any further action or consent of the Borrower. The Bank shall provide notice to the Borrower of any such amendment reasonably promptly after such amendment becomes effective.

If the applicable rate under this Note is based on a Benchmark and the Bank determines (which determination shall be final and conclusive) that (A) such Benchmark cannot be determined pursuant to its definition other than as a result of a Benchmark Transition Event (as defined below), or (B) any enactment, promulgation or adoption of or any change in any applicable law, rule or regulation, or any change in the interpretation or administration thereof by a governmental authority, central bank or comparable agency charged with the interpretation or administration thereof, or compliance by the Bank with any guideline, request or directive (whether or not having the force of law) of any such authority, central bank or comparable agency shall make it unlawful or impracticable for the Bank to make or maintain or fund loans based on that Benchmark, then the Bank shall give notice thereof to the Borrower. Thereafter, until the Bank notifies the Borrower that the circumstances giving rise to such determination no longer exist, the interest rate on all amounts outstanding under this Note shall be the Alternate Rate.

Notwithstanding anything to the contrary herein or in any other Loan Document, if the Bank determines (which determination shall be final and conclusive) that a Benchmark Transition Event has occurred with respect to a Benchmark, the Bank may amend this Note to replace such Benchmark with a Benchmark Replacement (as defined below); and any such amendment shall be in writing, shall specify the date that the Benchmark Replacement is effective and will not require any further action or consent of the Borrower. Until the Benchmark Replacement is effective, amounts bearing interest with reference to a Benchmark will continue to bear interest with reference to such Benchmark as long as such Benchmark is available, and otherwise such amounts automatically will bear interest at the Alternate Rate.

For purposes of this Section, the following terms have the meanings set forth below:

“**Benchmark**” means, at any time, any interest rate index then used in the determination of an interest rate under the terms of this Note. Once a Benchmark Replacement becomes effective under this Note, it is a Benchmark. The initial Benchmark under this Note is Daily Simple SOFR.

“**Benchmark Replacement**” means, for any Benchmark, the sum of (a) an alternate benchmark rate and (b) an adjustment (which may be a positive or negative value or zero), in each case that has been selected by the Bank as the replacement for such Benchmark giving due consideration to any evolving or then-prevailing market convention, including any applicable recommendations made by the official sector or any official sector-sponsored committee or working group, for U.S. dollar-denominated credit facilities at such time; provided that, if the Benchmark Replacement as determined pursuant to the foregoing would be less than the Floor, the Benchmark Replacement will be deemed to be the Floor for the purposes of this Note and the other Loan Documents.

“**Benchmark Transition Event**” shall mean a public statement or publication by or on behalf of the administrator of a Benchmark, the regulatory supervisor of such administrator, the Board of Governors of the Federal Reserve System, NYFRB, an insolvency official or resolution authority with jurisdiction over the administrator for such Benchmark or a court or an entity with similar insolvency or resolution authority over the administrator for such Benchmark, announcing or stating that (a) such administrator has ceased or will cease to provide such Benchmark permanently or indefinitely, provided that at the time of such statement or publication there is no successor administrator that will continue to provide such Benchmark or (b) such Benchmark is or will no longer be representative.

6. Other Payment Terms. If any payment under this Note is due on a day of a calendar month for which there is no numerically corresponding day in certain other months (each, a “**Non-Conforming Month**”), then the payment in a Non-Conforming Month shall be due on the last Business Day of such Non-Conforming Month. If any payment under this Note shall become due on a day other than a Business Day, such payment shall be due on the next succeeding Business Day, except that if such day falls in the next succeeding calendar month, such payment shall be due on the next preceding day that is a Business Day. Interest shall be computed to, but excluding, the date of payment. The Borrower hereby authorizes the Bank to charge the Borrower’s deposit account at the Bank for any payment when due under this Note or any other Loan Document. Payments received will be applied to charges, fees and expenses (including attorneys’ fees), accrued interest and principal in any order the Bank may choose, in its sole discretion. Any amortization schedule provided to Borrower is only an estimate and is superseded by the terms of this Note regarding the accrual and payment of interest.

7. Late Payments; Default Rate. If the Borrower fails to make any payment of principal, interest or other amount coming due pursuant to the provisions of this Note within 15 calendar days of the date due and payable, the Borrower also shall pay to the Bank a late charge equal to the lesser of 3% of the amount of such payment or \$100.00 (the “**Late Charge**”). Such 15-day period shall not be construed in any way to extend the due date of any such payment. Upon maturity, whether by acceleration, demand or otherwise, and at the Bank’s option upon the occurrence of any Event of Default (as hereinafter defined) and during the continuance thereof, amounts outstanding under this Note shall bear interest at the Default Rate. The Default Rate shall continue to apply whether or not judgment shall be entered on this Note. Both the Late Charge and the Default Rate are imposed as liquidated damages for the purpose of defraying the Bank’s expenses incident to the handling of delinquent payments, but are in addition to, and not in lieu of, the Bank’s exercise of any rights and remedies hereunder, under the other Loan Documents or under applicable law, and any fees and expenses of any agents or attorneys which the Bank may employ. In addition, the Default Rate reflects the increased credit risk to the Bank of carrying a loan that is in default. The Borrower agrees that the Late Charge and Default Rate are reasonable forecasts of just compensation for anticipated and actual harm incurred by the Bank, and that the actual harm incurred by the Bank cannot be estimated with certainty and without difficulty.

8. Prepayment. The Borrower shall have the right to prepay any amounts outstanding hereunder at any time and from time to time without penalty or premium, in whole or in part. Upon request of Borrower, prepayments of the Facility shall be applied to the ending balance, so long as any such prepayment (a) shall not be less than One Million Dollars (\$1,000,000.00), and (b) shall be made concurrently with a regularly scheduled payment due on a Reset Date. For the avoidance of doubt, prepayments made pursuant to the preceding sentence shall not be deemed or construed by any party as (i) permitting Borrower to avoid making any regularly scheduled payments hereunder, or (ii) modifying the Maturity Date.

9. Increased Costs; Yield Protection. On written demand, together with written evidence of the justification therefor, the Borrower agrees to pay the Bank all direct costs incurred, any losses suffered or payments made by the Bank as a result of any Change in Law (hereinafter defined), imposing any reserve, deposit, allocation of capital or similar requirement (including without limitation, Regulation D of the Board of Governors of the Federal Reserve System) on the Bank, its holding company or any of their respective assets relative to the Facility. “**Change in Law**” means the occurrence, after the date of this Note, of any of the

following: (a) the adoption or taking effect of any law, rule, regulation or treaty, (b) any change in any law, rule, regulation or treaty or in the administration, interpretation, implementation or application thereof by any governmental authority or (c) the making or issuance of any request, rule, guideline or directive (whether or not having the force of law) by any governmental authority; provided that notwithstanding anything herein to the contrary, (x) the Dodd-Frank Wall Street Reform and Consumer Protection Act and all requests, rules, guidelines or directives thereunder or issued in connection therewith and (y) all requests, rules, guidelines or directives promulgated by the Bank for International Settlements, the Basel Committee on Banking Supervision (or any successor or similar authority) or the United States or foreign regulatory authorities, in each case pursuant to Basel III, shall in each case be deemed to be a "Change in Law", regardless of the date enacted, adopted or issued.

10. Other Loan Documents. This Note is issued in connection with the Loan Agreement and the other Loan Documents (as the same may be amended, modified or renewed from time to time), and is secured by the property (if any) described in the Loan Documents and by any and all mortgages, security agreements, assignments, loan agreements, pledge agreements and other documents or instruments evidencing a security interest or other lien in favor of the Bank and delivered by the Borrower in connection with the Loan Agreement and the other Loan Documents. Such documents may be executed contemporaneously with the execution of this Note, or they may be executed and delivered at another time.

11. Events of Default. The occurrence of any "Event of Default" under the Loan Agreement shall constitute an "**Event of Default**" under this Note. Upon the occurrence and during the continuance of an Event of Default: subject to any cure periods in the Loan Agreement, (a) the Bank shall be under no further obligation to make advances hereunder; (b) if an Event of Default specified in clause (iii) or (iv) above shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder shall be immediately due and payable without demand or notice of any kind; (c) if any other Event of Default shall occur, the outstanding principal balance and accrued interest hereunder together with any additional amounts payable hereunder, at the Bank's option and without demand or notice of any kind, may be accelerated and become immediately due and payable; (d) at the Bank's option, this Note will bear interest at the Default Rate from the date of the occurrence of the Event of Default; and (e) the Bank may exercise from time to time any of the rights and remedies available under the Loan Documents or under applicable law.

12. Right of Setoff. In addition to all liens upon and rights of setoff against the Borrower's money, securities or other property given to the Bank by law, the Bank shall have, with respect to the Borrower's obligations to the Bank under this Note and to the extent permitted by law, a contractual possessory security interest in and a contractual right of setoff against, and the Borrower hereby grants the Bank a security interest in, and hereby assigns, conveys, delivers, pledges and transfers to the Bank, all of the Borrower's right, title and interest in and to, all of the Borrower's deposits, moneys, securities and other property now or hereafter in the possession of or on deposit with, or in transit to, the Bank or any other direct or indirect subsidiary of The PNC Financial Services Group, Inc., whether held in a general or special account or deposit, whether held jointly with someone else, or whether held for safekeeping or otherwise, excluding, however, all IRA, Keogh, and trust accounts. Every such security interest and right of setoff may be exercised without demand upon or notice to the Borrower. Every such right of setoff shall be deemed to have been exercised immediately upon the occurrence of an Event of Default hereunder without any action of the Bank, although the Bank may enter such setoff on its books and records at a later time.

13. Anti-Money Laundering/International Trade Law Compliance. The Borrower represents and warrants to the Bank, as of the date hereof, the date of each advance of proceeds under the Facility, the date of any renewal, extension or modification of the Facility, and at all times until the Facility has been terminated and all amounts thereunder have been indefeasibly paid in full, that: (a) no Covered Entity (i) is a Sanctioned Person; (ii) has any of its assets in a Sanctioned Country or in the possession, custody or control of a Sanctioned Person; or (iii) does business in or with, or derives any of its operating income from investments in or transactions with, any Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (b) the proceeds of the Facility will not be used to fund any operations in, finance any investments or activities in, or, make any payments to, a Sanctioned Country or Sanctioned Person in violation of any law, regulation, order or directive enforced by any Compliance Authority; (c) the funds used to repay the Facility are not derived from any unlawful activity; and (d) each Covered Entity is in compliance with, and no Covered Entity engages in any dealings or transactions prohibited by, any laws of the United States, including but not limited to any Anti-Terrorism Laws. Borrower covenants and agrees that it shall immediately notify the Bank in writing upon the occurrence of a Reportable Compliance Event. Notwithstanding anything to the contrary herein or in any of the other Loan Documents, the collateral securing any debt, liabilities or other obligations of any Obligor to the Bank shall not include any Embargoed Property, but only to the extent and for so long as such collateral is or remains Embargoed Property.

As used herein: “**Anti-Terrorism Laws**” means any laws relating to terrorism, trade sanctions programs and embargoes, import/export licensing, money laundering, or bribery, all as amended, supplemented or replaced from time to time; “**Compliance Authority**” means each and all of the (a) U.S. Treasury Department/Office of Foreign Assets Control, (b) U.S. Treasury Department/Financial Crimes Enforcement Network, (c) U.S. State Department/Directorate of Defense Trade Controls, (d) U.S. Commerce Department/Bureau of Industry and Security, (e) U.S. Internal Revenue Service, (f) U.S. Justice Department, and (g) U.S. Securities and Exchange Commission; “**Covered Entity**” means the Borrower, its affiliates and subsidiaries, all guarantors, pledgors of collateral, all owners of the foregoing, and all brokers or other agents of the Borrower acting in any capacity in connection with the Facility; “**Embargoed Property**” means any property (a) in which a Sanctioned Person holds an interest; (b) beneficially owned, directly or indirectly, by a Sanctioned Person; (c) that is due to or from a Sanctioned Person; (d) that is located in a Sanctioned Country; or (e) that would otherwise cause any actual or possible violation by Bank of any applicable Anti-Terrorism Law if the Bank were to obtain an encumbrance on, lien on, pledge of or security interest in such property or provide services in consideration of such property; “**Reportable Compliance Event**” means that any Covered Entity becomes a Sanctioned Person, or is indicted, arraigned, investigated or custodially detained, or receives an inquiry from regulatory or law enforcement officials, in connection with any Anti-Terrorism Law or any predicate crime to any Anti-Terrorism Law, or self-discovers facts or circumstances implicating any aspect of its operations with the actual or possible violation of any Anti-Terrorism Law; “**Sanctioned Country**” means a country subject to a sanctions program maintained by any Compliance Authority; and “**Sanctioned Person**” means any individual person, group, regime, entity or thing listed or otherwise recognized as a specially designated, prohibited, sanctioned or debarred person or entity, or subject to any limitations or prohibitions (including but not limited to the blocking of property or rejection of transactions), under any order or directive of any Compliance Authority or otherwise subject to, or specially designated under, any sanctions program maintained by any Compliance Authority.

14. **[Reserved].**

15. **Miscellaneous.** All notices, demands, requests, consents, approvals and other communications required or permitted hereunder (“**Notices**”) must be in writing (except as may be agreed otherwise above with respect to borrowing requests or as otherwise provided in this Note) and will be effective upon receipt. Notices may be given in any manner to which the parties may agree. Without limiting the foregoing, first-class mail, postage prepaid, facsimile transmission and commercial courier service are hereby agreed to as acceptable methods for giving Notices. In addition, the parties agree that Notices may be sent electronically to any electronic address provided by a party from time to time. Notices may be sent to a party’s address as set forth above or to such other address as any party may give to the other for such purpose in accordance with this paragraph. No delay or omission on the Bank’s part to exercise any right or power arising hereunder will impair any such right or power or be considered a waiver of any such right or power, nor will the Bank’s action or inaction impair any such right or power. The Bank’s rights and remedies hereunder are cumulative and not exclusive of any other rights or remedies which the Bank may have under other agreements, at law or in equity. No modification, amendment or waiver of, or consent to any departure by the Borrower from, any provision of this Note will be effective unless made in a writing signed by the Bank, and then such waiver or consent shall be effective only in the specific instance and for the purpose for which given. Notwithstanding the foregoing, the Bank may modify this Note for the purposes of completing missing content or correcting erroneous content, without the need for a written amendment, provided that the Bank shall send a copy of any such modification to the Borrower (which notice may be given by electronic mail). The Borrower agrees to pay on demand, to the extent permitted by law, all costs and expenses incurred by the Bank in the enforcement of its rights in this Note and in any security therefor, including without limitation reasonable fees and expenses of the Bank’s counsel. If any provision of this Note is found to be invalid, illegal or unenforceable in any respect by a court, all the other provisions of this Note will remain in full force and effect. The Borrower and all other makers and indorsers of this Note hereby forever waive presentment, protest, notice of dishonor, notice of non-payment, notice of intent to accelerate and notice of acceleration, and any other notice of any kind. The Borrower also waives all defenses based on suretyship or impairment of collateral. If this Note is executed by more than one Borrower, the obligations of such persons or entities hereunder will be joint and several. This Note shall bind the Borrower and its heirs, executors, administrators, successors and assigns, and the benefits hereof shall inure to the benefit of the Bank and its successors and assigns; provided, however, that the Borrower may not assign this Note in whole or in part without the Bank’s written consent and the Bank at any time may assign this Note in whole or in part.

16. **Governing Law and Venue.** This Note has been delivered to and accepted by the Bank and will be deemed to be made in the State of New York (the “**State**”). **This Note will be interpreted and the rights and liabilities of the Bank and the Borrower determined in accordance with the laws of the state, excluding its conflict of laws rules, including without limitation the Electronic Transactions Act (or equivalent) in effect**

in the state (or, to the extent controlling, the laws of the United States Of America, including without limitation the Electronic Signatures in Global and National Commerce Act). The Borrower hereby irrevocably consents to the exclusive jurisdiction of any state or federal court in the county or judicial district in the State; provided that nothing contained in this Note will prevent the Bank from bringing any action, enforcing any award or judgment or exercising any rights against the Borrower individually, against any security or against any property of the Borrower within any other county, state or other foreign or domestic jurisdiction. The Borrower acknowledges and agrees that the venue provided above is the most convenient forum for both the Bank and the Borrower. The Borrower waives any objection to venue and any objection based on a more convenient forum in any action instituted under this Note.

17. Commercial Purpose. The Borrower represents that the indebtedness evidenced by this Note is being incurred by the Borrower solely for the purpose of acquiring or carrying on a business, professional or commercial activity, and not for personal, family or household purposes.

18. USA PATRIOT Act Notice. To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify and record information that identifies each Borrower that opens an account. What this means: when the Borrower opens an account, the Bank will ask for the business name, business address, taxpayer identifying number and other information that will allow the Bank to identify the Borrower, such as organizational documents. For some businesses and organizations, the Bank may also need to ask for identifying information and documentation relating to certain individuals associated with the business or organization.

19. Representation by Counsel. The Borrower hereby represents that it has been represented by competent counsel of its choice, or has knowingly waived its right to use and retain counsel, in the negotiation and execution of this Note and the other Loan Documents; that it has read and fully understood the terms hereof; that the Borrower and any retained counsel have been afforded an opportunity to review, negotiate and modify the terms of this Note and the other Loan Documents; and that it intends to be bound hereby. In accordance with the foregoing, the general rule of construction to the effect that any ambiguities in a contract are to be resolved against the party drafting the contract shall not be employed in the construction and interpretation of this Note or any other Loan Document.

20. Authorization to Obtain Credit Reports. By signing below, each person, who is signing in his or her individual capacity, requests and provides written authorization to the Bank or its designee (and any assignee or potential assignee hereof) to obtain such individual's personal credit profile from one or more national credit bureaus. This authorization extends to obtaining a credit profile in (i) considering an application for credit that is evidenced, guaranteed or secured by this document, (ii) assessing creditworthiness and (iii) considering extensions of credit, including on an ongoing basis, as necessary for the purposes of (a) update, renewal or extension of such credit or additional credit, (b) reviewing, administering or collecting the resulting account and (c) reporting on the repayment and satisfaction of such credit obligations. By signing below, such individual further ratifies and confirms his or her prior requests and authorizations with respect to the matters set forth herein. For the avoidance of doubt, this provision does not apply to persons signing below in their capacities as officers or other authorized representatives of entities, organizations or governmental bodies.

21. Counterparts; Electronic Signatures and Records. This Note and any other Loan Document may be signed in any number of counterpart copies and by the parties hereto on separate counterparts, but all such copies shall constitute one and the same instrument. Notwithstanding any other provision herein, the Borrower agrees that this Note, the Loan Documents, any amendments thereto, and any other information, notice, signature card, agreement or authorization related thereto (each, a "**Communication**") may, at the Bank's option, be in the form of an electronic record. Any Communication may, at the Bank's option, be signed or executed using electronic signatures. For the avoidance of doubt, the authorization under this paragraph may include, without limitation, use or acceptance by the Bank of a manually signed paper Communication which has been converted into electronic form (such as scanned into PDF format) for transmission, delivery and/or retention.

22. WAIVER OF JURY TRIAL. The Borrower irrevocably waives any and all rights the Borrower may have to a trial by jury in any action, proceeding or claim of any nature relating to this Note, any documents executed in connection with this Note or any transaction contemplated in any of such documents. The Borrower acknowledges that the foregoing waiver is knowing and voluntary.

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Amended and Restated Term Note

[SIGNATURE PAGE]

The Borrower acknowledges that it has read and understands all the provisions of this Note, including the waiver of jury trial, and has been advised by counsel as necessary or appropriate.

WITNESS the due execution hereof as a document under seal, as of the date first written above, with the intent to be legally bound hereby.

LUNA INNOVATIONS INCORPORATED,
a Delaware corporation

By: _____
Name: _____
Title: _____

EXHIBIT A

As used herein, the term “**Applicable Margin**” shall mean, beginning on the date hereof, two and one half percent (2.50%) per annum and, thereafter, the Applicable Margin shall be subject to adjustment as of the end of Borrower’s fiscal quarter ending after the Effective Date, based on the Net Leverage Ratio as of such quarter end and for each successive quarter thereafter. Any increase or decrease in the Applicable Margin computed as of a quarter end shall be effective on the date on which the Compliance Certificate evidencing such computation is due to be delivered under Section 6.2(d) of the Loan Agreement. For the avoidance of doubt, if the Net Leverage Ratio, measured as of the end of each fiscal quarter, is as described below, the Applicable Margin shall be the Applicable Margin appearing opposite the corresponding Net Leverage Ratio:

Fiscal Quarter End Net Leverage Ratio	Applicable Margin
Net Leverage Ratio less than or equal to 0.50 to 1.00	1.75%
Net Leverage Ratio greater than 0.50 to 1.00 and less than 1.25 to 1.00	2.00%
Net Leverage Ratio greater than or equal to 1.25 to 1.00 and less than 1.75 to 1.00	2.25%
Net Leverage Ratio greater than or equal to 1.75 to 1.00	2.50%

Bank shall determine whether any adjustment to the Applicable Margin is to be made quarterly, based on the Compliance Certificate delivered to Bank pursuant to the Loan Agreement; provided, however, that if such Compliance Certificate is not timely delivered to Bank, then, at the option of Bank, an adjustment to the Applicable Margin shall be made based on an assumed delivery of said Compliance Certificate reflecting a Net Leverage Ratio which is greater than 1.75 to 1.00; provided, further, at the option of the Bank, on and after receipt of a notice that an Event of Default has occurred, the Default Rate may then apply as of the date of such Event of Default (as reasonably determined by Bank) and shall continue to apply to but excluding the date on which such Event of Default shall cease to be continuing (and thereafter, in each case, the Applicable Margin otherwise determined in accordance with this Exhibit A shall apply). Each such adjustment shall apply to all Advances then existing and any made during the period for which such adjustment becomes effective.

**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: August 12, 2022

/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: August 12, 2022

/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 June 30, 2022 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)

August 12, 2022

**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 June 30, 2022 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)

August 12, 2022