BANCORP RHODE ISLAND INC
Form S-3/A
March 31, 2005
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As filed with the Securities and Exchange Commission on March 31, 2005

Registration Statement No. 333-122968

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, D.C. 20549

PRE-EFFECTIVE AMENDMENT NO. 2

TO THE

FORM S-3

REGISTRATION STATEMENT

UNDER

THE SECURITIES ACT OF 1933

BANCORP RHODE ISLAND, INC.

(Exact name of registrant as specified in its charter)

Rhode Island	**05-0509802**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

One Turks Head Place

Providence, Rhode Island 02903

(401) 456-5000

(Address, including zip code, and telephone number, including area code, of registrant s principal executive offices)

Merrill W. Sherman

President and Chief Executive Officer

Bancorp Rhode Island, Inc.

One Turks Head Place

Providence, Rhode Island 02903

(401) 456-5000

(Name, address, including zip code, and telephone number, including area code, of agent for service)

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Approximate date of commencement of proposed sale to public: As soon as practicable after this Registration Statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box: ¨

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box: ¨

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act of 1933, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ¨

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act of 1933, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering: ¨

If delivery of the prospectus is expected to be made pursuant to Rule 434, please check the following box: ¨

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), shall determine.

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The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

Subject to completion, dated March 31, 2005

PROSPECTUS

550,000 SHARES

COMMON STOCK

Bancorp Rhode Island, Inc. is the holding company for Bank Rhode Island, a commercial bank chartered as a financial institution in the State of Rhode Island and headquartered in Providence. We are offering for sale 550,000 shares of our common stock in an underwritten public offering. Our shares of common stock trade on the Nasdaq National Market under the symbol BARI . The last reported sale price of our common stock on March 30, 2005 was $37.20 per share.

Investing in our common stock involves risks, including the possible loss of principal. Therefore, before buying any shares of our common stock, you should carefully consider the section of this prospectus entitled Risk Factors beginning on page 8.

None of the Securities and Exchange Commission (SEC) or any state securities commission or other regulatory body has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The securities offered by this prospectus are not savings accounts, deposits or obligations of any bank and are not insured by the Federal Deposit Insurance Corporation (FDIC) or any other governmental agency.

	Per Share	Total
Public offering price	$	$

Underwriting commission to be paid by us	$	$
Net proceeds, before expenses, to us	$	$

The underwriters are offering shares of our common stock as described in the section of this prospectus entitled Underwriting . The underwriters may also purchase from us up to an additional 82,500 shares of our common stock, at the public offering price less the underwriting discount and commissions, to cover over-allotments, if any, within 30 days from the date of this prospectus. If the underwriters exercise this option in full, the total underwriting discounts and commissions will be $ and the total proceeds, before expenses, to us will be $. Delivery of the shares will be made on or about , 2005.

The date of this prospectus is , 2005.

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As a prospective investor, you should rely only on the information incorporated by reference or contained in this prospectus. Neither we nor the underwriters have authorized anyone to provide you with information different from that contained or incorporated by reference in this prospectus. If anyone provides you with additional, different or inconsistent information, you should not rely on it. This prospectus is not an offer to sell nor is it seeking an offer to buy shares of our common stock in any jurisdiction where the offer or sale is not permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, and information incorporated by reference is accurate only as of the date of the incorporation by reference, regardless of the time of delivery of this prospectus or of any sale of common stock. Our business, financial condition, results of operations and prospects may have changed since those dates, respectively.

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PROSPECTUS SUMMARY

This summary highlights important features of this offering and the information included or incorporated by reference in this prospectus. Because this is a summary, it may not contain all of the information that you should consider before investing in our common stock. Therefore, you should read the entire prospectus carefully, especially the risks of investing in our common stock discussed under Risk Factors, as well as the consolidated financial statements and the other information that is incorporated by reference to this prospectus before making a decision to invest in our common stock. Unless the context otherwise requires, references in this prospectus to the Company, we, us, and our refer to Bancorp Rhode Island, Inc. and its consolidated subsidiaries. References to the Bank refer to our principal operating subsidiary, Bank Rhode Island.

Unless we indicate otherwise, the information in this prospectus assumes that the underwriters will not exercise their over-allotment option to purchase additional shares of common stock.

WHO WE ARE

Bancorp Rhode Island, Inc. is the holding company for Bank Rhode Island, a commercial bank chartered as a financial institution in the State of Rhode Island and headquartered in Providence. The Bank was formed in March 1996 as a result of the acquisition of 12 branches divested by Fleet Financial Group as part of the Fleet/Shawmut merger. The Bank became our wholly-owned subsidiary upon completion of our reorganization into a holding company on September 1, 2000. As of December 31, 2004, we had total assets of $1.2 billion, total deposits of $880.7 million and total shareholders equity of $78.9 million.

We provide a community banking alternative in the greater Providence area, where we currently operate 14 branches in Rhode Island s three most populous counties. We augment our branch network through online banking services and automatic teller machines (ATM s), both owned and leased, located throughout the state.

The Bank is the fifth largest bank in Rhode Island, based on total deposits as of June 30, 2004 (excluding one bank that draws its deposits primarily from the internet), and the only mid-sized commercially focused bank headquartered in Providence, the state s capital. We offer a wide variety of commercial real estate, business, residential and consumer loans, deposit products, nondeposit investment products, cash management and online banking services and other products and services designed to meet the financial needs of individuals and small- to mid-sized businesses.

We have a cohesive, experienced and locally-focused management team, many of whom have been with the Bank since inception, who foster an energetic and entrepreneurial culture. While we regularly promote from within, we have not hesitated to recruit senior executive talent to augment our management capabilities as we grow and our business becomes more complex. We have a diverse board of directors with strong personal and business ties to our community, which strengthens our ability to cultivate relationships with local businesses and individuals.

Our Growth and Profitability

Our business has experienced significant growth. Since inception we have concentrated our asset generation efforts on commercial and consumer loans, allowing our residential mortgage loan portfolio to decline as a percentage of loans. Our deposit generation efforts have focused on relationship-based core deposit accounts, checking and savings. Since December 31, 2000, our total assets have grown from $739.4 million to over $1.2 billion, our total loans have increased from $518.8 million to $886.3 million, and our total deposits have increased from $631.6 million to $880.7 million. During the same five-year period, our net income has grown from $4.4 million to $8.6 million and our diluted earnings per share have grown from $1.14 to $2.04. We had positive growth in net income and earnings per share in all years during this period except 2003, a year in which we invested heavily in our infrastructure. Through this five-year span, our return on average assets and return on average equity ranged from 0.69% to 0.83% and 10.45% to 12.37%, respectively.

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For the year ended December 31, 2004, our growth and profitability were as follows:

Total assets increased 13.3%, from $1.09 billion to $1.24 billion;

Commercial loans increased 21.2%, from $332.3 million to $402.8 million; and

Consumer loans increased 44.6%, from $115.8 million to $167.4 million.

Deposits increased 8.6%, from $811.3 million to $880.7 million.

Net income increased 19.4%, from $7.2 million in 2003 to $8.6 million in 2004.

Diluted earnings per share increased 15.3%, from $1.77 in 2003 to $2.04 in 2004.

Return on average assets increased from 0.69% in 2003 to 0.74% in 2004.

Return on average equity increased from 10.45% in 2003 to 11.53% in 2004.

Our Market Area

Greater Providence is a densely populated urban area. Based upon information provided by Claritas, Providence is the second most populous city in New England, after Boston. It ranks second in the rate of population growth, both since 2000 and projected over the next five years, relative to the ten largest cities in New England. Additionally, Rhode Island s employment growth rate was the highest of the New England states between August 2003 and August 2004 according to the U.S. Bureau of Labor Statistics.

Like Boston, Providence boasts a number of institutions of higher learning. The City is home to Brown University, Rhode Island School of Design, Johnson & Wales University and Providence College. Additionally, a number of hospitals and other health care providers are headquartered in the Providence area, as are state and other governmental offices. These sectors, as well as the local national airport, T.F. Green, which was significantly expanded in 1995, are key drivers of the state s economy.

The profile of the state s businesses is decidedly small business-oriented. According to data furnished by the Rhode Island Department of Labor and Training (RIDLT), more than 95% of Rhode Island s businesses have fewer than 50 employees. Since 1992, Rhode Island has experienced significant growth in the service, finance, insurance and real estate sectors, offsetting a substantial loss of manufacturing jobs and reflecting a dramatic realignment of what was once primarily a manufacturing based economy. While this growth is indicative of national trends, Rhode Island s shift to these sectors has been significantly greater than the nation s. Additionally, the RIDLT projects that Rhode Island s growth rate in the service and finance sectors will surpass the nation s growth rate in such sectors over the next five to seven years.

The City of Providence itself is enjoying an urban renaissance. It has preserved its architecturally distinctive flavor and enjoys numerous restaurants, theaters and other cultural venues, has a strong arts community and offers easy access to numerous recreational amenities. In recent years, both the Governor of Rhode Island and Mayor of Providence were elected on reform platforms and have taken steps to restore a sense of confidence and integrity to state and local government.

Thirteen of our fourteen branches are located in Providence and Kent Counties, the two most populous counties in Rhode Island. These counties contain 75% of the state s population, 72% of its businesses and 79% of its jobs. The six largest cities in the state are located in these two counties, and we have branches in five of these six cities. We recently expanded into Washington County, the third most populous county in the state, with the successful opening of our North Kingstown branch. In the nine months since opening, the branch has surpassed our expectations by garnering over $25 million in deposits.

The Rhode Island banking market is dominated by three large banks, one national and two regional. Their combined market share in Providence and Kent Counties represents approximately 84% of the deposits (excluding the internet-based bank), reflecting an exceptionally high degree of market concentration. The smallest of these institutions has total assets in excess of $56 billion. We have just under 6% of the deposits in Providence and Kent Counties and the remainder is scattered among a dozen other institutions. None of these other institutions has a branch footprint similar to ours in Providence and Kent Counties. As a result, we regard the three large banks in our area as our primary competition.

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The Rhode Island market has experienced slow to moderate economic growth over the past decade. Accordingly, our future growth depends largely on our ability to continue to attract business away from these large banks by continuing to increase our penetration in existing markets and successfully expanding in new markets. We believe we will enjoy continued success in winning business by offering a combination of competitive pricing for our services, quick decision making processes and a high level of personalized customer service to commercial, small business and other customers in the area who are seeking an alternative to the larger financial institutions.

Our Business Strategy

Our core strategy is to sufficiently differentiate ourselves from the large banks so as to attract business away from them. We seek to accomplish this through superior, relationship-based personal service, responsiveness, and our ability to set policies and procedures, as well as make decisions, locally. We believe we have a sophisticated commercial lending group and a solid footprint of branches which enable us to compete against the larger banks.

We believe we are well positioned to capitalize on the opportunities our marketplace, expertise and customer base afford us. Three primary opportunities are:

- The consolidation of the banking industry in Rhode Island and our relatively small market share provides the opportunity for us to grow by continuing to increase our market penetration and expanding our market presence.
- The prevalence of small businesses, our target customers, supports our focus on commercial lending as our primary business driver. We believe that service-oriented, relationship banking is meaningful to many businesses, and that our branch footprint has sufficient touch-points to make us accessible to these businesses.
- Our customer relationships and core competencies provide opportunities for cross selling products to our existing customers and for developing new business lines that utilize our knowledge base.

Specifically, we plan to focus on the following specific operating and growth strategies:

- *Providing Superior, Relationship-Based Customer Service.* We have distinguished ourselves from the larger institutions in our region by providing high touch , individualized, responsive, quality service. To provide this personalized service, we strive to recruit and train highly motivated employees who are able to make decisions and respond quickly to customers needs. We emphasize to our employees the importance of delivering a consistent and superior level of service and building further relationships with our customers. We believe our consistent, customer-focused approach across our entire organization provides us with a competitive advantage over the larger banks in our market.
- *Expanding Our Commercial Banking Relationships.* Building on our past success in commercial lending, we seek to position ourselves as the bank for business in our market. Our strategy revolves around providing ready access to a knowledgeable, experienced commercial lending officer with a relationship orientation, able to respond to a broad range of business needs on a customized basis. Our lenders provide continuity and consistency in approach as well as value-added advice. We believe our ability to know our commercial customers, to provide a significant level of personal contact and to respond to their lending and banking needs on a more individualized basis will enable us to continue to attract relationship-oriented customers dissatisfied with the service and responsiveness of our larger competitors.

Growing Our Core Deposits. We stress growing the Bank s core deposit base, namely checking and savings deposits. These deposits provide both a low cost source of funds for our lending operations and a potential source of fee income. These accounts, which generally represent a customer s primary banking relationship, also present opportunities for cross-selling other products. We rely mainly on quality customer service and diversified products, as well as competitive pricing policies and advertising, to attract and retain these deposits.

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Diversifying Our Products and Services and Increasing Noninterest Income. Over the years we have introduced new products and services in order to more fully service our customers as well as to broaden our sources of noninterest income. Such services and products include cash management and a nondeposit investment program which offers customers a variety of mutual funds and annuities. We have also expanded our consumer loan generation (largely home equity lines of credit and home equity term loans) through marketing programs with other local organizations and increased our residential mortgage origination capacity. We plan to continue to leverage off our knowledge base and customer relationships to diversify our business lines and sources of noninterest income.

Expanding Our Branch Network. We plan to broaden and deepen our branch footprint in order to provide more touch points for our customers, increase market awareness of our presence and enhance our franchise generally. While we expect that most of our growth will continue to be organic, we will consider acquisitions of individual branches or other institutions should attractive opportunities arise. We recently announced an expansion plan which calls for the construction and development of six branches over the next three to four years, using three branch models: a traditional branch, a smaller Xpress design tailored to commuters and drive-up traffic and a flagship Xcel model, which features innovative design, the latest technology and expanded hours and services. In April 2004, we opened an Xcel branch in North Kingstown, Rhode Island, which garnered in excess of $25 million in deposits in its first nine months of operation. We plan to open an Xpress branch adjacent to our operations center in Lincoln, Rhode Island in the Spring of 2005, a traditional branch in East Greenwich, Rhode Island in the Summer of 2005 and a traditional branch in Pawtucket, Rhode Island in early 2006.

Maintaining Our Strong Asset Quality. While increasing our commercial business, commercial real estate and consumer loans, we have maintained strong asset quality. We believe that this experience is the result of conservative underwriting standards, experienced loan officers, diligent monitoring of our loan portfolio, ability to know our customers and a stable economy. At December 31, 2004, our nonperforming loans as a percentage of total loans was 0.08%.

Recent Developments

On January 10, 2005, we entered into a non-binding letter of intent to purchase substantially all of the operating assets of a lease financing business (the Leasing Company) located in the greater New York metropolitan area for a maximum aggregate purchase price of $1.9 million. Completion of this acquisition is subject to the successful negotiation of a purchase and sale agreement. If the transaction is consummated, the purchase price will be paid in shares of our common stock with $250,000 paid at the closing of the acquisition, up to $750,000 payable upon the achievement of certain performance goals over a three-year period and up to an additional $900,000 subject to an earn-out over five years.

In 2004, the Leasing Company originated approximately $20.4 million in leases. In November 2004, we acquired approximately $3.0 million of leases from the Leasing Company. Following consummation of the acquisition, we currently anticipate that we will retain a significant portion of the leases generated by the Leasing Company.

Corporate Information

Our executive offices are located at One Turks Head Place, Providence, Rhode Island 02903, our telephone number is (401) 456-5000 and our Internet address is *http://www.bankri.com*. The information on our Internet website is not incorporated by reference in this prospectus.

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THE OFFERING

Common stock we are offering	550,000 shares[1]
Common stock outstanding after the offering	4,560,554 shares[2]
Net proceeds	The net proceeds of the offering will be approximately $18.8 million without the underwriters over-allotment option, assuming an offering price of $37.20 per share (based upon the closing price of our common stock on March 30, 2005).
Use of proceeds	We intend to retain the net proceeds from the offering of shares of common stock by us at the Company level for general business purposes and working capital and intend to downstream such proceeds to the Bank as necessary to provide regulatory capital to support our asset growth and continued expansion of the Bank s business. The proceeds from the offering should enable us to maintain our status as a well-capitalized institution as we execute our growth strategy.
Dividends on common stock	We have historically paid quarterly cash dividends on our common stock, and currently intend to do so in the future. See Market for Common Stock and Dividends.
Nasdaq National Market symbol	BARI
Common stock purchased by Directors and Executive Officers in the offering	Certain of our officers and directors have indicated an intent to participate in the offering through the purchase of approximately 42,500 shares, in the aggregate. In anticipation of this participation, we have directed 42,500 shares to be reserved specifically for purchase by such officers and directors.
Risk Factors	Before investing, you should carefully review the information contained under Risk Factors beginning at page 8.

1 The number of shares of common stock offered assumes that the underwriters over-allotment option is not exercised. If the over-allotment option is exercised in full, we will issue and sell 632,500 shares.

2 The number of shares of common stock outstanding after the offering is based on the number of shares outstanding as of December 31, 2004 and assumes that the underwriters over-allotment option is not exercised. It excludes an aggregate of 598,017 shares reserved for issuance under our stock incentive plans, under which options to purchase 487,805 shares at a weighted average exercise price of $19.30 had been granted and were outstanding as of December 31, 2004.

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SELECTED CONSOLIDATED FINANCIAL AND OTHER DATA

The following tables set forth selected consolidated historical financial and other data of the Company for the years ended December 31, 2004, 2003, 2002, 2001 and 2000. The selected consolidated financial data is derived in part from our Consolidated Financial Statements, which have been audited by KPMG LLP. The selected consolidated financial data set forth below does not purport to be complete and should be read together with, and are qualified in their entirety by, the more detailed information, including the Consolidated Financial Statements and related Notes, and Management s Discussion and Analysis of Financial Condition and Results of Operations, incorporated by reference into this prospectus from our Annual Report on Form 10-K for the fiscal year ended December 31, 2004.

As of and for the year ended December 31,		
2004	2003	20
(Dollars in thousands, except Per Share Data)		
57,719	$ 51,773	$
19,625	19,453	
38,094	32,320	
900	1,600	
8,581	8,830	
32,865	28,790	
12,910	10,760	
4,296	3,546	
8,614	$ 7,214	$
2.17	$ 1.89	$
2.04	$ 1.77	$
0.58	$ 0.56	$
28.4%	31.6%	
19.68	$ 18.53	$
16.99	$ 15.76	$
3,975,413	3,819,232	3,7
4,222,856	4,085,878	3,9

	1,239,069	$ 1,093,971	$ 1,0
	104,600	98,595	1
	159,946	106,618	1
	402,770	332,266	2
	316,135	366,230	2
	167,396	115,786	
	886,301	814,282	6
	11,906	11,078	
	10,766	10,766	

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

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

gy Development segment revenues, which consist primarily of government-funded research, accounted for 49% and f our total revenues for the years ended December 31, 2018 and 2017, respectively. As a result, we are vulnerable to changes in our revenues and cash flows if a significant number of our research contracts and subcontracts were to be usly delayed or canceled for budgetary, performance or other reasons. For example, the U.S. government may cancel contracts at any time without cause or may change its requirements, programs or contract budget, any of which could duce our revenues and cash flows from U.S. government research contracts. Our revenues and cash flows from U.S. nt research contracts and subcontracts could also be reduced by declines or other changes in U.S. defense, homeland other federal agency budgets. In addition, we compete as a small business for some of these contracts, and in order to ur eligibility to compete as a small business, we, together with any affiliates, must continue to meet size and revenue limitations established by the U.S. government.

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

on to contract cancellations and changes in agency budgets, our future financial results may be adversely affected by urtailment of or restrictions on the U.S. government's use of contract research providers, including curtailment due to budget reductions and related fiscal matters or any legislation or resolution limiting the number or amount of awards eive. These or other factors could cause U.S. defense and other federal agencies to conduct research internally rather h commercial research organizations or direct awards to other organizations, to reduce their overall contract research ments or to exercise their rights to terminate contracts. Alternatively, the U.S. government may discontinue the SBIR or its funding altogether. Also, SBIR regulations permit increased competition for SBIR awards from companies that have previously been eligible, such as those backed by venture capital operating companies, hedge funds and private . Any of these developments could limit our ability to obtain new contract awards and adversely affect our revenues, cash flows and ability to fund our growth.

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

ity of highly trained and skilled technical and professional personnel is critical to our future growth and profitability. on 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

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f the tight labor market in certain fields. Any difficulty in hiring or retaining qualified employees, combined with our rowth strategy and future needs for additional experienced personnel, particularly in highly specialized areas such as rial manufacturing and fiber optic sensing technologies, may make it more difficult to meet all of our needs for these a timely manner. Although we intend to continue to devote significant resources to recruit, train and retain qualified loyees, we may not be able to attract and retain these employees, especially in technical fields in which the supply of qualified candidates is limited, or at the senior management level. Any failure to do so would have an adverse effect ess. Any loss of key personnel could have a material adverse effect on our ability to meet key operational objectives, timely and effective project milestones and product introductions, which in turn could adversely affect our business, results of operations and financial condition.

certain services to the U.S. government that require us to maintain a facility security clearance and for certain of our s and our board chairman to hold security clearances. In general, the failure for necessary persons to obtain or retain security clearances, any loss by us of a facility security clearance or any public reprimand related to security matters ult 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.

ion, our future success depends in a large part upon the continued service of key members of our senior management 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.

ss 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.

ors beyond our control affect our business, including consumer confidence in the economy, interest rates, fuel prices eral availability of credit. The overall economic climate and changes in Gross National Product growth have a direct n 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.

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

, our historical results of operations have been subject to substantial fluctuations, and we may experience substantial o-period fluctuations in future results of operations. Any future downturn in the markets in which we compete could ntly reduce the demand for our products and therefore may result in a significant reduction in revenue or increase the 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.

ition, the telecommunications industry has, from time to time, experienced, and may again experience, a pronounced wnturn. 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 ogies from original equipment manufacturers, which would have a negative impact on our business. Weakness in the nomy or a future downturn in the telecommunications industry may cause our results of operations to fluctuate from ter-to-quarter and year-to-year, harm our business, and may increase the volatility of the price of our common stock.

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

ustomer acceptance of our products is significantly dependent on our ability to offer products that meet the changing equirements 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.

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

ers generally establish demanding specifications for quality, performance and reliability that our products must meet. products are highly complex and may contain defects and failures when they are first introduced or as new versions Our products are also subject to rough environments as they are integrated into our customer products for use by the customers. If defects and failures occur in our products, we could experience lost revenue, increased costs, including xpense 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

ation and brand equity, and in some cases consequential damages, any of which would harm our operating results. In delays in our ability to fill product orders as a result of quality control issues may negatively impact our relationship omers. We cannot assure you that we will have sufficient resources, including any available insurance, to satisfy any asserted claims.

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

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

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.

markets for many of our products are characterized by changing technology, new product introductions and product ts, and evolving industry standards. The introduction or enhancement of products embodying new technology or the ence of new industry standards could render existing products obsolete, and result in a write down to the value of our y, 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.

siness is reliant on our ability to find new customers and retain existing customers. In particular, customers normally certain of our products and incorporate them into products that they, in turn, sell in their own markets on an ongoing esult, the historical sales or these products have been dependent upon the success of our customers' products and our ormance is dependent upon our success in finding new customers and receiving new orders from existing customers. al markets, the quality and reliability of our products are a major concern for our customers, not only upon the initial ure of the product, but for the life of the product. Many of our products are used in remote locations for higher value making servicing of our products unfeasible. Any failure of the quality or reliability of our products could harm our business.

mer 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.

anning and spending decisions, including determining the levels of business that we will seek and accept, production inventory levels, component procurement commitments, personnel needs and other resource requirements, based on es of customer requirements. The short-term nature of commitments by many of our customers and the possibility of cted changes in demand for their products reduce our ability to accurately estimate future customer requirements. On , customers may require rapid increases in production, which can strain our resources, cause our manufacturing to be vely impacted by materials shortages, necessitate higher or more restrictive procurement commitments, increase our ng yield loss and scrapping of excess materials, and reduce our gross margin. We may not have sufficient capacity at ne to meet the volume demands of our customers, or one or more of our suppliers may not have sufficient capacity at me 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

nt of products ordered or to cancel existing orders, leading to lower utilization of our facilities. Because many of our erating 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.

f 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.

economic and political conditions affect our customers' businesses and the markets they serve. A severe or prolonged ownturn or a negative or uncertain political climate could adversely affect our customers' financial conditions and the evels of business activity of our customers and the industries we serve. This may reduce the demand for our products pricing for our products and have a material adverse effect on our results of operations. Changes in global economic ons could also shift demand to products or services for which we do not have competitive advantages, and this could affect the amount of business we are able to obtain. In addition, if we are unable to successfully anticipate changing d 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.

history of losses, and because our strategy for expansion may be costly to implement, we may experience losses and may not maintain profitability or positive cash flow.

history of net losses from operations and only recently generated positive net income from continuing operations of million for the year ended December 31, 2018. We expect to continue to incur significant expenses as we pursue our atives, including increased expenses for research and development, sales and marketing and manufacturing. We may ur 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 related expenses. As a result, we may incur net losses in the future, and these losses could be substantial. At a certain ed net losses could impair our ability to comply with Nasdaq continued listing standards, as described further below. ability to generate additional revenues and to become 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 ies, 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 may require additional capital to support and expand our business.

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

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

nable 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.

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

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

of our competitors have longer operating histories, greater name recognition, larger customer bases and significantly ncial, 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.

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dition, current and potential competitors have established or may establish financial or strategic relationships among elves or with existing or potential customers or other third parties. Accordingly, new competitors or alliances among ors 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.

npetition in our markets could result in aggressive business tactics by our competitors, including aggressively pricing oducts or selling older inventory at a discount. If our current or future competitors utilize aggressive business tactics, se 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.

profit margins vary among our product platforms, and are generally highest on our test & measurement instruments. gross profit may fluctuate from period to period as a result of a variety of factors including shifts in product mix, the n of new products, and decreases in average selling prices for older products. If our customers decide to buy more of ts 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

ble to successfully integrate acquired businesses, it could have an adverse effect on our future results and the market price of our common stock.

2018 we acquired the assets of Micron Optics, Inc., a leading provider of provider of innovative optical components er-based equipment that advance the quality of optical measurements. In March 2019 we acquired General Photonics , a leading provider of innovative components, modules and test equipment focused on the generation, measurement of polarized light critical in fiber optic-based applications. In the future, we may continue to seek acquisition targets ting our growth strategy. The success of an acquisition will depend, in large part, on sales of the acquired company's ts and the realization of operating synergies. To realize these anticipated benefits, we must successfully integrate the ompany's business into our existing business. Such integrations may be complex and time-consuming. The failure to ntegrate and manage the challenges presented by the integration process may result in our failure to achieve some or nticipated benefits of the acquisition. Potential difficulties that may be encountered in the integration process include the following:

- 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;
- potential unknown liabilities associated with the acquisition;

shortfalls as a result of the diversion of management's attention caused by completing the acquisition and integrating

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

ot 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 luct sales and revenues from the provision of services or from licensing. Product sales and these revenues potentially ater scalability than contract research revenues. Our current plan is to increase our sales of commercial products, our g revenues and our provision of non-research services to customers so as to represent a larger percentage of our total ve are unable to develop and grow our product sales and revenues from the provision of services or from licensing to ur 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.

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

ss will depend on our ability to develop and introduce new products that customers choose to buy. The new products narket requires tend to be increasingly complex, incorporating more functions and operating at faster speeds than old ts. If we fail to introduce new product designs or technologies in a timely manner or if customers do not successfully y 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.

eed to expand our personnel resources to grow our business effectively. We believe that sustained growth at a higher ce a strain on our management as well as on our other human resources. To manage this growth, we must continue to tain qualified management, professional, scientific and technical and operating personnel. If we are unable to recruit umber 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.

business model depends on our ability to correctly identify market needs for new technologies. We intend to identify arket needs, but we may not always have success in doing so in part because our contract research largely centers on n and development of unproven technologies, often for new or emerging markets. Furthermore, we must identify the ising technologies from a sizable pool of projects. If our commercialization strategy process fails to identify projects ercial 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.

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

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

- nply with U.S. export control regulations and policies that restrict our ability to communicate with non-U.S. d supply foreign affiliates and customers;
- es in or interpretations of foreign regulations that may adversely affect our ability to sell our products, perform es or repatriate profits to the United States;
- the imposition of tariffs;
- hyperinflation or economic or political instability in foreign countries;
- limitations on, or increase of withholding and other taxes on remittances and other payments by foreign r 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;

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- the imposition or increase of investment and other restrictions or requirements by foreign governments;
- uncertainties relating to foreign laws and legal proceedings;
- having to comply with a variety of U.S. laws, including the Foreign Corrupt Practices Act ("FCPA"); and
- having to comply with licensing requirements.

ot know the impact that these regulatory, geopolitical and other factors may have on our international business in the future.

elopments relating to the United Kingdom's referendum vote in favor of withdrawal from the European Union could adversely affect us.

d a referendum on June 23, 2016, in which a majority voted for the UK's withdrawal from the EU, commonly known 'Brexit'. As a result of this vote, on March 29, 2017, the UK officially started the separation process and commenced ations to determine the terms of the UK's withdrawal from the EU. The UK is currently scheduled to leave the EU at m. GMT on March 29, 2019. If the UK and the EU are unable to negotiate acceptable withdrawal terms, barrier-free tween the UK and other European Member States or among the EEA overall could be diminished or eliminated. The exit are expected to be far-reaching and will depend on any agreements (or lack thereof) between the UK and the EU in particular, any arrangements for the UK to retain access to EU markets either during a transitional period or more ly. Given the level of uncertainty, Brexit, and the perceptions as to its impact, may adversely affect business activity omic conditions in the UK, Europe and globally and could continue to contribute to instability in global financial and exchange markets, asset valuations and credit ratings. Brexit could also have the effect of disrupting and potentially ee movement of goods, services and people between the UK and the EU, which may negatively affect our operations together with those of our customers and suppliers.

xample, it is unclear at this time what Brexit's impact will have on our intellectual property rights and the process for taining, maintaining, defending and enforcing such rights. For example, while current guidance provided by the UK's t suggests that trademarks granted by the EU, known as EU registered trademarks or EUTMs, will be continue to be the UK after Brexit, it is unclear whether we will be required to refile our trademarks and other intellectual property ns domestically in the UK and whether any other steps will be required for us to protect our trade marks in the UK in future. As a result of Brexit, other European countries may seek to conduct referenda with respect to their continuing p in the EU. Given these possibilities and others we may not anticipate, as well as the lack of comparable precedent, ot be certain of the full extent to which Brexit could adversely affect our business, results of operations and financial condition.

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

ng basis, we evaluate our various product offerings and technology developments in order to determine whether any scontinued or, to the extent possible, divested. In addition, if we are unable to generate the amount of cash needed to e operations of our business, we may be forced to sell one or more of our product lines or technology developments. uarantee that we have correctly forecasted, or that we will correctly forecast in the future, the right product lines and evelopments to dispose or discontinue or that our decision to dispose of or discontinue various investments, products es and technology developments is prudent if market conditions change. In addition, there are no assurances that the ance of various product lines will reduce operating expenses or will not cause us to incur material charges associated cision. Furthermore, the discontinuance of existing product lines entails various risks, including the risk that we will 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 ssets for the product line. Other risks include managing the expectations of, and maintaining good relations with, our customers who previously purchased products from a disposed or discontinued product line, which could prevent us 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.

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

ne risk, as does any company, of a security breach, whether through cyber-attack or cyber-intrusion over the internet, omputer 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

particularly through cyber-attack or cyber-intrusion, including by computer hackers, foreign governments and cyber , has increased as the number, intensity and sophistication of attempted attacks and intrusions from around the world have increased.

nology company, and particularly as a government contractor, we may face a heightened risk of a security breach or from threats to gain unauthorized access to our proprietary, confidential or classified information on our IT networks systems. These types of information and IT networks and related systems are critical to the operation of our business tial to our ability to perform day-to-day operations, and, in some cases, are critical to the operations of certain of our n addition, as certain of our technological capabilities become widely known, it is possible that we may be subjected attack or cyber-intrusion as third parties seek to gain improper access to information regarding these capabilities and or cyber-intrusion could compromise our confidential information or our IT networks and systems generally, as it is as a business matter to isolate all of our confidential information and trade secrets from email and internet access. To have not experienced a significant cyber-intrusion or cyber-attack. There can be no assurance that our security efforts d measures will be effective or that attempted security breaches or disruptions would not be successful or damaging. breach or other significant disruption involving these types of information and IT networks and related systems could rupt the proper functioning of these networks and systems and therefore our operations, compromise our confidential on and trade secrets, or damage our reputation among our customers and the public generally. We have not identified nt security breaches or experienced other significant disruptions of these types to date. Any of these developments in the future could have a negative impact on our results of operations, financial condition and cash flows.

Risks Relating to our Regulatory Environment

operations are subject to domestic and foreign laws, regulations and restrictions, and noncompliance with these laws, ns 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.

erations, particularly our international sales, subject us to numerous U.S. and foreign laws and regulations, including, ation, regulations relating to imports, exports (including the Export Administration Regulations and the International Arms Regulations), technology transfer restrictions, anti-boycott provisions, economic sanctions and the FCPA. The r various emerging technologies, the development of many of which has been funded by the Department of Defense, with many regulatory challenges. Failure by us or our sales representatives or consultants to comply with these laws ons could result in administrative, civil, or criminal liabilities and could result in suspension of our export privileges, 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.

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

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

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

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

ufacturing facilities are subject to periodic inspection by regulatory authorities and our operations will continue to be gulated by the FDA for compliance with Good Manufacturing Practice requirements contained in the quality systems 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

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ng Practice requirements or ISO standards, we may be required to cease all or part of our operations until we comply
gulations. Obtaining and maintaining such compliance is difficult and costly. We cannot be certain that our facilities
ound to comply with Good Manufacturing Practice requirements or ISO standards in future inspections and audits by
thorities. In addition, if we cannot maintain or establish manufacturing facilities or operations that comply with such
r 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.

bject 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.

ilities and current and proposed activities involve the use of a broad range of materials that are considered hazardous
applicable laws and regulations. Accordingly, we are subject to a number of foreign, federal, state and local laws and
lations relating to health and safety, protection of the environment and the storage, use, disposal of, and exposure to,
ous materials and wastes. We could incur costs, fines and civil and criminal penalties, personal injury and third party
y damage claims, or could be required to incur substantial investigation or remediation costs, if we were to violate or
ble under environmental, health and safety laws. Moreover, a failure to comply with environmental laws could result
s 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
ental and health and safety laws will not occur in the future as a result of the inability to obtain permits, human error,
ent failure or other causes. Environmental laws could become more stringent over time, imposing greater compliance
increasing risks and penalties associated with violations, which could harm our business. Accordingly, violations of
ture 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.

liance with foreign, federal, state and local environmental laws and regulations represents a small part of our present
e fail to comply with any such laws or regulations, however, a government entity may levy a fine on us or require us
stly measures to ensure compliance. Any such fine or expenditure may adversely affect our development. We cannot
ict 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.

Risks Relating to our Intellectual Property

Our proprietary rights may not adequately protect our technologies.

ommercial success will depend in part on our obtaining and maintaining patent, trade secret, copyright and trademark
tion of our technologies in the United States and other jurisdictions as well as successfully enforcing this intellectual
d defending it against third-party challenges. We will only be able to protect our technologies from unauthorized use
arties to the extent that valid and enforceable intellectual property protections, such as patents or trade secrets, cover
em. In particular, we place considerable emphasis on obtaining patent and trade secret protection for significant new
es, products and processes. The degree of future protection of our proprietary rights is uncertain because legal means
limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage.
ree of future protection of our proprietary rights is also uncertain for products that are currently in the early stages of
ment 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.

ent 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:

nsors might not have been the first to make the inventions covered by each of our pending patent applications and
;

- 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;

hat none of our pending patent applications or the pending patent applications of our licensors will result in issued

- patents may issue to third parties that cover how we might practice our technology;

tents and issued patents of our licensors may not provide a basis for commercially viable technologies, may not th any competitive advantages, or may be challenged and invalidated by third parties; and

- we may not develop additional proprietary technologies that are patentable.

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

so rely on trade secrets to protect our technology, especially where we believe patent protection is not appropriate or inable. However, trade secrets are difficult to protect. We regularly attempt to obtain confidentiality agreements and provisions with our collaborators, employees and consultants to protect our trade secrets and proprietary know-how. agreements may be breached or may not have adequate remedies for such breach. While we use reasonable efforts to ct our trade secrets, our employees, consultants, contractors or scientific and other advisors, or those of our strategic y unintentionally or willfully disclose our information to competitors. If we were to enforce a claim that a third party obtained and was using our trade secrets, our enforcement efforts would be expensive and time consuming, and the vould be unpredictable. In addition, courts outside the United States are sometimes unwilling to protect trade secrets. f 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.

t able to defend the patent or trade secret protection position of our technologies, then we will not be able to exclude 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.

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

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

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

cial application of nanotechnologies in particular, or technologies involving nanomaterials, is new and the scope and atent protection is uncertain. Consequently, the patent positions of companies involved in nanotechnologies have not ted, and there are complex legal and factual questions for which important legal principles will be developed or may esolved. In addition, it is not clear whether such patents will be subject to interpretations or legal doctrines that differ tional patent law principles. Changes in either the patent laws or in interpretations of patent laws in the United States ountries 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

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he event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold ding or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or ose patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, ufacture or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition and results of operations.

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.

ntial portion of our technology is licensed from academic institutions, corporations and government agencies. Under ng arrangements, a licensor may obtain rights over the technology, including the right to require us to grant a license e or more third parties selected by the licensor or that we provide licensed technology or material to third parties for ommercial research. The grant of a license for any of our core technologies to a third party could have a material and ffect on our business. In addition, some of our licensors retain certain rights under the licenses, including the right to al licenses to a substantial portion of our core technology to third parties for non-commercial academic and research ifficult to monitor and enforce such non-commercial academic and research uses, and we cannot predict whether the party licensees would comply with the use restrictions of such licenses. We have incurred and could incur substantial 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.

, some of our licenses with academic institutions give us the right to use certain technology previously developed by these institutions. In certain cases we also have the right to practice improvements on the licensed technology to the are encompassed by the licensed patents and are within our field of use. Our licensors may currently own and may in btain additional patents and patent applications that are necessary for the development, manufacture and commercial ticipated products. We may be unable to agree with one or more academic institutions from which we have obtained hether certain intellectual property developed by researchers at these academic institutions is covered by our existing he event that the new intellectual property is not covered by our existing licenses, we would be required to negotiate ense agreement. We may not be able to reach agreement with current or future licensors on commercially reasonable 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.

f our patents may cover inventions that were conceived or first reduced to practice under, or in connection with, U.S. contracts or other federal funding agreements. With respect to inventions conceived or first reduced to practice under unding agreement, the U.S. government may retain a non-exclusive, non-transferable, irrevocable, paid-up license to r have practiced for or on behalf of the United States the invention throughout the world. We may not succeed in our to retain title in patents, maintain ownership of intellectual property or in limiting the U.S. government's rights in our 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.

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.

we have licensed certain technologies for use in our products. In the future, we may choose, or be required, to license or intellectual property from third parties in connection with the development of our products. We cannot assure you rd-party licenses will be available on commercially reasonable terms, if at all. Our competitors may be able to obtain cross-license their technology, on better terms than we can, which could put us at a competitive disadvantage. Also, ter into confidentiality agreements with such third parties in which we agree to protect and maintain their proprietary dential information, including at times requiring our employees to enter into agreements protecting such information. n 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

The United States Tax Cuts and Jobs Act of 2017 could adversely affect our business and financial condition.

. Tax Cuts and Jobs Act (the "TCJA") significantly reforms the US Internal Revenue Code. The TCJA, among other tains significant changes to U.S. federal corporate income taxation, including reduction of the U.S. federal corporate

income tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest

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30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to
f current year taxable income and elimination of net operating loss carrybacks, immediate deductions for certain new
instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and
deral net operating losses arising in taxable year ending after December 31, 2017, will be carried forward indefinitely
he TCJA. We continue to examine the impact this tax reform legislation may have on our business. Notwithstanding
eduction in the corporate income tax rate, the overall impact of the TCJA is uncertain and our business and financial
ould be adversely affected. The impact of this tax reform on holders of our common stock is also uncertain and could
We urge our stockholders to consult with their legal and tax advisors with respect to such legislation and the potential
tax consequences of investing in our common stock.

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

f our stockholders were to sell substantial amounts of our common stock, the market price of our common stock may
hich might make it more difficult for us to sell equity or equity-related securities in the future at a time and price that
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.

ic holds approximately 4.1 million shares of our common stock (including approximately 1.3 million shares issuable
upon conversion of shares of Series A Convertible Preferred Stock that Carilion holds). All of these shares have been
for sale on a Form S-3 registration statement and, accordingly, may generally be freely sold by Carilion at any time.
ales of these shares, or the perception that future sales of shares may occur by Carilion or any of our other significant
may have a material adverse effect on the market price of our stock. Any such continuing material adverse effect on
rket price of our stock could impair our ability to comply with Nasdaq's continuing listing standards in respect of our
minimum stock price, as further described below.

come 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.

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

non 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.

c trading price for our common stock is volatile and may fluctuate significantly. Since January 1, 2009, our common
traded between a high of $5.00 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;
- rnings estimates, investors' perceptions, recommendations by securities analysts or our failure to achieve analysts' nates;
- changes in our status as an entity eligible to receive SBIR contracts and grants;
- quarterly variations in our or our competitors' results of operations;
- challenges integrating our recent or future acquisitions, including the inability to realize any expected synergies;
- et conditions and other factors unrelated to our operating performance or the operating performance of our
- ts by us, or by our competitors, of acquisitions, new products, significant contracts, commercial relationships or itments;
- pending or threatened litigation;
- ajor 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;

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ons of our company or our stock price by the financial and scientific press and online investor communities; and

• general developments in our industry.

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

r internal control over financial reporting is found not to be effective or if we make disclosure of existing or potential ial weaknesses in those controls, investors could lose confidence in our financial reports, and our stock price may be adversely affected.

of the Sarbanes-Oxley Act of 2002 requires us to include an internal control report with our Annual Report on Form eport must include management's assessment of the effectiveness of our internal control over financial reporting as of the end of the fiscal year.

our existing internal control over financial reporting based on the framework issued by the Committee of Sponsoring izations of the Treadway Commission. During the course of our ongoing evaluation of the internal controls, we may fy areas requiring improvement, and may have to design enhanced processes and controls to address issues identified review. Remedying any deficiencies, significant deficiencies or material weaknesses that we identify may require us ificant costs and expend significant time and management resources. We cannot assure you that any of the measures mplement to remedy any such deficiencies will effectively mitigate or remedy such deficiencies. Investors could lose n our financial reports, and our stock price may be adversely affected, if our internal controls over financial reporting ot to be effective by management or if we make disclosure of existing or potential significant deficiencies or material weaknesses in those controls.

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

ion of financial statements in conformity with U.S. GAAP requires our management to make estimates, assumptions nents that affect the amounts reported in the consolidated financial statements and accompanying notes. We base our historical experience and on various other assumptions that we believe to be reasonable under the circumstances, the ich form the basis for making judgments about the carrying values of assets, liabilities, equity, revenue and expenses readily apparent from other sources. Our operating results may be adversely affected if our assumptions change or if nstances differ from those in our assumptions, which could cause our operating results to fall below the expectations nancial analysts and investors, resulting in a decline in our stock price. Significant assumptions and estimates used in ng our consolidated financial statements include those related to revenue recognition, stock-based compensation and e taxes. Moreover, the new revenue recognition guidance, ASC Topic 606, Revenue from Contracts with Customers, requires more judgment than did the prior guidance.

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

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

r provisions in our amended and restated certificate of incorporation and bylaws and Delaware law could discourage 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.

mended and restated certificate of incorporation and bylaws and Delaware law contain provisions that might delay or nt a change in control, discourage bids at a premium over the market price of our common stock and adversely affect

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ket 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;
- ty stockholder vote requirement for amending certain provisions of our amended and restated certificate of and bylaws; and
- sue preferred stock without stockholder approval, which could be used to dilute the stock ownership of a potential er.

so subject to provisions of the Delaware General Corporation law that, in general, prohibit any business combination peneficial 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.
ence 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.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

roximately 4,400 square feet of office space in Roanoke, Virginia, which serves as our corporate headquarters and is used for general and administrative functions. This lease expires March 31, 2020.
se approximately 42,000 square feet of space in Blacksburg, Virginia, near Virginia Tech, which is used by both our Technology Development segment and our Products and Licensing segment. This lease expires December 31, 2024.
approximately 11,000 square feet of space in Ann Arbor, Michigan, for research, development and manufacturing of our THz product platform. This lease expires December 31, 2021.
ase approximately 19,600 square feet of space in Charlottesville, Virginia, near the University of Virginia, for use by certain groups in our Technology Development segment. This lease expires December 31, 2020.
approximately 21,000 square feet of space in Atlanta, Georgia, for use by our Products and Licensing segment. This lease expires October 31, 2020.
24,000 square foot facility in Danville, Virginia for use by certain groups in our Technology Development segment.
ase approximately 28,000 square feet of space in Chino, California, for manufacture and support of our GP products.
elieve that our existing facilities are adequate for our current needs and suitable additional or substitute space will be available as needed to accommodate expansion of our operations.

ITEM 3. LEGAL PROCEEDINGS

cember 2018, we received a notice of claim (the "Claim") from Macom Technology Solutions, Inc. ("Macom"), who ur HSOR business in August 2017 pursuant to an asset purchase agreement. Under the asset purchase agreement, we emnify Macom for certain matters, including, among other things, the collection of accounts receivable from certain tomers, and placed $4.0 million of the purchase price into an escrow account for the potential settlement of any valid claims. The Claim received from Macom totaled $2.1 million under various indemnity provisions. We have disputed ertion of right to payment for the matters described in the Claim. It is uncertain what amount, if any, will be owed in the Claim. As of December 31, 2018, $1.5 million of the escrow balance had been received with the remaining $2.5 million in the escrow account pending resolution of the dispute.
onally, from time to time, we may become involved in litigation or claims arising out of our operations in the normal usiness. 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.

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ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

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PART II

MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

STOCKHOLDERS

n stock is listed on the Nasdaq Capital Market under the symbol "LUNA." As of March 12, 2019, we had 28,125,598 mon stock outstanding held by 100 holders of record. The actual number of stockholders is greater than this number olders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and nees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

STOCK PERFORMANCE GRAPH

h set forth below compares the cumulative total stockholder return on our common stock for the previous five years, which our common stock was traded on the Nasdaq Capital Market, as compared to the cumulative total return of the osite Index and the Russell 2000 Index over the same period. This graph assumes the investment of $100,000 in our ck at the closing price on January 1, 2014, and an equivalent amount in the Nasdaq Composite Index and the Russell on that date, and assumes the reinvestment of dividends, if any. We have never paid dividends on our common stock and have no present plans to do so.

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

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

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

DIVIDEND POLICY

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

Unregistered Sales of Equity Securities

Common Stock Dividend Payable to Carilion

l 1,321,514 shares of Series A Preferred Stock, par value $0.001 per share, to Carilion Clinic in January 2010, which re issued in reliance on the exemptions from registration under the Securities Act provided by Sections 3(a)(9) and 4 eof. The Series A Preferred Stock accrues dividends at the rate of $0.2815 per share per annum, payable quarterly in crued dividends are payable in shares of our common stock, with the number of shares being equal to the quotient of ative aggregate balance of accrued but unpaid dividends on each share of Series A Preferred Stock divided by (ii) the n price of the Series A Preferred Stock, which is currently $4.69159 per share. For the period from January 12, 2010, iginal issue date of the Series A Preferred Stock, through December 31, 2018, the Series A Preferred Stock issued to has accrued $1,417,633 in dividends. The accrued dividend as of December 31, 2018 will be paid by the issuance of 710,985 shares of our common stock, which we will issue at Carilion's written request. As the Series A

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d Stock was issued in reliance on the exemption provided by Section 3(a)(9), the shares of common stock payable as dividends will also be exempt from registration in reliance on Section 3(a)(9) of the Securities Act.

Purchases of Equity Securities by the Issuer and Affiliated Parties-

Not applicable.

ITEM 6. SELECTED FINANCIAL DATA

solidated statement of operations data for each of the years ended December 31, 2018 and 2017 and the consolidated sheet data as of December 31, 2018 and 2017 have been derived from our audited consolidated financial statements elsewhere in this report. The consolidated statement of operations data for the years ended December 31, 2016, 2015 and the consolidated balance sheet data as of December 31, 2016, 2015 and 2014 have been derived from our audited ed financial statements that do not appear in this report. The following selected consolidated financial data should be onjunction with our consolidated financial statements and the accompanying notes and "Management's Discussion and f Financial Condition and Results of Operations" included at Part II, Item 7 in this Annual Report on Form 10-K. The d data in this section is not intended to replace the consolidated financial statements, and the historical results are not necessarily indicative of the results to be expected in any future period.

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nds, except share and per share data	Years ended December 31, 2018	2017	2016	2015	2014
ated Statement of Operations Data:					
:					
gy development	$20,968	$ 18,576	$ 16,281	$ 13,599	$ 12,206
and licensing	21,950	14,505	13,323	12,975	9,054
enues	42,917	33,082	29,604	26,574	21,260
venues:					
gy development	15,400	13,988	12,473	10,379	9,376
and licensing	8,079	5,724	5,417	5,652	4,047
of revenues	23,479	19,713	17,890	16,031	13,423
fit	19,438	13,369	11,714	10,543	7,837
expense	18,560	15,577	15,840	17,359	12,342
income/(loss)	878	(2,208)	(4,126)	(6,816)	(4,505)
pense)/income, net	(17)	26	28	(53)	111
come	550	—	—	—	—
xpense, net	(124)	(217)	(317)	(218)	(96)
oss) from continuing operations before income taxes	1,286	(2,399)	(4,414)	(7,087)	(4,490)
x expense/(benefit)	48	(1,149)	(136)	(602)	(1,137)
ne/(loss) from continuing operations	1,238	(1,250)	(4,279)	(6,484)	(3,353)
om discontinued operations, net of income taxes	9,766	15,866	1,909	8,801	9,347
ne/(loss)	11,004	14,616	(2,369)	2,317	5,994
stock dividend	257	147	105	86	112
ne/(loss) attributable to common stockholders	$10,747	$ 14,469	$ (2,475)	$ 2,231	$ 5,882
ne/(loss) per share from continuing operations:					
	$0.04	$ (0.05)	$ (0.16)	$ (0.28)	$ (0.23)
ted	$0.04	$ (0.05)	$ (0.16)	$ (0.28)	$ (0.23)
ne per share from discontinued operations:					
	$0.35	$ 0.58	$ 0.07	$ 0.38	$ 0.63
ted	$0.30	$ 0.58	$ 0.07	$ 0.38	$ 0.63
ne/(loss) per share attributable to common stockholders:					
	$0.39	$ 0.52	$ (0.09)	$ 0.10	$ 0.40
ted	$0.33	$ 0.52	$ (0.09)	$ 0.10	$ 0.40
-average shares:					
	27,596,401	27,579,988	27,547,217	23,026,494	14,880,697
	32,452,228	27,579,988	27,547,217	23,026,494	14,880,697

In thousands	As of December 31, 2018	2017	2016	2015	2014
Consolidated Balance Sheet Data:					
Cash and cash equivalents	$42,460	$36,982	$17,464	$14,117	$7,779
Working capital	56,089	43,975	23,417	15,413	10,106
Total assets	75,599	66,223	58,132	27,584	19,704
Total current liabilities	12,139	14,826	15,334	8,473	7,206
Total debt	619	2,436	6,125	625	2,125

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

ng discussion and analysis of our financial condition and results of operations should be read in conjunction with our
olidated financial statements and the related notes to those statements included elsewhere in this report. In addition to
l 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

ed in these forward-looking statements as a result of many factors, including those discussed under “Risk Factors” and elsewhere in this report.

Business Overview

der in advanced optical technology, providing high performance fiber optic test products for the telecommunications d distributed fiber optic sensing products for industries utilizing composite and other advanced materials, such as the otive, aerospace, energy and infrastructure industries. Our distributed fiber optic sensing products help designers and rers more efficiently develop new and innovative products by providing valuable information such as highly detailed ain, and temperature measurements of a new design or manufacturing process. In addition, our distributed fiber optic ucts are used to monitor the structural integrity or operational health of critical assets, including large civil structures ges. Our communications test products accelerate the development of advanced fiber optic components and networks ng fast and highly accurate characterization of components and networks. We also provide applied research services, ally under research programs funded by the U.S. government, in areas of advanced materials, sensing, and healthcare Our business model is designed to accelerate the process of bringing new and innovative products to market. We use -house technical expertise across a range of technologies to perform applied research services for companies and for funded projects. We continue to invest in product development and commercialization, which we anticipate will lead to increased product sales growth.

organized into two main operating segments, our Products and Licensing segment and our Technology Development Our Products and Licensing segment develops, manufactures and markets distributed fiber optic sensing products, as ommunications test products. We are continuing to develop and commercialize our fiber optic technology for sensing ications for aerospace, automotive, energy, and infrastructure as well as for test and measurement applications in the telecommunications and data communications industries. Our Products and Licensing segment revenues represented approximately 51% and 44% of our total revenues for the years ended December 31, 2018 and 2017, respectively.

ogy Development segment performs applied research principally in the areas of sensing & instrumentation, advanced als, and health sciences. Our Technology Development segment comprised approximately 49% and 56% of our total for the years ended December 31, 2018 and 2017, respectively. Most of the government funding for our Technology t segment is derived from the Small Business Innovation Research ("SBIR"), program coordinated by the U.S. Small dministration. Our Technology Development segment revenues have historically accounted for a large portion of our nues, and we expect that they will continue to represent a significant portion of our total revenues for the foreseeable thin the Technology Development segment, we have historically had a backlog of contracts for which work has been ed, but for which a specified portion of work has not yet been completed. We define backlog as the dollar amount of gations payable to us under negotiated contracts upon completion of a specified portion of work that has not yet been exclusive of revenues previously recognized for work already performed under these contracts, if any. Total backlog funded backlog, which is the amount for which money has been directly authorized by the U.S. government and for rchase order has been received by a commercial customer, and unfunded backlog, representing firm orders for which not yet been appropriated. Indefinite delivery and quantity contracts and unexercised options are not reported in total og. The approximate value of our Technology Development segment backlog was $26.0 million and $23.5 million at er 31, 2018 and 2017, respectively. The approximate value of our Products and Licensing segment backlog was $5.8 million and $6.9 million at December 31, 2018 and 2017, respectively.

om product sales are mostly derived from the sales of our sensing and test & measurement products that make use of itting optical fibers, or fiber optics. We continue to invest in product development and commercialization, which we will lead to increased product sales growth. Although we have been successful in licensing certain technology in past o not expect license revenues to represent a significant portion of future revenues. Over time, however, we do intend increase such revenues. In the near term, we expect revenues from product sales to continue to be primarily in areas th our fiber optic test & measurement and sensing platforms. In the long term, we expect that revenues from product resent a larger portion of our total revenues and that as we develop and commercialize new products, these revenues will reflect a broader and more diversified mix of products.

ed net income attributable to common stockholders of approximately $10.7 million for the year ended December 31, income attributable to common stockholders of approximately $14.5 million for the year ended December 31, 2017.

ne effects of our HSOR business and our optoelectronics business, which we sold in 2017 and 2018, respectively, we d a net income from continuing operations of $1.2 million for the year ended December 31, 2018 and a net loss from continuing operations of $1.3 million for the year ended December 31, 2017.

ncur increasing expenses as we seek to expand our business, including expenses for research and development, sales ing and manufacturing capabilities. We may continue to grow our business in part through acquisitions of additional companies and complementary technologies, which could cause us to incur transaction expenses, amortization or

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f intangible assets and goodwill and other acquisition-related expenses. As a result, we may incur net losses in future periods, and these losses could be substantial.

Acquisition of General Photonics Corporation.

rch 1, 2019, we acquired all of the outstanding stock of General Photonics Corporation ("GP"), a leading provider of tive components, modules and test equipment focused on the generation, measurement and control of polarized light fiber optic-based applications for aggregate consideration of $19.0 million. Of the purchase price, $17.1 million was t closing and $1.9 million was placed into escrow for possible working capital adjustments to the purchase price and sfaction of certain post-closing indemnification obligations. Additionally, we can become obligated to pay additional sideration of up to $1.0 million if certain revenue targets for the GP historical business are met for the twelve months following the closing.

Acquisition of Micron Optics, Inc.

r 15, 2018, we acquired the assets of the United States operations of Micron Optics, Inc. ("MOI"), a leading provider vative optical components and laser-based equipment that advance the quality of optical measurements, allowing the maging, and telecommunications industries to make critical measurements for total cash consideration of $5 million, ding $4.0 million paid at closing and $1.0 million placed in escrow until the later of October 1, 2019, or the date that ters are resolved as agreed by us and MOI. The purchase price was subject to adjustment after closing based upon an final working capital compared to a target amount specified in the purchase agreement. In 2019, we expect to pay an .5 million to MOI in connection with the working capital adjustment. With the acquisition of MOI, we expanded our and product portfolio to include optical sensors and sensing interrogators capable of a broader range of measurement es, including higher speed measurements such as vibration, and the ability to instrument larger structures over longer ces. In addition, the MOI acquisition adds a product suite of tunable optical filters, optical sensors, and swept lasers.

Sale of Luna Optoelectronics Business

018, we sold substantially all of the assets associated with our custom optoelectronic components and sub-assemblies ess for total cash consideration of $17.5 million, paid at closing, in addition to contingent consideration of up to $1.0 The contingent consideration is subject to the optoelectronic business achieving specified revenue targets for the 18 l following the closing date. In addition, the purchase price was subject to adjustment based upon an analysis of final apital as of the acquisition date compared to a target amount specified in the purchase agreement. Following closing, and additional $0.7 million in connection with the working capital adjustment. We have been engaged since 2015 in the optoelectronic business as part of our acquisition of Advanced Photonix, Inc.

Sale of High Speed Optical Receiver Business

2017, we completed the sale of our high speed optical receivers ("HSOR") business, which was part of our Products g segment, to an unaffiliated third party for an initial purchase price of $33.5 million, of which $29.5 million in cash eived, and $4.0 million was placed into escrow until December 15, 2018 for possible working capital adjustments to e price and potential satisfaction of certain post-closing indemnification obligations. As of December 31, 2018, $1.5 escrow balance had been received. The remaining $2.5 million remains in the escrow account pending resolution of a dispute over certain indemnity claims by the buyer.

Description of Our Revenues, Costs and Expenses

Revenues

revenues from technology development, product sales and commercial product development and licensing activities. erive Technology Development segment revenues from providing research and development services to third parties, g government entities, academic institutions and corporations, and from achieving milestones established by some of acts. In general, we complete contracted research over periods ranging from six months to three years, and recognize enues over the life of the contract as costs are incurred. Our Technology Development segment revenues represented approximately 49% and 56% of our total revenues for the years ended December 31, 2018 and 2017, respectively. oducts and Licensing segment revenues reflect amounts that we receive from sales of our products or development of ts for third parties and, to a lesser extent, fees paid to us in connection with licenses or sub-licenses of certain patents

intellectual property. Products and licensing revenues represented approximately 51% and 44% of our total revenues for the years ended December 31, 2018 and 2017, respectively.

Cost of Revenues

venues associated with Technology Development segment revenues consists of costs associated with performing the ated research activities including direct labor, amounts paid to subcontractors and overhead allocated to Technology Development segment activities.

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

Operating Expense

xpense consists of selling, general and administrative expenses, as well as expenses related to research, development ing, depreciation of fixed assets and amortization of intangible assets. These expenses also include compensation for es in executive and operational functions including certain non-cash charges related to expenses from equity awards, ties costs, professional fees, salaries, commissions, travel expense and related benefits of personnel engaged in sales, g, and administrative activities; costs of marketing programs and promotional materials; salaries, bonuses and related nefits of personnel engaged in our own research and development beyond the scope and activities of our Technology t segment; product development activities not provided under contracts with third parties; and overhead costs related to these activities.

Interest Expense, Net

rm loan with Silicon Valley Bank ("SVB") which is scheduled to mature in May 2019. The term loan carries interest le rate of prime plus 2%. At December 31, 2018, we had $0.6 million in the aggregate outstanding on this term loan. ne years ended December 31, 2018 and 2017, interest expense primarily included interest accrued on our outstanding SVB debt and interest incurred with respect to our capital lease obligations.

Critical Accounting Policies and Estimates

Technology Development Revenues

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

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

e typical payment terms of our U.S. government contracts, the customer pays us either performance-based payments r progress payments. PBPs, which are typically used in the firm fixed price contracts, are interim payments based on ble measures of performance or on the achievement of specified events or milestones. Progress payments, which are ly used in our cost type contracts, are interim payments based on costs incurred as the work progresses. For our U.S. t cost-type contracts, the customer generally pays us during the performance period for 80%-90% of our actual costs ause the customer retains a small portion of the contract price until completion of the contract and audit of allowable costs, cost type contracts generally result in revenue recognized in excess of billings which

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contract assets on the balance sheet. Amounts billed and due from our customers are classified as receivables on the et. For non-U.S. government contracts, we typically receive interim payments as work progresses, although for some may be entitled to receive an advance payment. We recognize a liability for these advance payments and PBPs paid which are in excess of the revenue recognized and present these amounts as contract liabilities on the balance sheet.

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

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

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

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

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

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

method.

rtain costs under government contracts are allowable is subject to audit by the government. Certain indirect costs are contracts using provisional or estimated indirect rates, which are subject to later revision based on government audits se costs. Management is of the opinion that costs subsequently disallowed, if any, would not likely have a significant venues recognized for those contracts. We have agreed on final billing rates with the government through December 31, 2017.

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Products and Licensing Revenues

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

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

ne product rental contracts, a customer may be offered a discount on the purchase of an item that would provide for a right. When a material right has been provided to a customer, a separate performance obligation is established and a ne rental revenue will be deferred until the future product is purchased or the option expires. This deferred revenue is s a contract liability on the balance sheet. In certain circumstances we may offer a "right of return" to a distributor of cts, in which case a contract liability is calculated based on the terms of the agreement and recorded as a reduction to In addition, a contract asset for the rights to recover products from customers and a reduction of cost of sales is also calculated and recorded.

Income Taxes

our tax liability through calculating our current tax liability, together with assessing temporary differences resulting n the different treatment of items for tax and accounting purposes. These differences result in deferred tax assets and ities, which we record on our balance sheet. Management then assesses the likelihood that deferred tax assets will be ered in future periods. In assessing the need for a valuation allowance against the net deferred tax asset, management

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s factors such as future reversals of existing taxable temporary differences, taxable income in prior carry back years, er carry back is permitted under the tax law, tax planning strategies and estimated future taxable income exclusive of mporary differences and carry forwards. To the extent that we cannot conclude that it is more likely than not that the benefit of such assets will be realized, we establish a valuation allowance to reduce their net carrying value. ss our projections of future taxable income or other factors that may impact our ability to generate taxable income in periods, our estimate of the required valuation allowance may change, which could have a material impact on future earnings or losses.

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

to differences between federal and state tax law, and accounting principles generally accepted in the United States of ca ("GAAP") certain items are included in the tax return at different times than when those items are reflected in the financial statements. Therefore, the annual tax rate reflected in our consolidated financial statements is different than in our tax return. Some of these differences are permanent, such as expenses that are not deductible in our tax return. nces, such as depreciation expense, reverse over time and create deferred tax assets and liabilities. The tax rates used e deferred tax assets or liabilities are the enacted tax rates in effect for the year in which the differences are expected Based on the evaluation of all available information, we recognize future tax benefits, such as net operating loss carry forwards, to the extent that realizing these benefits is considered more likely than not.

er 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act tax reform legislation. This kes significant changes in U.S. tax law including a reduction in the corporate tax rates, changes to net operating loss ds and carrybacks, and a repeal of the corporate alternative minimum tax. The legislation reduced the U.S. corporate m the current rate of 35% to 21%. As a result of the enacted law, we were required to revalue deferred tax assets and at the enacted rate. This revaluation resulted in a $1.9 million reduction in the deferred tax asset and a corresponding ction in the valuation allowance in 2017. In 2018, we realized a benefit of $0.6 million in recovery of the alternative x credit from prior periods. The other provisions of the Tax Cuts and Jobs Act did not have a material impact on our financial statements.

Stock-Based Compensation

gnize stock-based compensation expense based upon the fair value of the underlying equity award on the date of the alculation of the fair value of our awards requires certain inputs that are subjective and changes to the estimates used he fair values of our stock awards and related stock-based compensation expense to vary. We have elected to use the holes-Merton ("Black-Scholes") option pricing model to determine the fair value of stock options. The fair value of a option award is affected by our stock price on the date of the grant as well as other assumptions used as inputs in the odel including the estimated volatility of our stock price over the term of the awards, the estimate period of time that mployees to hold their stock options and the risk-free interest rate assumption. In addition, we are required to reduce k-based compensation expense for the effects of estimated forfeitures of awards over the expense recognition period. Although we estimate the rate of future forfeitures based on historical experience, actual forfeitures may differ.

Long-lived and Intangible Assets

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

Goodwill

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

Business Combinations

ccount for business combinations under the acquisition method of accounting. Under this method, the total estimated nsideration is allocated to the acquired tangible and intangible assets and assumed liabilities based on their estimated as of the acquisition date. Any excess of the fair value of acquisition consideration over the fair value of identifiable assets acquired and liabilities assumed is recorded as goodwill.

Results of Operations

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

	Years ended December 31,	
	2018	2017
Revenues:		
Technology development	48.9 %	56.2 %
Products and licensing	51.1	43.8
Total revenues	100.0	100.0
Cost of revenues:		
Technology development	35.9	42.3
Products and licensing	18.8	17.3
Total cost of revenues	54.7	59.6
Gross profit	45.3	40.4
Operating expense	43.2	47.1
Operating income/(loss)	2.1	(6.7)
Total other income/(expense)	1.0	(0.6)
Income/(loss) from continuing operations before income taxes	3.1	(7.3)
Income/(loss) from continuing operations, net of income taxes	2.9	(3.8)
Income from discontinued operations, net of income taxes	22.8	48.0
Net income	25.7 %	44.2 %

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Revenues

	Years ended December 31,			
	2018	2017	$ Difference	% Difference
Technology development revenues	$20,967,556	$18,576,383	$2,391,173	12.9 %
Products and licensing revenues	21,949,689	14,505,482	7,444,207	51.3 %
Total revenues	$42,917,245	$33,081,865	$9,835,380	29.7 %

ology Development segment revenues increased $2.4 million to $21.0 million for the year ended December 31, 2018 red to $18.6 million for the year ended December 31, 2017. This increase was attributable primarily to growth in our gent systems and biomedical technologies groups. Revenues within these groups increased due to additional contract awards, including higher value Phase II SBIR contracts.

ducts and Licensing segment revenues increased $7.4 million to $21.9 million for the year ended December 31, 2018 $14.5 million for the year ended December 31, 2017. This increase was primarily driven by an increase in our sales backscatter reflectometer instruments and ODiSI instruments. In addition, revenues associated with the operations of ch we acquired on October 15, 2018, were $2.6 million for the period from the completion of the acquisition through December 31, 2018.

Cost of Revenues

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	Years ended December 31,			
	2018	2017	$ Difference	% Difference
Technology development costs	$15,400,475	$13,988,378	$1,412,097	10.1 %
Products and licensing costs	8,078,870	5,724,457	2,354,413	41.1 %
Total costs of revenues	$23,479,345	$19,712,835	$3,766,510	19.1 %

chnology Development segment costs increased $1.4 million, to $15.4 million for the year ended December 31, 2018 d to $14.0 million for the year ended December 31, 2017. The overall increase in Technology Development segment osts was driven by increases in direct labor and subcontractor costs consistent with the rate of growth in Technology Development segment revenues.

r Products and Licensing segment costs increased $2.4 million to $8.1 million for the year ended December 31, 2018 o $5.7 million for the year ended December 31, 2017. The increase in product and licensing cost is attributable to the costs associated with increased volume of optical backscatter reflectometer and ODiSI instrument sales. In addition, venues associated with the operations of MOI were $0.7 million for the period from the completion of the acquisition December 31, 2018. Products and Licensing segment costs increased in accordance with the increase in Products and Licensing segment revenues over the same period taking into account the gross margin effect of the product mix.

Operating Expense

	Years ended December 31,			
	2018	2017	$ Difference	% Difference
Selling, general and administrative expense	$14,794,205	$12,923,841	$1,870,364	14.5 %
Research, development and engineering expense	3,766,160	2,653,337	1,112,823	41.9 %
Total operating expense	$18,560,365	$15,577,178	$2,983,187	19.2 %

, general and administrative expenses increased $1.9 million to $14.8 million for the year ended December 31, 2018 to$12.9 million for the year ended December 31, 2017. The increase in selling, general and administrative expenses ded $0.8 million in transaction-related expenses associated with the acquisition of MOI and $0.5 million in expenses ciated with the operations of MOI for the period from the completion of the acquisition through December 31, 2018.

development and engineering expenses increased $1.1 million to $3.8 million for the year ended December 31, 2018 $2.7 million for the year ended December 31, 2017. During 2018, we increased our headcount and other expenses in within our Lightwave division in order to accelerate our product development roadmap to continue our growth in the eas of fiber optic-based sensing and communications testing. In addition, the operations of research development and neering expense associated with the operations of MOI for the period from the completion of the acquisition through December 31, 2018 were $0.3 million.

Interest Expense, Net

nterest expense was $0.1 million for the year ended December 31, 2018 compared to $0.2 million for the year ended 31, 2017. The average monthly loan balance for the year ended December 31, 2018 was $1.5 million as compared to $3.3 million for the year ended December 31, 2017, resulting in this decrease in interest expense.

Investment Income

ment income was $0.5 million for the year ended December 31, 2018. During the year ended December 31, 2018, we d a portion of our cash in funds holding U.S. treasury securities. We did not have any investment income for the year ended December 31, 2017.

Income Tax Expense/(Benefit) from Continuing Operations

year ended December 31, 2018, we recorded income tax expense of $47,818, or 3.7% of our income from continuing ompared to an income tax benefit of $1.1 million, or 47.9% of our loss from continuing operations for the year ended 31, 2017. The change resulted from the recognition of income from continuing operations in 2018 compared to a loss from continuing operations in 2017. The income tax benefit recognized in 2017 was also driven by the

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in associated with the discontinued operations of our former HSOR and optoelectronic components business and the related intraperiod tax allocation requirements.

Net Income/(Loss) From Continuing Operations

ar ended December 31, 2018, we recognized income from continuing operations before income taxes of $1.3 million a loss from continuing operations before income taxes of $2.4 million for the year ended December 31, 2017. After t income from continuing operations was $1.2 million for the year ended December 31, 2018, compared to a net loss from continuing operations of $1.3 million for the year ended December 31, 2017.

Income from Discontinued Operations, Net of Income Taxes

nded December 31, 2018, we recognized income from discontinued operations, net of income taxes, of $9.8 million. e year ended December 31, 2017, we recognized income from discontinued operations, net of income taxes, of $15.9 et income from discontinued operations for the year ended December 31, 2018, included an after tax gain recognized of our optoelectronics business during 2018 of $8.6 million in addition to $1.2 million of after-tax income associated erations of the optoelectronics business prior to its sale. For the year ended December 31, 2017, our net income from ntinued operations included a $15.7 million after tax gain recognized on the sale of the HSOR business in addition to ome of $0.2 million related to the operations of both the HSOR and optoelectronics businesses that were disposed of during 2017 and 2018, respectively.

Preferred Stock Dividend

ary 2010, we issued 1,321,514 shares of our newly designated Series A Convertible Preferred Stock to Carilion. The onvertible Preferred Stock carries an annual cumulative dividend of 6%, or approximately 79,292 shares of common ear. During each of 2018 and 2017, we accrued $0.3 million and $0.1 million, respectively, for the dividends payable lion. The dividends are not payable in cash, but rather in shares of our common stock, until liquidation event occurs. of 2018 and 2017, 79,292 shares of common stock became issuable to Carilion as dividends and have been recorded in the statement of changes in stockholders' equity.

Liquidity and Capital Resources

r 31, 2018, our total cash and cash equivalents were $42.5 million. As described elsewhere in this report, subsequent to year end, we used $19.0 million of cash to purchase GP.

a term loan with SVB which, at December 31, 2018, had a balance of $0.6 million and matures on May 1, 2019. We y prepay amounts due under the term loan at any time, subject to prepayment penalties of up to 2% of the amount of ment. Amounts due under the term loan are secured by substantially all of our assets, including intellectual property, personal property and bank accounts.

loan contains customary events of default, including nonpayment of principal, interest or other amounts, violation of naterial adverse change, an event of default under any subordinated debt documents, incorrectness of representations s in any material respect, bankruptcy, judgments in excess of a threshold amount, and violations of other agreements a threshold amount. If any event of default occurs SVB may declare due immediately all borrowings under the credit oreclose on the collateral. Furthermore, an event of default under the credit facility would result in an increase in the erest rate on any amounts outstanding. The credit facility requires us to comply with certain operational and financial nants, including maintaining a minimum cash balance of at least $4.0 million. As of December 31, 2018, we were in compliance with all covenants under the credit facility.

We maintain a letter-of-credit in the amount of $1.0 million as a condition of our lease on our Blacksburg office. elieve that our cash and cash equivalents as of December 31, 2018 will provide adequate liquidity for us to meet our pital needs over the next twelve months. Additionally, we believe that should we have the need for increased capital 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 and cash equivalents.

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Discussion of Cash Flows

	Years ended December 31,	
	2018	2017
Net cash (used in)/provided by operating activities	$(3,308,825)	$915,042
Net cash provided by investing activities	10,037,123	26,181,400
Net cash used in financing activities	(1,249,564)	(2,917,367)
Net increase in cash and cash equivalents	$5,478,734	$24,179,075

8, operations used $3.3 million of net cash, as compared to 2017, when operations provided $0.9 million of net cash. ur net income of $11.0 million included a gain on the sale of our optoelectronics business, net of income tax, of $8.6 nd non-cash expenses which did not impact cash flow for the period. These non-cash expenses were depreciation and of $1.2 million, and stock-based compensation of $0.6 million. Additionally, changes in working capital resulted in cash outflow of $7.6 million, principally driven by an increase in accounts receivable of $6.2 million, an increase in f $1.0 million, an increase in contract assets of $0.8 million and decreases in accounts payable and accrued expenses $0.5 million and contract liabilities of $1.0 million, partially offset by a decrease in prepaid expenses of $1.8 million. , our net income of $14.6 million included after-tax income from discontinued operations of $15.7 million as well as for depreciation and amortization of $2.5 million and stock-based compensation of $0.7 million, each of which were ash items that do not impact cash flow for the period. Additionally, changes in working capital resulted in a net cash f $1.4 million, principally driven by an increase in inventory of $1.9 million and an increase in accounts payable and accrued liabilities of $0.9 million partially offset by a decrease in accounts receivable of $1.2 million.

ed by investing activities in 2018 consisted primarily of the proceeds from the sale of our optoelectronics business of n, partially offset by payment of $5.0 million related to our acquisition of MOI along with $0.4 million of fixed asset additions and $0.4 million of capitalized intellectual property costs.

ided by investing activities in 2017 consisted primarily of the proceeds from the sale of our HSOR business of $28.0 on, partially offset by a cash outflow of $2.0 million related to the purchase of property and equipment to expand our manufacturing capability as well as capitalized costs associated with securing intellectual property rights.

d in financing activities for the year ended December 31, 2018 was $1.2 million, compared to cash used in financing $2.9 million in 2017. During 2018, we repaid $1.8 million on our term loans with SVB. We also used $0.5 million to ur common stock under our stock repurchase program and received $1.1 million from exercises of stock options and During 2017, we repaid $1.8 million on our outstanding term loan with SVB and also used $1.1 million to repurchase our common stock under our stock repurchase program.

Summary of Contractual Obligations

ng table sets forth information concerning our known contractual obligations as of December 31, 2018 that are fixed and determinable.

	Total	Less than 1 year	1 - 3 years	3 - 5 years	More than 5 years
Long-term debt obligations (1)	$625,000	$625,000	$—	$—	$—
Operating facility leases (2)	4,608,720	1,216,124	1,758,484	1,089,408	544,704
Other leases (3)	147,076	53,052	72,664	21,360	—
Purchase order obligation (4)	752,448	752,448	—	—	—
MOI working capital adjustment (5)	542,983	542,983	—	—	—
Other liabilities (6)	440,000	440,000	—	—	—
Total	$7,116,227	$3,629,607	$1,831,148	$1,110,768	$544,704

lue under our debt obligations to SVB are payable in monthly installments, plus accrued interest, through May 2019.

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e lease our facilities in Blacksburg, Charlottesville and Roanoke, Virginia, Ann Arbor, Michigan, and Atlanta, orgia under operating leases that as of December 31, 2018, are scheduled to expire between December 2018 and cember 2024. Upon expiration of our office leases, we may exercise certain renewal options as specified in the ses. Rental payments associated with these option periods are not included in the table above.

2013 and January 2016, we executed leases in the amounts of $51,000, and $207,000, respectively, for office . These equipment leases expire in 2018 and 2021, respectively.

rder obligations included outstanding orders for inventory purchases. In 2017 and 2018, our Luna Technologies executed non-cancelable purchase orders for a total amount of $2.3 million for multiple shipments of tunable lasers ered over an 18-month period beginning in November 2017.

vorking capital associated with the acquisition of MOI is estimated to be higher than the target value specified in the nase agreement and therefore such excess amount is payable to the stockholders of MOI.

lities include remaining amounts payable for minimum royalty payments for certain licensed technologies payable maining patent terms of the underlying technology.

Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements as defined in Regulation S-K, Item 303(a)(4)(ii).

Inflation

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

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

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

Interest Rate Risk

e derivative financial instruments as a hedge against interest rate fluctuations, and, as a result, interest income earned and cash equivalents and short-term investments is subject to changes in interest rates. However, we believe that the hese fluctuations does not have a material effect on our financial position due to the immediate available liquidity or short-term nature of these financial instruments.

are exposed to interest rate fluctuations as a result of our SVB debt facility having a variable interest rate. We do not y use derivative instruments to alter the interest rate characteristics of our debt. The principal amount of $0.6 million under the term loan as of December 31, 2018, is scheduled to amortize in monthly installments through May 2019. A 1% in the applicable interest rate during 2018 would have had an insignificant impact in our annual interest expense.

Foreign Currency Exchange Rate Risk

ember 31, 2018, all payments made under our research contracts have been denominated in U.S. dollars. Our product gn customers are also generally denominated in U.S. dollars, and we do not receive payments in foreign currency. As are not directly exposed to significant currency gains or losses resulting from fluctuations in foreign exchange rates.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders
Luna Innovations Incorporated

Opinion on the financial statements

dited the accompanying consolidated balance sheets of Luna Innovations Incorporated (a Delaware corporation) and ries (the "Company") as of December 31, 2018 and 2017, the related consolidated statements of operations, changes in rs' equity, and cash flows for each of the two years in the period ended December 31, 2018, and the related notes and tatement schedule included under Item 15(a) (collectively referred to as the "financial statements"). In our opinion, the tatements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and nd the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

Basis for opinion

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

ted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over eporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

cluded performing procedures to assess the risks of material misstatement of the financial statements, whether due to or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, upporting the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting es used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ GRANT THORNTON LLP

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

Arlington, Virginia
March 14, 2019

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CONSOLIDATED BALANCE SHEETS

	December 31, 2018	December 31, 2017
s:		
n equivalents	$42,460,267	$36,981,533
eivable, net	13,037,068	5,929,042
le from sale of HSOR business	2,500,000	4,000,976
s	2,422,495	1,778,142
	6,873,742	4,634,781
ses and other current assets	935,185	1,140,999
held for sale	—	4,336,105
assets	68,228,757	58,801,578
equipment, net	3,627,886	2,854,641
ets, net	3,302,270	1,727,390
	101,008	—
ntract assets	336,820	209,699
	1,995	1,995
ssets held for sale	—	2,627,333
	$75,598,736	$66,222,636
d stockholders' equity		
ties:		
on of long term debt obligations	$619,315	$1,833,333
on of capital lease obligations	40,586	43,665
able	2,395,984	2,111,077
lities	6,597,458	6,547,230
lities	2,486,111	3,318,379
ties held for sale	—	972,451
liabilities	12,139,454	14,826,135
rtion of deferred rent	1,035,974	1,184,438
bt obligations	—	603,007
pital lease obligations	68,978	71,275
es	13,244,406	16,684,855
and contingencies		
equity:		
k, par value $0.001, 1,321,514 shares authorized, issued and outstanding at 2018 and 2017	1,322	1,322
k, par value $0.001, 100,000,000 shares authorized, 29,209,506 and 28,354,822 shares 6,401 and 27,283,918 shares outstanding at December 31, 2018 and 2017, respectively	30,120	29,186
k at cost, 1,253,105 and 1,070,904 shares at December 31, 2018 and 2017, respectively	(2,116,640)	(1,649,746)
id-in capital	85,744,750	83,563,208
deficit	(21,305,222)	(32,406,189)
lders' equity	62,354,330	49,537,781
es and stockholders' equity	$75,598,736	$66,222,636

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

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CONSOLIDATED STATEMENTS OF OPERATIONS

	Years ended December 31, 2018	2017
evelopment	$20,967,556	$18,576,383
licensing	21,949,689	14,505,482
s	42,917,245	33,081,865
ues:		
evelopment	15,400,475	13,988,378
licensing	8,078,870	5,724,457
revenues	23,479,345	19,712,835
	19,437,900	13,369,030
pense:		
al and administrative	14,794,205	12,923,841
elopment and engineering	3,766,160	2,653,337
g expense	18,560,365	15,577,178
ome/(loss)	877,535	(2,208,148)
/(expense):		
e)/income, net	(17,143)	26,106
come	549,580	—
se, net	(124,344)	(217,352)
come/(expense)	408,093	(191,246)
from continuing operations before income taxes	1,285,628	(2,399,394)
xpense)/benefit	(47,818)	1,148,579
oss) from continuing operations	1,237,810	(1,250,815)
ome from discontinued operations, net of income tax expense of $183,921 and	1,170,634	194,692
net of $1,572,244 and $912,298 of related income taxes	8,595,797	15,671,028
discontinued operations, net of income taxes	9,766,431	15,865,720
	11,004,241	14,614,905
k dividend	257,302	146,889
tributable to common stockholders	$10,746,939	$14,468,016
oss) per share from continuing operations:		
	$0.04	$(0.05)
	$0.04	$(0.05)
er share from discontinued operations:		
	$0.35	$0.58
	$0.30	$0.58
er share attributable to common stockholders:		
	$0.39	$0.52
	$0.33	$0.52
rage shares:		
	27,596,401	27,579,988
	32,452,228	27,579,988

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

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CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY

	Preferred Stock		Common Stock		Treasury Stock		Additional Paid in Capital	Accumulated Deficit	Total
	Shares	$	Shares	$	Shares	$	$	$	$
ry 1,	1,321,514	$1,322	27,541,277	$28,600	446,827	$(517,987)	$82,451,958	$(46,874,205)	$35,089,688
k	—	—	83,888	84	—	—	99,769	—	99,853
	—	—	147,333	287	—	—	714,807	—	715,094
	—	—	135,497	136	—	—	149,864	—	150,000
(1)	—	—	—	79	—	—	146,810	(146,889)	—
sury	—	—	(624,077)	—	624,077	(1,131,759)	—	—	(1,131,759)
	—	—	—	—	—	—	—	14,614,905	14,614,905
mber 31,	1,321,514	$1,322	27,283,918	$29,186	1,070,904	$(1,649,746)	$83,563,208	$(32,406,189)	$49,537,781
ge in cy	—	—	—	—	—	—	—	354,028	354,028
e as 018	1,321,514	1,322	27,283,918	29,186	1,070,904	(1,649,746)	83,563,208	(32,052,161)	49,891,809
k rants	—	—	442,425	441	—	—	1,096,592	—	1,097,033
	—	—	282,394	282	—	—	627,857	—	628,139
	—	—	129,865	131	—	—	199,871	—	200,002
(1)	—	—	—	80	—	—	257,222	(257,302)	—
sury	—	—	(182,201)	—	182,201	(466,894)	—	—	(466,894)
	—	—	—	—	—	—	—	11,004,241	11,004,241
mber 31,	1,321,514	$1,322	27,956,401	$30,120	1,253,105	$(2,116,640)	$85,744,750	$(21,305,222)	$62,354,330

dividends payable in connection with the Series A Convertible Preferred Stock are issuable upon the request of

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

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CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years ended December 31,	
	2018	2017
flows (used in)/provided by operating activities:		
come	$11,004,241	$14,614,905
tments to reconcile net income to net cash (used in)/provided by operating activities:		
ciation and amortization	1,218,559	2,526,609
-based compensation	627,856	715,094
on disposal of fixed assets	(1,000)	3,640
on sale of discontinued operations, net of income taxes	(8,595,797)	(15,671,028)
ebt	6,000	99,888
ges in operating assets and liabilities:		
unts receivable	(6,240,377)	1,152,055
act assets	(761,714)	—
tory	(967,797)	(1,902,311)
assets	1,849,630	83,428
unts payable and accrued expenses	(461,928)	(896,534)
act liabilities	(986,498)	—
red revenue	—	189,296
ash (used in)/provided by operating activities	(3,308,825)	915,042
flows provided by investing activities:		
sition of property and equipment	(386,890)	(1,352,531)
eds from sale of property and equipment	1,000	3,000
gible property costs	(374,766)	(495,597)
sition of Micron Optics	(5,001,750)	—
eds from sale of discontinued operations, net	15,799,529	28,026,528
ash provided by investing activities	10,037,123	26,181,400
flows used in financing activities:		
ents on debt obligations	(1,833,333)	(1,833,333)
ents on capital lease obligations	(46,653)	(52,128)
ase of treasury stock	(466,894)	(1,131,759)
eds from the exercise of options and warrants	1,097,316	99,853
ash used in financing activities	(1,249,564)	(2,917,367)
hange in cash and cash equivalents	5,478,734	24,179,075
and cash equivalents—beginning of period	36,981,533	12,802,458
and cash equivalents—end of period	$42,460,267	$36,981,533
emental disclosure of cash flow information		
paid for interest	$117,616	$209,497
paid for income taxes	$1,846,037	$377,907
received for income tax refunds	$17,834	$—
non stock issued pursuant to restricted stock vesting	$200,202	$150,000
end on preferred stock	$257,302	$146,889

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

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Organization and Summary of Significant Accounting Policies

Luna Innovations Incorporated (“we” or the "Company”), headquartered in Roanoke, Virginia, was incorporated in the Commonwealth of Virginia in 1990 and reincorporated in the State of Delaware in April 2003.

der in advanced optical technology, providing high performance fiber optic test products for the telecommunications d distributed fiber optic sensing products for industries utilizing composite and other advanced materials, such as the otive, aerospace, energy and infrastructure industries. Our distributed fiber optic sensing products help designers and rers more efficiently develop new and innovative products by providing valuable information such as highly detailed ain, and temperature measurements of a new design or manufacturing process. In addition, our distributed fiber optic ucts are used to monitor the structural integrity or operational health of critical assets, including large civil structures ges. Our communications test products accelerate the development of advanced fiber optic components and networks ng fast and highly accurate characterization of components and networks. We also provide applied research services, ally under research programs funded by the U.S. government, in areas of advanced materials, sensing, and healthcare Our business model is designed to accelerate the process of bringing new and innovative products to market. We use -house technical expertise across a range of technologies to perform applied research services for companies and for funded projects. We continue to invest in product development and commercialization, which we anticipate will lead to increased product sales growth.

Consolidation Policy

olidated financial statements are prepared in accordance with accounting principles generally accepted in the United AAP") and include our accounts and the accounts of our wholly owned subsidiaries. We eliminate from our financial results all intercompany transactions.

Reclassifications

n amounts in the prior period have been reclassified to conform to current presentation. As a result of the adoption of unting Standards Codification ("ASC") 2014-09, Revenue from Contracts with Customers (Topic 606), we presented tled contract assets and contract liabilities within the consolidated balance sheet as well as the impact of the changes ances within the consolidated statement of cash flows. We reclassified comparable balances within the December 31, nsolidated balance sheet as well as the impact of changes in those balances within the consolidated statement of cash n order to enhance comparability. These reclassifications had no effect on our reported financial condition, results of or cash flows. Any other reclassifications were immaterial to the consolidated interim financial statements taken as a whole.

Use of Estimates

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

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

Technology Development Revenues

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

with agencies of the U.S. government are subject to periodic funding by the respective contracting agency. Funding ct may be provided in full at inception of the contract or ratably throughout the contract as the services are provided. ting the probability of funding for purposes of assessing collectability of the contract price, we consider our previous experience with our customers, communication with our customers regarding funding status and our knowledge of

able funding for the contract or program. If funding is not assessed as probable, revenue recognition is deferred until realization is reasonably assured.

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

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

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

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

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

cost reimbursable contracts to be earned in proportion to the allowable costs incurred in performance of the contract.

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

contracts may include either a product delivery or specific service performance throughout a period. For fixed price that are based on the proportional performance method and involve a specified number of deliverables, we recognize revenue based on the proportion of the cost of the deliverables compared to the cost of all deliverables included in

ntract as this method more accurately measures performance under these arrangements. For fixed price contracts that the development and delivery of a specific prototype or product, revenue is recognized based upon the percentage of completion method.

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

Product Sales Revenues

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

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

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

er controlled asset, revenue is recognized over time by the output method using the performance to date. For royalty apply the practical expedient "royalty exception" recognizing revenue based on the royalty agreement which specifies an amount based on sales or minimum amount, whichever is greater.

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

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d as a contract liability on the balance sheet. In certain circumstances we may offer a "right of return" to a distributor cts, in which case a contract liability is calculated based on the terms of the agreement and recorded as a reduction to In addition, a contract asset for the rights to recover products from customers and a reduction of cost of sales is also calculated and recorded.

Allowance for Uncollectible Receivables

nts receivable are recorded at their face amount, less an allowance for doubtful accounts. We review the status of our eceivables on a regular basis. In determining the need for an allowance for uncollectible receivables, we consider our rs' financial stability, past payment history and other factors that bear on the ultimate collection of such amounts. The allowance was $0.3 million at each of December 31, 2018 and 2017.

Cash Equivalents

all highly liquid investments with maturities of three months or less when purchased to be cash equivalents. To date, e not incurred losses related to cash and cash equivalents. Cash equivalents at December 31, 2018 and 2017 included n and $25.2 million, respectively, invested in U.S. Treasury obligations through a sweep account with our bank. The ue of amounts invested through the sweep account are convertible to cash on a daily basis. Our cash transactions are d through reputable commercial banks. We regularly maintain cash balances with financial institutions which exceed Deposit Insurance Corporation ("FDIC") insurance limits. At December 31, 2018 and 2017, we had approximately $4.0 million and $11.5 million, respectively, in excess of FDIC insured limits.

outstanding term loans that require us to comply with certain financial covenants, including maintaining a minimum cash balance of at least $4.0 million.

Fair Value Measurements

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

- Level 1—Quoted prices for identical instruments in active markets.
- oted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that ; 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.

values of cash and cash equivalents, accounts receivable and accounts payable approximate fair value because of the rm nature of these instruments. We consider the terms of the Silicon Valley Bank ("SVB") debt facility including its interest rate of prime plus 2%, to be at market based upon similar instruments that would be available to us.

Property and Equipment

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

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

Intangible Assets

e assets consist of patents related to certain intellectual property that we have developed or acquired and identifiable gible assets recognized in connection with our merger with Advanced Photonix, Inc. ("API") and Micron Optics, Inc. amortize our identified intangible assets over their estimated useful lives ranging between one and eleven years, and reasonableness of the remaining useful life whenever events or circumstances indicate that the carrying amount may not be recoverable to determine whether their carrying value has been impaired.

Goodwill

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

Research, Development and Engineering

, development and engineering expenses not related to contract performance are expensed as incurred. We expensed million and $2.7 million of non-contract related research, development and engineering expenses for the year ended December 31, 2018 and 2017, respectively.

Valuation of Long-Lived Assets

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

Inventory

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

Net Income/(Loss) per Share

r share data is computed by dividing net income/(loss) attributable to common stockholders by the weighted average shares outstanding during the period. Diluted per share data is computed by dividing net income/(loss) attributable to ckholders by the weighted average shares outstanding during the period increased to include, if dilutive, the number l common share equivalents that would have been outstanding if potential common shares had been issued using the ck method. Diluted per share data would also include the potential common share equivalents relating to convertible securities by application of the if-converted method.

effect of 4.9 million common stock equivalents (which include outstanding warrants, preferred stock, accrued stock nd stock options) are included for the diluted per share data for the year ended December 31, 2018. The effect of 4.3 mmon stock equivalents (which include outstanding warrants, preferred stock and stock options) are not included for ended December 31, 2017, as they are anti-dilutive to earnings per share due to us having a net loss from continuing operations.

Stock-Based Compensation

e two stock-based compensation plans, which are described further in Note 10. We recognize compensation expense he fair value of the underlying equity award as of the date of grant. We have elected to use the Black-Scholes option odel to value any stock options granted. Restricted stock and restricted stock units awarded are valued at the closing common stock on the date of the award. We recognize stock-based compensation for such awards on a straight-line ver the requisite service period of the awards taking into account the effects of the employees' expected exercise. We reduce stock-based compensation expense for the value of any forfeitures of vested awards as such forfeitures occur. e expense for equity instruments issued to non-employees based upon the fair value of the equity instruments issued.

Advertising

he cost of advertising as incurred. Advertising expenses were $0.1 million for each of the years ended December 31, 2018 and 2017.

Income Taxes

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

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nize deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the al statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and es are measured using enacted tax rates in effect for the year in which those temporary differences are expected to be settled. We evaluate our ability to benefit from all deferred tax assets and establish valuation allowances for amounts ve are not more-likely-than-not to be realizable. For uncertain tax positions, we use a more-likely-than-not threshold, 51% or greater, based on the technical merits of the income tax position taken. Income tax positions that meet the e-likely-than-not recognition threshold are measured in order to determine the tax benefit recognized in the financial Penalties, if probable and reasonably estimable, and interest expense related to uncertain tax positions are recognized as a component of the tax provision.

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

Recent Accounting Pronouncements

January 1, 2018, we adopted Revenue from Contracts with Customers (Topic 606), using the modified retrospective method. Under the modified retrospective approach, we apply the standards to new contracts and those that were not as of January 1, 2018. For those contracts not completed as of January 1, 2018, this method resulted in a cumulative stment to decrease the accumulated deficit in the net amount of $0.4 million. Prior periods will not be retrospectively ut we will maintain dual reporting for the year of initial application in order to maintain comparability of the periods e cumulative effect of the changes made to our January 1, 2018 consolidated balance sheet for the adoption of Topic 606 was as follows:

	Balance at December 31, 2017	Adjustment for Topic 606	Adjusted balance at January 1, 2018
Assets:			
Current assets held for sale	$4,336,105	$ 379,891	$4,715,996
Liabilities:			
Contract liabilities	$3,318,379	$ 2,250	$3,320,629
Current liabilities held for sale	$862,205	$ 23,613	$885,818
Stockholders' equity:			
Accumulated deficit	$(32,406,189)	$ 354,028	$(32,052,161)

assets were formerly reported as unbilled accounts receivable. Contract liabilities were formerly reported as accrued deferred revenue. Inventory was also impacted by the adoption of the new guidance. The titles have been changed in the table below to be consistent with accounts currently used under the new standard.

	December 31, 2017	
	As Reported	As Adopted
Accounts receivables, net	$9,857,009	$5,929,042
Contract assets	—	1,778,142
Current assets held for sale	—	1,940,126
Long-term contract assets	—	209,699
Accrued liabilities	8,959,935	6,547,230

Contract liabilities	—	3,318,379
Current liabilities held for sale	—	120,665
Deferred revenue	1,026,339	—

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new standard, contracts in our Technology Development segment, which primarily provide research services, are not impacted upon the adoption of Topic 606 as revenue will continue to be recognized over time using an input model. s in our Products and Licensing segment generally provide for the following revenue sources: standard product sales, uct development and sales, product rental, extended warranties, training/service, and certain royalties. Revenues for egment are recognized using either the "point in time" or "over time" methods of Topic 606, depending upon the revenue e. The major change in revenue recognition for the Products and Licensing segment related to custom optoelectronic hich changed from "point in time" to "over time" upon the adoption of Topic 606. This change results in the acceleration when compared to existing standards with the cumulative adjustment relating to contracts that are not complete as of 1, 2017 recognized as an adjustment to opening accumulated deficit on January 1, 2018. The revenue received from optoelectronic products segment is included as part of our discontinued operations (Note 17) and shown above in the ssets and liabilities held for sale as of December 31, 2017. Our revenue for our standard products will continue to be ed using the "point in time" model of Topic 606, and the timing of such revenue recognition is not expected to differ from our historical revenue recognition. Other immaterial adjustments related to the Products and Licensing segment ometimes offered to customers include discounts on future purchases related to rental agreements, customer rights of return, and volume discounts.

Technology Development Revenues

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

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

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

ne the proper revenue recognition method for research and development contracts, we evaluate whether two or more should be combined and accounted for as one single contract and whether the combined or single contract should be for as more than one performance obligation. For instances where a contract has options that were bid with the initial awarded at a later date, we combine the options with the original contract when options are awarded. For most of our e customer contracts for research with multiple milestones that are interdependent. Consequently, the entire contract

nted for as one performance obligation. The effect of the combined or modified contract on the transaction price and of progress for the performance obligation to which it relates, is recognized as an adjustment to revenue (either as an increase in or a reduction of revenue) on a cumulative catch-up basis.

enue recognition is measured over time as we perform because of continuous transfer of control to the customer. For nent contracts which are typically subject to the Federal Acquisition Regulation, this continuous transfer of control to is supported by clauses in the contract that allow the customer to unilaterally terminate the contract for convenience, r cost incurred plus a reasonable profit and take control of any work in process. From time to time, as part of normal management processes, facts may change, causing revisions to estimated total costs or revenues

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e cumulative impact of any revisions to estimates and the full impact of anticipated losses on any type of contract are recognized in the period in which they become known.

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

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

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

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

rtain costs under government contracts are allowable is subject to audit by the government. Certain indirect costs are contracts using provisional or estimated indirect rates, which are subject to later revision based on government audits se costs. Management is of the opinion that costs subsequently disallowed, if any, would not likely have a significant venues recognized for those contracts. We have agreed on final billing rates with the government through December 31, 2017.

Products and Licensing Revenues

e produce standard and customized products for commercial organizations, educational institutions, and U.S. Federal ment agencies. In addition we will also offer extended warranties, product rentals, and services which include testing, repairs for specific products. Customers also pay royalties as agreed based on sales or usage. We account for product ted items when a contract has been executed, the rights of the parties are identified, payment terms are identified, the contract has commercial substance, and collectability of the contract price is considered probable.

mine the proper revenue recognition method for Products and Licensing contracts, we evaluate whether two or more should be combined and accounted for as one single contract and whether the combined or single contract should be nted for as more than one performance obligation. We recognize revenue when the performance obligation has been

y transferring the control of the product or service to the customer. For tangible products that contain software that is o the tangible product's functionality, we consider the product and software to be a single performance obligation and renue accordingly. For contracts with multiple performance obligations, we allocate the contract's transaction price to ance obligation based on their relative stand-alone selling prices. In such circumstances, we use the observable price or services which are sold separately in similar circumstances to similar customers. If these prices are not observable, estimate the stand-alone selling price using information that is reasonably available. For the majority of our standard nd services, price list and discount structures related to customer type are available. For products and services that do e list and discount structures, we may use one or more of the following: (i) adjusted market assessment approach, (ii) expected cost plus a margin approach, and (iii) residual approach. The adjusted market

ch requires us to evaluate the market in which we sell goods or services and estimate the price that a customer in that uld be willing to pay for those goods or services. The expected cost plus margin approach requires us to forecast our osts of satisfying the performance obligation and then add a reasonable margin for that good or service. The residual decreases the total transaction price by the sum of the observable standalone selling prices if either the company sells od or services to different customers for a broad range of amounts or the company has not established a price for the ce and that good or service has not been sold on a standalone basis. Shipping and handling activities primarily occur mer obtains control and are considered fulfillment cost rather than separate performance obligations. Similarly, sales and similar taxes assessed by a governmental authority that are both imposed on and concurrent with a specific ducing transaction and collected by the entity from a customer are excluded from the measurement of the transaction price.

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

ne product rental contracts, a customer may be offered a discount on the purchase of an item that would provide for a right. When a material right has been provided to a customer, a separate performance obligation is established and a ne rental revenue will be deferred until the future product is purchased or the option expires. This deferred revenue is s a contract liability on the balance sheet. In certain circumstances we may offer a "right of return" to a distributor of cts, in which case a contract liability is calculated based on the terms of the agreement and recorded as a reduction to In addition, a contract asset for the rights to recover products from customers and a reduction of cost of sales is also calculated and recorded.

lled performance obligations represent amounts expected to be earned on executed contracts. Indefinite delivery and ntracts and unexercised options are not reported in total unfulfilled performance obligations. Unfulfilled performance bligations include funded obligations, which is the amount for which money has been directly authorized by the U.S. and for which a purchase order has been received by a commercial customer, and unfunded obligations, representing s for which funding has not yet been appropriated. The approximate value of our Technology Development segment lled performance obligations was $26.0 million at December 31, 2018. We expect to satisfy 87% of the performance ions in 2019, 9% in 2020 and the remaining by 2022. The approximate value of our Products and Licensing segment filled performance obligations was $5.8 million at December 31, 2018. We expect to satisfy 95% of the performance obligations in 2019, 4% in 2020 and the remaining by 2023.

ggregate our revenue from contracts with customers by geographic locations, customer-type, contract type, timing of tion, and major categories for each of our segments, as we believe it best depicts how the nature, amount, timing and

uncertainty of our revenue and cash flows are affected by economic factors. See details in the tables below.

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	Three Months Ended December 31, 2018 (unaudited)			Year Ended December 31, 2018		
	Technology Development	Products and Licensing	Total	Technology Development	Products and Licensing	Total
otal Revenue by Geographic Location						
Jnited States	$5,548,639	$3,624,247	$9,172,886	$20,967,556	$11,585,296	$32,552,852
Asia	—	2,697,215	2,697,215	—	5,977,563	5,977,563
Europe	—	1,331,145	1,331,145	—	3,873,161	3,873,161
Canada, Central and South America	—	282,990	282,990	—	382,797	382,797
All Others	—	54,089	54,089	—	130,872	130,872
Total	$5,548,639	$7,989,686	$13,538,325	$20,967,556	$21,949,689	$42,917,245
otal Revenue by Major Customer Type						
Sales to the U.S. government	$5,418,679	$469,534	$5,888,213	$20,703,338	$1,834,289	$22,537,627
J.S. direct commercial sales and other	129,960	3,154,714	3,284,674	264,218	9,737,720	10,001,938
Foreign commercial sales & other	—	4,365,438	4,365,438	—	10,377,680	10,377,680
Total	$5,548,639	$7,989,686	$13,538,325	$20,967,556	$21,949,689	$42,917,245
otal Revenue by Contract Type						
Fixed-price contracts	$2,777,012	$7,989,686	$10,766,698	$9,388,770	$21,949,689	$31,338,459
Cost-type contracts	2,771,627	—	2,771,627	11,578,786	—	11,578,786
Total	$5,548,639	$7,989,686	$13,538,325	$20,967,556	$21,949,689	$42,917,245
otal Revenue by Timing of Recognition						
Goods transferred at a point in time	$—	$7,824,102	$7,824,102	$—	$21,329,999	$21,329,999
Goods/services transferred over time	5,548,639	165,584	5,714,223	20,967,556	619,690	21,587,246
Total	$5,548,639	$7,989,686	$13,538,325	$20,967,556	$21,949,689	$42,917,245
otal Revenue by Major Products/Services						
Technology development	$5,548,639	$—	$5,548,639	$20,967,556	$—	$20,967,556
Optical test and measurement systems	—	7,625,325	7,625,325	—	19,641,434	19,641,434
Optical components and sub-assemblies	—	—	—	—	—	—
Other	—	364,361	364,361	—	2,308,255	2,308,255
Total	$5,548,639	$7,989,686	$13,538,325	$20,967,556	$21,949,689	$42,917,245

owing tables summarize the impacts of adopting Topic 606 on our consolidated financial statements as of and for the three months and year ended December 31, 2018.

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	Impact of changes in accounting policies December 31, 2018		
	As Reported	Adjustments	Balances without adoption of Topic 606
s:			
n equivalents	$42,460,267	$ —	$42,460,267
eivable, net	13,037,068	—	13,037,068
om sale of HSOR business	2,500,000	—	2,500,000
ts	2,422,495	—	2,422,495
	6,873,742	—	6,873,742
ses and other current assets	935,185	—	935,185
assets	68,228,757	—	68,228,757
ntract assets	336,820	—	336,820
equipment, net	3,627,886	—	3,627,886
ets, net	3,302,270	—	3,302,270
	101,008	—	101,008
	1,995	—	1,995
	$75,598,736	$ —	$75,598,736
d stockholders' equity			
ties:			
on of long-term debt obligations	$619,315	$ —	$619,315
on of capital lease obligations	40,586	—	40,586
able	2,395,984	—	2,395,984
lities	6,597,458	—	6,597,458
lities	2,486,111	(3,880)	2,482,231
liabilities	12,139,454	(3,880)	12,135,574
ferred rent	1,035,974	—	1,035,974
pital lease obligations	68,978	—	68,978
es	13,244,406	(3,880)	13,240,526
s and contingencies			
equity:			
k, par value $0.001, 1,321,514 shares authorized, issued and outstanding 31, 2018 and December 31, 2017, respectively	1,322	—	1,322
k, par value $0.001, 100,000,000 shares authorized, 29,209,506 and hares issued, 27,956,401 and 27,283,918 shares outstanding at 2018 and 2017, respectively	30,120	—	30,120
k at cost, 1,253,105 and 1,070,904 shares at December 31, 2018 and 2017, respectively	(2,116,640)	—	(2,116,640)
id-in capital	85,744,750	—	85,744,750
deficit	(21,305,222)	3,880	(21,301,342)
lders' equity	62,354,330	3,880	62,358,210
es and stockholders' equity	$75,598,736	$ —	$75,598,736

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	Impact of changes in accounting policies Three Months Ended December 31, 2018			Year Ended December 31, 2018		
	As reported	Adjustments	Balances without adoption of Topic 606	As reported	Adjustments	Balances without adoption of Topic 606
evelopment	$5,548,639	$ —	$5,548,639	$20,967,556	$ —	$20,967,556
licensing	7,989,686	—	7,989,686	21,949,689	1,630	21,951,319
enues	13,538,325	—	13,538,325	42,917,245	1,630	42,918,875
ues:						
evelopment	4,268,509	—	4,268,509	15,400,475	—	15,400,475
licensing	2,697,538	—	2,697,538	8,078,870	—	8,078,870
t of revenues	6,966,047	—	6,966,047	23,479,345	—	23,479,345
	6,572,278	—	6,572,278	19,437,900	1,630	19,439,530
pense:						
al and administrative	4,896,136	—	4,896,136	14,794,205	—	14,794,205
elopment and engineering	1,252,663	—	1,252,663	3,766,160	—	3,766,160
rating expense	6,148,799	—	6,148,799	18,560,365	—	18,560,365
ome	423,479	—	423,479	877,535	1,630	879,165
:						
e	(1,070)	—	(1,070)	(17,143)	—	(17,143)
come	198,525	—	198,525	549,580	—	549,580
se	(21,136)	—	(21,136)	(124,344)	—	(124,344)
come	176,319	—	176,319	408,093	—	408,093
continuing operations before	599,798	—	599,798	1,285,628	1,630	1,287,258
pense	722,148	—	722,148	47,818	—	47,818
ome from continuing operations	$(122,350)	$ —	$(122,350)	$1,237,810	$ 1,630	$1,239,440

e January 1, 2018, we adopted Accounting Standards Update ("ASU") No. 2016-15, Statement of Cash Flows (Topic addresses eight specific cash flow issues with the objective of reducing the existing diversity in practice in how cash ts and cash payments are presented in the statement of cash flows. The adoption of ASU No. 2016-15 did not have a significant impact on our consolidated financial statements.

y 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842). This standard revises the accounting for leases and essees to recognize, for all leases with terms greater than one year, a right-of-use asset and liability which depicts the igations arising from a lease. This standard also requires qualitative and quantitative disclosures designed to provide regarding the nature, amount and timing of lease expense. The new guidance is not expected to significantly change recognition and measurement of lease expense. It is effective for the first interim and annual periods beginning after 15, 2018, with early adoption permitted. In July 2018, the FASB issued ASU 2018-11, Leases (Topic 842): Targeted ments, permitting the recognition of a cumulative-effect adjustment to retained earnings on the date of adoption. We the standard beginning January 1, 2019 using the alternative transition method. We are finalizing the value as of the te of the right-of-use asset and lease liabilities and estimate that the right-of-use asset will be between $4 million and llion and that the lease liability will be reasonably consistent with the right-of-use asset amounts. We do not expect a

material impact from adopting the new standard on our results of operations or cash flows.

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017, the Financial Accounting Standards Board ("FASB") issued ASU No. 2017-04, Intangibles—Goodwill and Other Simplifying the Test for Goodwill Impairment. This update simplifies the subsequent measurement of goodwill. The removes Step 2 of the goodwill impairment test, which requires a hypothetical purchase price allocation. A goodwill t will now be the amount by which a reporting unit's carrying value exceeds its fair value, not to exceed the carrying goodwill. The accounting standard will be effective for reporting periods beginning after December 15, 2019. We do not expect ASU 2017-04 will have a material impact on our financial statements.

ary 2018, the FASB issued ASU 2018-02: Income Statement – Reporting Comprehensive Income (Topic 220). Under unting guidance, the income tax effects for changes in income tax rates and certain other transactions are recognized m continuing operations resulting in income tax effects recognized in AOCI that do not reflect the current tax rate of (“stranded tax effects”). The new guidance allows us the option to reclassify these stranded tax effects to accumulated hat relate to the change in the federal tax rate resulting from the passage of the Tax Cuts and Jobs Act. This update is r fiscal years beginning after December 15, 2018, including interim periods therein, and early adoption is permitted. e do not expect the adoption of this standard will have a significant impact on our consolidated financial statements.

August 2018, the FASB issued ASU No. 2018-13, Fair Value Measurement (Topic 820): Changes to the Disclosure ements for Fair Value Measurement. which amends the disclosure requirements in ASC 820 by adding, changing, or certain disclosures. The ASU applies to all entities that are required under this guidance to provide disclosures about nonrecurring fair value measurements. These amendments are effective for all entities for fiscal years beginning after ber 15, 2019 including interim periods within those fiscal years. We do not expect ASU 2018-13 will have a material impact on our financial statements.

2. Inventory

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

Components of inventory are as follows:

	December 31,	
	2018	2017
Finished goods	$1,339,832	$762,394
Work-in-process	643,420	288,165
Raw materials	4,890,490	3,584,222
	$6,873,742	$4,634,781

3. Contract Balances

assets consist of unbilled amounts for technology development contracts, custom product contracts, royalty revenue nd the carrying amounts of right of returned inventory. Long-term contract assets include the fee withholding on cost able contracts that will not be billed within a year. Contract liabilities include excess billings, subcontractor accruals, warranty expense, extended warranty revenue, right of return refund, and customer deposits.

The following table shows the significant changes in contract balances for the year ended December 31, 2018:

	Contract Assets	Contract Liabilities
nce as of January 1, 2018	$1,987,841	$3,320,629
gnized that was included in the contract liabilities balance at the beginning of the period	—	(878,402)
payables from contract liabilities recognized at the beginning of the period	—	(2,078,640)
to cash received or adjustment of estimates, excluding amounts recognized as revenue riod	—	2,122,524
receivables from contract assets recognized at the beginning of the period	(1,679,363)	—
result of cumulative catch-up adjustment arising from changes in the estimate of the letion	2,450,837	—
December 31, 2018	$2,759,315	$2,486,111

4. Debt

Silicon Valley Bank Facility

tly have a Loan and Security Agreement with SVB (the "Credit Facility") under which, as amended on May 8, 2015, a term loan with an original borrowing amount of $6.0 million (the “Original Term Loan”). The Original Term Loan is 48 monthly installments of $125,000, plus accrued interest payable monthly in arrears, and unless earlier terminated, to mature in May 2019. The Original Term Loan carries a floating annual interest rate equal to SVB’s prime rate then us 2%. We may prepay amounts due under the Original Term Loan at any time, subject to an early termination fee of up to 2% of the amount of prepayment.

ber 2015, we entered into the Waiver and Seventh Loan Modification Agreement, which provided an additional $1.0 f available financing for purchases of equipment through December 31, 2015, which we fully borrowed in December he "Second Term Loan" and, together with the Original Term Loan, the "Term Loans"). The Second Term Loan was repaid in December 2018.

Facility requires us to maintain a minimum cash balance of $4.0 million and to maintain at each month end a ratio of 0% of accounts receivable greater than or equal to 1.5 times the outstanding principal of the Term Loans. The Credit lity also requires us to observe a number of additional operational covenants, including protection and registration of property rights, and certain customary negative covenants. As of December 31, 2018, we were in compliance with all covenants under the Credit Facility.

s due under the Credit Facility are secured by substantially all of our assets, including intellectual property, personal ty and bank accounts. In addition, the Credit Facility contains customary events of default, including nonpayment of nterest or other amounts, violation of covenants, material adverse change, an event of default under any subordinated uments, incorrectness of representations and warranties in any material respect, bankruptcy, judgments in excess of a amount, and violations of other agreements in excess of a threshold amount. If any event of default occurs SVB may mmediately all borrowings under the Credit Facility and foreclose on the collateral. Furthermore, an event of default Credit Facility would result in an increase in the interest rate on any amounts outstanding. As of December 31, 2018 there were no events of default on the Credit Facility.

gate balance under the Term Loans at December 31, 2018 and December 31, 2017 was $0.6 million and $2.5 million, ely. The remaining term loan, with a balance of $0.6 million as of December 31, 2018, matures on May 1, 2019. The effective rate of our Term Loan at December 31, 2018 was 7%.

The following table presents a summary of debt outstanding:

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	December 31,	
	2018	2017
Silicon Valley Bank Term Loans	$625,000	$2,458,333
Less: unamortized debt issuance costs	5,685	21,993
Less: current portion	619,315	1,833,333
Total long-term debt obligations	$—	$603,007

ance costs associated with the issuance of the SVB Term Loans totaled $55 thousand. Amortization of debt issuance puted using the effective interest method and is included in interest expense. Amortization of the debt issuance costs totaled $16 thousand for the year ended December 31, 2018.

Maturities on outstanding debt are as follows:

Year	Amount
2019	$625,000
Total	$625,000

Interest expense for the years ended December 31, 2018 and 2017 consisted of the following:

	Years ended December 31,	
	2018	2017
Interest expense on Term Loans	$108,062	$201,696
Amortization of debt issuance costs	16,308	16,308
Other interest income	(26)	(652)
Total interest expense	$124,344	$217,352

5. Accounts Receivable, Net

Accounts receivable, net consist of the following:

	December 31,	
	2018	2017
Billed	$13,289,790	$6,189,625
Other	31,361	20,000
	13,321,151	6,209,625
Less: allowance for doubtful accounts	(284,083)	(280,583)
	$13,037,068	$5,929,042

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6. Property and Equipment

Property and equipment, net, consists of the following:

	December 31, 2018	December 31, 2017
Building	$69,556	$69,556
Equipment	9,341,007	8,213,626
Furniture and fixtures	640,890	565,885
Software	1,122,231	1,122,231
Leasehold improvements	4,950,510	4,840,510
	16,124,194	14,811,808
Less—accumulated depreciation	(12,496,308)	(11,957,167)
	$3,627,886	$2,854,641

ion for the years ended December 31, 2018 and 2017 was approximately $0.5 million and $0.7 million, respectively.

7. Intangible Assets

Intangible assets, net consist of the following:

	Estimated Life	December 31, 2018	December 31, 2017
Patent costs	1 - 18 years	$4,991,460	$4,658,198
Developed technology	5 years	2,600,000	1,400,000
In-process research and development	N/A	200,000	—
Customer base	7 years	100,000	—
Trade names	3 years	150,000	—
		8,041,460	6,058,198
Accumulated amortization		(4,739,190)	(4,330,808)
		$3,302,270	$1,727,390

ion for the years ended December 31, 2018 and 2017 was approximately $0.4 million and $0.5 million, respectively.
ed aggregate amortization, based on the net value of intangible assets at December 31, 2018, for each of the next five years and beyond is as follows:

Year Ending December 31,	
2019	$591,120
2020	558,156
2021	535,288
2022	480,219
2023	279,631
2023 and beyond	857,856
	$3,302,270

8. Accrued Liabilities

Accrued liabilities consist of the following:

	December 31,	
	2018	2017
Accrued compensation	$4,467,587	$5,274,005
Accrued professional fees	198,062	117,445
Accrued income tax	236,636	403,547
Deferred rent	146,542	144,740
Royalties	302,428	290,235
Accrued liabilities-other	404,752	317,258
Working capital payable	542,983	—
Liability to related party	298,468	—
Total accrued liabilities	$6,597,458	$6,547,230

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9. Income Taxes

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

	Years ended December 31,	
	2018	2017
Current:		
Federal	$(44,727)	$(1,154,105)
State	92,545	5,526
Deferred federal	—	—
Deferred state	—	—
Income tax expense/(benefit)	$47,818	$(1,148,579)

Deferred tax assets consist of the following components:

	December 31, 2018	December 31, 2017
	Long-Term	Long-Term
Bad debt and inventory reserve	$ 332,721	$ 226,358
Inventory adjustment	(21,785)	405,242
UNICAP	2,804	32,579
Deferred revenue	115,676	84,669
Deferred rent	288,017	340,199
Depreciation and amortization	(838,540)	(1,238,458)
Charitable contributions	—	3,385
Net operating loss carryforwards- Luna	349,421	349,421
Net operating loss carryforwards- API	1,265,538	1,436,568
Net operating loss carryforwards - state	179,149	534,194
Net operating loss carryforwards- Canada	10,503	10,503
Research and development credits	—	235,613
California manufacturing credit	—	15,554
Accrued liabilities	394,118	504,472
Deferred compensation	216,944	223,607
Stock-based compensation	803,757	1,275,372
Restricted stock	60,681	—
State bonus	44,861	—
AMT credit	—	581,467
Transaction costs	63,668	—
Total	3,267,533	5,020,745
Valuation allowance	(3,267,533)	(5,020,745)
Net deferred tax asset	$ —	$ —

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

	Years ended December 31,	
	2018	2017
Income tax expense at federal statutory rate	21.00 %	34.00 %
State taxes, net of federal tax effects	— %	(10.84)%
Change in tax rate from Tax Cuts and Jobs Act	— %	(79.17)%
Change in valuation allowance	(27.65)%	113.86 %
Incentive stock options	(1.05)%	(9.65)%
Provision to return adjustments	21.16 %	3.87 %
Meals and entertainment	0.97 %	(0.65)%
Capitalized merger costs	— %	— %
AMT Carryover	(9.83)%	— %
Other permanent differences	(0.88)%	(3.55)%
Income tax expense/(benefit)	3.72 %	47.87 %

lization of our deferred income tax assets is dependent upon sufficient taxable income in future periods. In assessing her deferred tax assets may be realized, we consider whether it is more likely than not that some portion, or all, of the sset will be realized. We consider scheduled reversals of deferred tax liabilities, projected future taxable income and g strategies that we can implement in making our assessment. We have no U.S. federal income tax net operating loss forwards at December 31, 2018 for Luna and net operating loss carryforwards of approximately $6.0 million for API expiring at varying dates through 2025.

, we performed a formal section 382 study and determined that we do not have a limitation on our net operating loss to offset future income for the Luna net operating losses. As a result of the acquisition of API, the API net operating over and research and development credits will be subject to the Section 382 limitation. A formal Section 382 study d in 2017, and it was determined that there was no ownership changes in 2017 resulting in a limitation on NOLs, but f the net operating losses will expire unutilized. As there is a full valuation allowance against all of the API deferred assets, there will not be a statement of operations impact to any expiration of the net operating losses or research and development credits.

S. federal statute of limitations remains open for the year 2015 and onward. We currently have no federal income tax nder examination. U.S. state jurisdictions have statutes of limitation generally ranging from three to seven years. We ve no state income or franchise tax returns under examination. We currently do not file tax returns in any foreign tax jurisdiction other than Canada.

urrently have no positions for which we expect that the amount of unrecognized tax benefit will increase or decrease ntly within twelve months of the reporting date or for which we believe there is significant risk of disallowance upon ve no tax interest or penalties reported in either our statement of operations or statement of financial position for any orted herein. Management believes it is not more likely than not that the deferred tax assets at December 31, 2018 or , 2017 will not be realized, and as a result a valuation allowance was established against all such deferred tax assets.

January 1, 2018, we adopted ASC Topic 606, Revenue from Contracts with Customers, which changes the timing of venue recognition from recognizing at customer delivery to recognizing over a period of time. The adoption of ASC Topic 606 did not have a significant impact on our consolidated financial statements.

er 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act tax reform legislation. This kes significant changes in U.S. tax law including a reduction in the corporate tax rates, changes to net operating loss carryforwards and carrybacks, and a repeal of the corporate alternative minimum tax. The legislation

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d the U.S. corporate tax rate from the current rate of 35% to 21%. As a result of the enacted law, we were required to erred tax assets and liabilities at the enacted rate. This revaluation resulted in a $1.9 million reduction in the deferred nd a corresponding reduction in the valuation allowance. In 2018, we realized a benefit of $0.7 million in recovery of ve minimum tax credit from prior periods. The other provisions of the Tax Cuts and Jobs Act did not have a material impact on our consolidated financial statements.

10. Stockholders' Equity

Series A Convertible Preferred Stock

2010, we entered into a transaction with Carilion, in which Carilion agreed to exchange all of its Senior Convertible Notes with an original principal amount of $5.0 million plus all accrued but unpaid interest, totaling $1.2 million, for .4 shares of our newly designated Series A Convertible Preferred Stock. The Series A Convertible Preferred Stock is oting, carries a dividend of 6% payable in shares of common stock and maintains a liquidation preference up to $6.2 on. As of December 31, 2018, 710,985 shares of common stock were issuable to Carilion as dividends and have been in the statement of stockholders' equity. These dividends are issuable on demand. Each share of Series A Convertible tock may be converted into one share of our common stock at the option of the holder. We recorded the fair value of Convertible Preferred Stock, determined based upon the conversion value immediately prior to the exchange, the fair new warrant issued to Carilion, determined using the Black-Scholes valuation model, and the incremental fair value of the prior warrant due to the re-pricing and extension of maturity to stockholders' equity.

Equity Incentive Plans

2016, we adopted our 2016 Equity Incentive Plan (the "2016 Plan") as a successor to the 2006 Plan. Under the 2016 ard of Directors is authorized to grant both incentive and non-statutory stock options to purchase common stock and ck awards to our employees, directors, and consultants. The 2016 Plan provides for the issuance of 3,500,000 shares mounts forfeited from grants under the 2006 Plan after the expiration date of the 2006 Plan. Options generally have a rs and exercise price equal to or greater than the fair market value of the Common Stock as determined by the Board of Directors.

Vesting for employees typically occurs over a four-year period.

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

	Options Outstanding				Options Exercisable		
	Number of Shares	Price per Share Range	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)	Number of Shares	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)
Balance at January 1, 2017	2,857,114	$0.61 - 6.83	$ 1.89	$107,063	2,367,630	$ 1.93	$101,071
Forfeited	(178,665)	$1.27 - 6.83	$ 2.24				
Exercised	(83,888)	$0.82 - 1.40	$ 1.19				
Granted	120,000	$1.51 - 2.40	$ 1.82				
Balance at December 31, 2017	2,714,561	$0.61 - 6.55	$ 1.88	$2,098,195	2,590,030	$ 1.89	$2,013,034
Forfeited	(675,607)	$1.15 - 6.55	$ 1.90				
Exercised	(96,425)	$0.65 - 2.46	$ 2.07				
Granted	1,166,339	$2.67 - 3.53	$ 3.09				
Balance at December 31, 2018	3,108,868	$0.61 - 6.55	$ 2.26	$3,669,794	1,986,740	$ 1.81	$3,314,494

sic value of an option represents the amount by which the market value of the stock exceeds the exercise price of the n-the-money options only.

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

	Years ended December 31,	
	2018	2017
Risk-free interest rate range	3.0%	2.05%
Expected life of option-years	7	6.5
Expected stock price volatility	67%	69%
Expected dividend yield	—%	—%

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

		Options Outstanding			Options Exercisable	
	Range of Exercise Prices	Options Outstanding	Weighted Average Remaining Life in Years	Weighted Average Exercise Price	Options Exercisable	Weighted Average Exercise Price of Options Exercisable
Year ended December 31, 2017	$0.61 - 6.55	2,714,561	4.23	$1.88	2,590,030	$1.89
Year ended December 31, 2018	$0.61 - 6.55	3,108,868	5.72	$2.26	1,986,740	$1.81

	Total Intrinsic Value of Options Exercised	Total Fair Value of Options Vested
Year ended December 31, 2017	$ 62,549	$ 3,962,746
Year ended December 31, 2018	$ 112,213	$ 2,980,110

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ars ended December 31, 2018 and 2017, the weighted average grant date fair value of options granted was $2.07 and are, respectively. We estimate the fair value of options at the grant date using the Black-Scholes model. For all stock options granted through December 31, 2018, the weighted average remaining service period is 3.6 years. ized stock option expense at December 31, 2018 that will be amortized over the weighted-average remaining service period of 3.6 years totaled $2.2 million.

Restricted Stock and Restricted Stock Units

2017, we issued 280,000 and 349,000 shares of restricted stock, respectively, to certain employees. Shares issued to est in three equal annual installments on the anniversary dates of their grant. In 2018 and 2017, 182,500 and 530,542 shares of restricted stock vested, respectively.

on, in 2018 and 2017, we issued 16,286 and 129,865, respectively, restricted stock units to members of our Board of n respect of the annual equity compensation under our non-employee director compensation policy. Restricted stock to our Board of Directors vest at the earlier of the one year anniversary of their grant or the next annual stockholders' meeting. In 2018 and 2017, 129,865 and 86,956 restricted stock units, respectively, vested.

following table summarizes our aggregate restricted stock awards and restricted stock unit activity in 2018 and 2017:

	Number of Unvested Shares	Weighted Average Grant Date Fair Value	Aggregate Value of Unvested Shares
Balance at January 1, 2017	829,998	$1.19	$988,763
Granted	478,865	$1.63	$780,252
Vested	(617,498)	$1.23	$(758,653)
Forfeitures	(201,667)	$1.35	$(272,017)
Balance at December 31, 2017	489,698	$1.51	$738,345
Granted	296,287	$3.07	$909,600
Vested	(312,365)	$1.45	$(454,339)
Forfeitures	(15,000)	$1.41	$(21,150)
Balance at December 31, 2018	458,620	$2.56	$1,172,456

gnized $0.6 million and $0.7 million in stock-based compensation expense, which is recorded in selling, general and dministrative expenses on the consolidated statement of operations for the years ended December 31, 2018 and 2017, respectively, and we will recognize $0.9 million over the remaining requisite service period. Unamortized restricted stock and restricted stock units expense at December 31, 2018 that will be amortized over the weighted-average remaining service period of 2 years totaled $1.0 million.

Non-employee Director Deferred Compensation Plan

Ve maintain a non-employee director deferred compensation plan (the “Deferred Compensation Plan”) that permits our nployee directors to defer receipt of certain of the compensation that they receive for serving on our board and board During the years ended December 31, 2018 and 2017, the Deferred Compensation Plan permitted the participants to er cash fees to which they were entitled for board and committee service. For 2018, the Deferred Compensation Plan nitted participants to defer the annual equity compensation for board service (which would otherwise be issued in the tricted stock units) under our non-employee director compensation policy. For participating directors, we credit their ounts under the Deferred Compensation Plan with a number of stock units based on the trading price of our common

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f the date of the deferral. These stock units are vested immediately, in the case of stock units in lieu of cash fees, and lier of the one year anniversary date of the grant or next annual meeting of stockholders, in the case of annual equity ation, although the participating directors do not receive the shares represented by such units until a future qualifying event. A summary of stock unit activity under the Deferred Compensation Plan for 2018 and 2017 is as follows.

	Number of Stock Units	Weighted Average Grant Date Fair Value per Share	Intrinsic Value Outstanding
January 1, 2017	393,012	$1.37	
Granted	73,690	$1.54	
Vested	—	$1.15	
Converted	—	$0.00	
December 31, 2017	466,702	$1.40	$ 1,134,086
Granted	40,588	$2.99	
Vested	—	$1.15	
Converted	—	$0.00	
December 31, 2018	507,290	$1.40	$1,699,422

Stock Repurchase Program

6, our board of directors authorized us to repurchase up to $2.0 million of our common stock through May 31, 2017. lay 31, 2017, we had repurchased a total of 205,500 shares for an aggregate purchase price of $0.2 million under this stock repurchase program, after which this stock repurchase program expired.

er 2017, our board of directors authorized a new stock repurchase program and providing for the repurchase of up to of our common stock through September 19, 2018. Our stock repurchase program did not obligate us to acquire any umber of shares. Under the program, shares may be repurchased in privately negotiated or open market transactions, der plans complying with Rule 10b5-1 under the Securities Exchange Act of 1934, as amended. As of December 31, 017, we had repurchased a total of 565,629 and 433,179 shares, respectively, for an aggregate purchase price of $1.1 this stock repurchase program. We currently maintain all repurchased shares under these stock repurchase programs as treasury stock.

11. Commitments and Contingencies

Obligation under Operating Leases

facilities in Virginia, Michigan, and Georgia under operating leases that as of December 31, 2018 were scheduled to ween March 2020 and December 2024. Certain of the leases are subject to fixed escalations and provide for possible prior to their expiration dates. We recognize rent expense on such leases on a straight-line basis over the lease term. e difference between the straight line method and cash paid is reflected in changes to the deferred rent balance in our ted balance sheets. Deferred rent primarily resulted from recognition of the value of certain leasehold improvements th our Blacksburg, Virginia facility at the inception of the lease. Rent expense under these leases recorded in selling, eral and administrative expense on our statements of operations totaled approximately $1.0 million and $1.1 million, respectively, for the years ended December 31, 2018 and 2017.

future payments, as of December 31, 2018, under the aforementioned operating leases for each of the next five years and thereafter are:

2019	1,216,124
2020	1,117,684
2021	640,800

2022	544,704
2023	544,704
Thereafter	544,704
	$4,608,720

Purchase Commitment

a non-cancelable purchase order totaling $0.5 million in the fourth quarter of 2017, a non-cancelable purchase order 1 million in the first quarter of 2018, and a non-cancelable purchase order totaling $0.7 million in the second quarter multiple shipments of tunable lasers to be delivered over an 18-month period. At December 31, 2018, approximately $0.8 million of these commitments remained and is expected to be delivered by July 30, 2019.

Royalty Agreement

censed certain third-party technologies from vendors for which we owe minimum royalties aggregating $0.4 million payable over the remaining patent terms of the underlying technology.

12. Employee Profit Sharing Plan

n a salary reduction/profit-sharing plan under provisions of Section 401(k) of the Internal Revenue Code. The plan is l of our permanent employees. We contribute 25% of the salary deferral elected by each employee up to a maximum deferral of 10% of annual salary.

We contributed approximately $0.3 million to the plan for each of the years ended December 31, 2018 and 2017.

13. Litigation and Other Contingencies

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

cember 2018, we received a notice of claim (the "Claim") from Macom Technology Solutions, Inc. ("Macom"), who ur HSOR business in August 2017 pursuant to an asset purchase agreement. Under the asset purchase agreement, we emnify Macom for certain matters, including, among other things, the collection of accounts receivable from certain tomers, and placed $4.0 million of the purchase price into an escrow account for the potential settlement of any valid claims. The Claim received from Macom totaled $2.1 million under various indemnity provisions. We have disputed ertion of right to payment for the matters described in the Claim. It is uncertain what amount, if any, will be owed in the Claim. As of December 31, 2018, $1.5 million of the escrow balance had been received with the remaining $2.5 million in the escrow account pending resolution of the dispute.

2018, we sold the assets associated with our optoelectronic components and sub-assemblies ("Opto") business to an hird party. The asset purchase agreement provides for additional consideration of up to $1.0 million contingent upon ement of a specified revenue level by the sold business during the 18 months following the sale. There have been no ts recorded in reference to the above matter in the financial statements as of December 31, 2018. It is uncertain what amount, if any, will be received with respect to this potential adjustment.

nade, and will continue to make, efforts to comply with current and future environmental laws. We anticipate that we dditional capital and operating costs in the future to comply with existing environmental laws and new requirements g from new or amended statutes and regulations. In addition, because the applicable regulatory agencies have not yet promulgated final standards for some existing environmental programs, we cannot at this time reasonably estimate

for compliance with these additional requirements. The amount of any such compliance costs could be material. We cannot predict the impact that future regulations will impose upon our business.

14. Relationship with Major Customers

years ended December 31, 2018 and 2017, approximately 53% and 48%, respectively, of our consolidated revenues were attributable to contracts with the U.S. government.

nber 31, 2018 and 2017, receivables with respect to contracts with the U.S. government represented 23% and 20% of total trade receivables, respectively.

15. Financial Information About Segments

tions are divided into two operating segments: Technology Development and Products and Licensing. Our engineers s collaborate with our network of government, academic and industry experts to identify technologies and ideas with rket potential. We then compete to win fee-for-service contracts from government agencies and industrial customers novative solutions to practical problems that require new technology. The Technology Development segment derives primarily from services. The Technology Development segment provides applied research to customers in our areas of focus.

and Licensing segment develops and sells products or licenses technologies based on commercially viable concepts the Technology Development segment. The Products and Licensing segment derives its revenue from product sales, funded product development and technology licenses.

ent and Chief Executive Officer and his direct reports collectively represent our chief operating decision makers, and they evaluate segment performance based primarily on revenue and operating income or loss.

Information about the results of operations for each segment is set forth in the table below. There were no significant inter-segment sales during the years ended December 31, 2018 and 2017.

ears ended December 31, 2018 and 2017, 24% and 19%, respectively, of our total sales took place outside the United No single country, outside of the United States, represented more than 10% of total revenues during the years ended December 31, 2018 or 2017.

	Years ended December 31,	
	2018	2017
Technology Development revenue	$20,967,556	$18,576,383
Products and Licensing revenue	21,949,689	14,505,482
Total revenue	42,917,245	33,081,865
Technology Development operating income/(loss)	378,212	(120,417)
Products and Licensing operating income/(loss)	499,323	(2,087,731)
Total operating income/(loss)	$877,535	$(2,208,148)
Depreciation, Technology Development	$379,952	$359,626
Depreciation, Products and Licensing	$273,185	$747,216
Amortization, Technology Development	$130,765	$139,067
Amortization, Products and Licensing	$418,349	$1,280,699

licensing depreciation includes amounts from discontinued operations of $0.1 million and $0.4 million for the years December 31, 2018 and 2017, respectively. Products and licensing amortization includes amounts from discontinued operations of $0.1 million and $0.9 million for the years ended December 31, 2018 and 2017, respectively.

Additional segment information is as follows:

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	December 31, 2018	December 31, 2017
Total segment assets:		
Technology Development	$34,823,525	$32,011,084
Products and Licensing	40,775,211	34,211,552
Total	$75,598,736	$66,222,636
Property plant and equipment and intangible assets, Technology Development	$2,103,711	$2,361,663
Property plant and equipment and intangible assets, Products and Licensing	$4,927,453	$4,831,671

ember 31, 2017, the products and licensing segment assets include assets held for sale in the amount of $7.0 million.
ant and equipment, and intangible assets as of December 31, 2017 excludes assets associated with the optoelectronic components business sold during 2018.

16. Quarterly Results (unaudited)

ng table sets forth our unaudited historical revenues, operating loss and net (loss)/income by quarter during 2018 and 2017.

	Quarter Ended							
ousands, are amounts)	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017
evelopment	$4,637	$ 5,466	$ 5,316	$ 5,549	$4,235	$4,602	$ 4,591	$ 5,549
licensing	4,131	4,457	5,371	7,990	2,398	3,681	3,713	4,637
s	8,768	9,923	10,687	13,538	6,633	8,283	8,304	10,186
	4,929	5,693	5,998	6,572	1,770	2,414	2,385	4,384
ome/(loss)	(373)	205	581	423	(1,374)	(237)	(150)	(61)
oss) from continuing	(272)	299	1,293	(122)	(1,254)	(195)	194	257
from discontinued t of income taxes	421	768	7,556	1,062	(102)	(26)	15,563	749
ome	149	1,067	8,849	940	(1,356)	(221)	15,757	1,006
ome attributable to kholders	$84	$ 1,004	$ 8,785	$ 873	$(1,390)	$(251)	$ 15,723	$ 939
oss) per share from erations:								
	$(0.01)	$ 0.01	$ 0.05	$ —	$(0.05)	$(0.01)	$ 0.01	$ 0.01
	$(0.01)	$ 0.01	$ 0.04	$ —	$(0.05)	$(0.01)	$ 0.01	$ 0.01
oss) per share from operations:								
	$0.02	$ 0.03	$ 0.27	$ 0.04	$—	$—	$ 0.56	$ 0.03
	$0.02	$ 0.02	$ 0.23	$ 0.04	$—	$—	$ 0.48	$ 0.02
oss) attributable to kholders:								
	$—	$ 0.04	$ 0.31	$ 0.03	$(0.05)	$(0.01)	$ 0.57	$ 0.03
	$—	$ 0.03	$ 0.27	$ 0.03	$(0.05)	$(0.01)	$ 0.48	$ 0.03
rage shares:								
	27,204,989	27,531,361	27,901,631	28,067,348	27,541,356	27,600,147	27,692,539	27,485,278
	27,204,989	31,506,745	33,055,881	28,067,348	27,541,356	27,600,147	32,714,389	31,790,418

17. Discontinued Operations

2017, we completed the sale of our high speed optical receivers ("HSOR") business, which was part of our Products g segment, to an unaffiliated third party for an initial purchase price of $33.5 million, of which $29.5 million in cash eived, and $4.0 million was placed into escrow until December 15, 2018 for possible working capital adjustments to price and potential satisfaction of certain post-closing indemnification obligations (the "Transaction"). The purchase bject to adjustment in the future based upon a determination of final working capital, as defined in the asset purchase he HSOR business was a component of the operations of Advanced Photonix, Inc., which we acquired in May 2015. t of the Transaction, the buyer also hired approximately 49 of our employees who were engaged in the development, ure, and sale of HSOR products in addition to certain corporate administrative functions. The buyer provided certain vices to us with respect to infrastructure and administration for which we paid $0.3 million per month for a period of for a total of $1.5 million. We recorded this obligation as a reduction of the value of the purchase price. In assessing e of the services expected to be received by us in relation to those we expected to deliver to the buyer, we concluded tion service payments were more closely aligned with the fair value of the assets sold than the services received and, ould be accounted for as part of the consideration reconciliation rather than operating activities. Our HSOR business accounted for 16.1% of revenues and 18.5% of our costs of revenues for the year ended December 31, 2017.

, 2018, we sold the assets and operations related to our Opto business, which was part of our Products and Licensing to an unaffiliated third party for an initial purchase price up to $18.5 million, of which $17.5 million was received at l has been properly recorded in the financial statements in accordance with GAAP with the remaining purchase price t up to $1.0 million which is contingent upon the attainment of specified revenue targets during the eighteen months g the closing of the sale. The purchase price is subject to adjustment in the future based upon a determination of final tal, as defined in the asset purchase agreement. The Opto business was a component of the operations of API, which ired in May 2015, and represented all of our operations in our Camarillo, California and Montreal, Quebec facilities.

We have reported the results of operations of both our HSOR and Opto businesses as discontinued operations in our financial statements. We allocated a portion of the consolidated tax expense to discontinued operations based on the he discontinued business's loss before allocations. We allocated a portion of the consolidated tax (benefit)/expense to discontinued operations based on the ratio of the discontinued business's loss/(income) before allocations.

g table presents a summary of the transactions related to the sales of Opto in the year ended December 31, 2018 and HSOR in the year ended December 31, 2017:

	Year Ended December 31,	
	2018	2017
Sale price	$17,500,000	$33,500,000
Less: transition services payments	—	(1,500,000)
Adjusted purchase price	17,500,000	32,000,000
Assets held for sale	(8,193,184)	(16,851,540)
Liabilities held for sale	989,453	2,330,052
Transaction costs	(858,227)	(895,186)
Return of working capital	730,000	—
Income tax expense	(1,572,245)	(912,298)
Gain on sale of discontinued operations	$8,595,797	$15,671,028

Assets and liabilities held for sale as of December 31, 2017 were as follows:

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	December 31, 2017
Assets	
Current assets:	
Accounts receivable, net	$1,940,125
Inventory	2,316,329
Prepaid expenses and other current assets	79,651
Total current assets	4,336,105
Property and equipment, net	599,102
Intangible assets, net	1,510,203
Goodwill	502,000
Other assets	16,028
Total non-current assets	2,627,333
Total assets held for sale	$6,963,438
Liabilities	
Current liabilities:	
Accounts payable	$851,785
Accrued liabilities	120,666
Deferred revenue	—
Total current liabilities	972,451
Long-term deferred rent	—
Total non-current liabilities	—
Total liabilities held for sale	$972,451

The key components of income from discontinued operations were as follows:

	Year Ended December 31,	
	2018	2017
Net revenues	$8,363,606	$19,511,646
Cost of revenues	5,294,268	12,994,656
Operating expenses	1,728,113	5,413,952
Other (income)/expenses	(13,330)	31,758
Income before income taxes	1,354,555	1,071,280
Allocated tax expense	183,921	876,588
Operating income from discontinued operations	1,170,634	194,692
Gain on sale, net of related income taxes	8,595,797	15,671,028
Net income from discontinued operations	$9,766,431	$15,865,720

s ended December 31, 2018 and 2017, depreciation and amortization from discontinued operations were $0.2 million
ion, respectively. For the years ended December 31, 2018 and 2017, the acquisition of property plant and equipment
continued operations were $0.1 million in each period. For the years ended December 31, 2018 and 2017, intangible
sts associated with discontinued operations were $0.01 million and $0.1 million, respectively. Proceeds from the sale
business which were included in cash flows from investing activities in 2018 were $16.0 million and proceeds from
the HSOR business which are included in cash flows from investing activities for 2017 were $28.0 million. The gain
discontinued operations included in non-cash adjustments to cash flows from operating activities for 2018 and 2017
was $8.6 million and $15.7 million, respectively.

18. Business Acquisitions

15, 2018, we acquired substantially all of the assets, other than cash, the United States operations of Micron Optics, for cash consideration of $5.5 million, of which $5.0 million was paid during 2018, with the remaining $0.5 million accrued liabilities. The transaction has been accounted for under the acquisition method of accounting in accordance 05. We incurred approximately $0.8 million of costs associated with the acquisition during 2018, which are included neral and administrative expenses in our consolidated statement of operations. For the period from the closing of the through December 31, 2018, we recognized revenues of $2.6 million and income of $1.1 million associated with the operations of MOI.

acquisition method of accounting, the total estimated purchase consideration is allocated to the acquired tangible and le assets and assumed liabilities based on their estimated fair values as of the acquisition date. Any excess of the fair acquisition consideration over the identifiable assets acquired and liabilities assumed is recognized as goodwill. We leted a preliminary allocation of the purchase consideration with the assistance of a third-party valuation expert. The llocation of the purchase consideration is subject to revision as additional information becomes known in the future.

	Preliminary Allocation
Accounts receivable	$1,742,693
Inventory	1,435,606
Other current assets	69,951
Property and equipment	996,460
Identifiable intangible assets	1,650,000
Goodwill	101,008
Accounts payable and accrued expenses	(450,985)
Total purchase consideration	$5,544,733

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

	Estimated Fair Value	Estimated Useful Life
Developed technology	$1,200,000	5.0 years
In process research and development	200,000	7.0 years
Trade names	150,000	3.0 years
Customer base	100,000	7.0 years
	$1,650,000	

ed technologies acquired primarily consists of MOI's existing technologies related to fiber optic sensing instruments, nd components. The developed technologies were valued using the "multi-period excess earnings" method, under the me approach. The multi-period excess earnings method reflects the present value of the projected cash flows that are the developed technologies less charges representing the contribution of other assets to those cash flows. A discount rate of 24.5% was used to discount the cash flows to present value.

search and development represents the fair value of incomplete MOI research and development projects that had not ached technological feasibility as of the closing date of the acquisition. In the future, the fair value of such project at

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closing date of the acquisition will be either amortized or impaired depending on whether the project is completed or doned. The fair value of in process research and development was determined using the multi-period excess earnings method. A discount rate of 29.5% was used to discount the cash flows to the present value.

base represents the fair value of projected cash flows that will be derived from the sale of products to MOI's existing s of the closing date of the acquisition. Customer relationships were valued using the "distributor" method, under the proach. Under this premise, the margin of a distributor within the industry is deemed to be the margin attributable to er relationships. This isolates the cash flows attributable to the customer relationships for which a market participant would be willing to pay. A discount rate of 24.5% was used to discount cash flows to present value.

nes and trademarks are considered a type of guarantee of a certain level of quality or performance represented by the brand. Trade names and trademarks were valued using the "relief from royalty" method of the income approach. This based on the assumption that in lieu of ownership, a market participant would be willing to pay a royalty in order to oit the related benefits of this asset. A discount rate of 17% was used to discount the cash flows to the present value.

epresents 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.

Pro forma consolidated results of operations

following unaudited pro forma financial information presents combined results of operations for each of the periods s if the acquisition of MOI had been completed on January 1, 2017. The pro forma information includes adjustments reciation expense for property and equipment acquired, to amortize expense for the intangible assets acquired, and to nate the acquisition transaction expenses recognized in each period. Transaction-related expenses associated with the nd excluded from the pro forma income/(loss) from continuing operations were $0.8 million. The pro forma data are ormational purposes only and are not necessarily indicative of the consolidated results of operations or the combined had the acquisition of MOI actually occurred on January 1, 2017, or the results of future operations of the combined . For instance, planned or expected operational synergies following the acquisition are not reflected in the pro forma information. Consequently, actual results will differ from the unaudited pro forma information presented below.

	Year ended December 31,	
	2018 (unaudited)	2017 (unaudited)
Revenue	$49,494,358	$40,954,093
Income/(loss) from continuing operations	$1,579,318	$(2,778,487)

, 2019, we acquired the outstanding stock of General Photonics Corporation for cash consideration of $19.0 million. urchase price, $17.1 million was paid at closing and $1.9 million was placed into escrow for possible working capital to the purchase price and potential satisfaction of certain post-closing indemnification obligations. Additionally, we become obligated to pay additional cash consideration of up to $1.0 million if certain revenue targets for the General Corporation historical business are met for the twelve month period following the closing. The purchase price is also adjustment based upon the determination of final working capital as of the closing date compared to a target working ued specified in the stock purchase agreement. We have not yet completed its analysis of the fair market value of the assets acquired and liabilities assumed as of the closing date and the associated allocation of the purchase price.

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

None.

ITEM 9A. CONTROLS AND PROCEDURES.

Evaluation of Disclosure Controls and Procedures

n “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act 34, as amended (the “Exchange Act”), which are controls and other procedures that are designed to provide reasonable at information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is ocessed, summarized and reported within the time periods specified in the SEC’s rules and forms. Disclosure controls ures include, without limitation, controls and procedures designed to ensure that information required to be disclosed any in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s t, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can ly reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating efit relationship of possible controls and procedures. In addition, the design of any system of controls also is based in rtain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in stated goals under all potential future conditions. Over time, controls may become inadequate because of changes in ons, 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.

pervision and with the participation of our management, including our President and Chief Executive Officer and our ncial Officer, we evaluated the effectiveness of the design and operation of our disclosure controls and procedures as the period covered by this report. Based on this evaluation, our President and Chief Executive Officer and our Chief l Officer have concluded that, as of December 31, 2018, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

ere have been no changes in our internal control over financial reporting identified in connection with the evaluation required by paragraph (d) of Securities Exchange Act Rule 13a-15(e) and Rule 15d-15(e) that occurred in the quarter ecember 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Management’s Report on Internal Control over Financial Reporting

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

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

supervision and with the participation of our management, including our President and Chief Executive Officer, and our Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial

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s of December 31, 2018. This evaluation was based on the criteria established in the 2013 Internal Control—Integrated k issued by the Committee of Sponsoring Organizations of the Treadway Commission. This evaluation excluded the trol over financial reporting of the United States operations of Micron Optics, Inc. ("MOI"), which were acquired on October 15, 2018. The total acquired assets, based on the preliminary purchase allocation is approximately 8% of our ed assets. Revenues and income from continuing operations from MOI for the period from October 16, 2018 through December 31, 2018, were approximately 6% and 83%, respectively, of our consolidated operations.
our evaluation under the framework established in the 2013 Internal Control—Integrated Framework, our President and ive officer, and our Chief Financial Officer concluded that our internal control over financial reporting was effective ember 31, 2018 to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP.

ITEM 9B. OTHER INFORMATION.

None

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PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

on required by Item 10 of Form 10-K will be included in the proxy statement related to our 2019 Annual Meeting of (the "2019 Proxy Statement"), anticipated to be filed with the SEC within 120 days after December 31, 2018, and is incorporated into this report by reference.

ITEM 11. EXECUTIVE COMPENSATION.

tion required by Item 11 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2019 Proxy Statement.

2. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

er than the information below relating to securities authorized for issuance under our equity compensation plans, the n required by Item 12 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2019 Proxy Statement.

EQUITY COMPENSATION PLANS

The following table summarizes our equity compensation plans as of December 31, 2018:

category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
ty compensation plans approved by security holders	3,316,888 (1)	2.16 (2)	2,702,667
l	3,316,888 (1)	2.16 (2)	2,702,667

(1) Consists of 3,035,238 shares underlying stock options and 281,650 shares underlying restricted stock units.

(2) Does not take into account restricted stock units, which have no exercise price.

Equity Incentive Plan allows for forfeited awards to be added back to our pool of available awards, including awards forfeited from the 2006 Plan after the expiration date of our 2006 Plan.

M 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

tion required by Item 13 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2019 Proxy Statement.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

tion required by Item 14 of Form 10-K is incorporated into this report by reference to the information to be provided in our 2019 Proxy Statement.

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PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULE

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

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

(2) Schedules.

Schedule II

Luna Innovations Incorporated

Valuation and Qualifying Accounts

Column A	Column B Balance at beginning of Period	Column C Additions	Column D Deductions	Column E Balance at end of period
Year Ended December 31, 2017				
Reserves deducted from assets to which they apply:				
Deferred tax valuation allowance	$21,309,546	$ —	$(16,288,802)	$5,020,744
Allowances for doubtful accounts	247,239	99,888	(60,410)	286,717
	$21,556,785	$ 99,888	$(16,349,212)	$5,307,461
Year Ended December 31, 2018				
Reserves deducted from assets to which they apply:				
Deferred tax valuation allowance	$5,020,744	$ —	$(1,753,211)	$3,267,533
Allowances for doubtful accounts	286,717	3,500	(6,134)	284,083
	$5,307,461	$ 3,500	$(1,759,345)	$3,551,616

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

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

(b) Exhibits

EXHIBIT INDEX

xhibit Document

greement and Plan of Merger and Reorganization dated as of January 30, 2015, by and among Luna Innovations ncorporated, API Merger Sub, Inc. and Advanced Photonix, Inc. (Exhibit 2.1)
sset Purchase Agreement, dated July 31, 2018 by and among Luna Innovations Incorporated, Advanced Photonix, nc., Advanced Photonix Canada, Inc. and OSI Optoelectronics, Inc. (Exhibit 2.1)
sset Purchase Agreement, dated October 15, 2018 by and among Luna Innovations Incorporated, Luna echnologies, Inc. and Micron Optics, Inc. (Exhibit 2.1)
tock Purchase Agreement, dated March 1, 2019 by and among Luna Innovations Incorporated, Luna Technologies, nc., Steve Yao and General Photonics Corporation (Exhibit 2.1)
mended and Restated Certificate of Incorporation of the Registrant (Exhibit 3.2)
ertificate of Designations of the Series A Convertible Preferred Stock (Exhibit 3.1)
mended and Restated Bylaws of the Registrant (Exhibit 3.4)
mendment to Amended and Restated Bylaws (Exhibit 3.1)
mendment to Amended and Restated Bylaws (Exhibit 3.1)
pecimen Common Stock certificate of the Registrant (Exhibit 4.1)
006 Equity Incentive Plan (Exhibit 10.9)
orm of Stock Option Agreement under 2006 Equity Incentive Plan (Exhibit 4.7)
016 Equity Incentive Plan (Exhibit 4.7)
orm of Stock Option Grant Notice and Stock Option Agreement under 2016 Equity Incentive Plan (Exhibit 4.8)
orm of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under 2016 Equity ncentive Plan (Exhibit 4.1)
orm of Restricted Stock Award Grant Notice and Restricted Stock Award Agreement under 2016 Equity Incentive lan (Exhibit 10.1)
orm of Indemnification Agreement for directors and executive officers (Exhibit 10.1)
icense Agreement No. DN-982, dated June 10, 2002, by and between the National Aeronautics and Space dministration (NASA) and Luna Innovations Incorporated; Modification No. 1 to License Agreement No. DN-982, ated January 23, 2006, by and between NASA and Luna Innovations Incorporated (Exhibit 10.22)
icense Agreement No. DN-951, dated December 20, 2000, by and between NASA and Luna Technologies, Inc. Exhibit 10.23)
mended and Restated License Agreement, dated March 19, 2004, by and between Virginia Tech Intellectual roperties, Inc. and Luna Innovations Incorporated (Exhibit 10.26)
sset Transfer and License Agreement by and between Luna Innovations Incorporated and Coherent, Inc. Exhibit 10.21)
evelopment and Supply Agreement, dated December 12, 2006, by and between Luna Innovations Incorporated and ntuitive Surgical, Inc. dated June 11, 2007 (Exhibit 10.1)
mendment to Commercial Lease, by and between Luna Innovations Incorporated and Canvasback Real Estate & nvestments LLC dated March 18, 2008 (Exhibit 10.5)
ecurities Purchase and Exchange Agreement, dated January 12, 2010, by and between Luna Innovations ncorporated and Carilion Clinic (Exhibit 10.1)
Varrant No. 1 to Purchase Common Stock, dated January 13, 2010, issued to Carilion Clinic (Exhibit 10.2)
Varrant No. 2 to Purchase Common Stock, dated January 13, 2010, issued to Carilion Clinic (Exhibit 10.3)
mended and Restated Investor Rights Agreement, dated January 13, 2010, by and among Luna Innovations ncorporated, Carilion Clinic, and certain stockholders of Luna Innovations Incorporated (Exhibit 10.4)
Non-Employee Directors' Deferred Compensation Plan (Exhibit 10.13)
icense Agreement, effective January 12, 2010, by and among Luna Innovations Incorporated, Luna Technologies, nc. and Hansen Medical, Inc. (Exhibit 10.6)
icense Agreement, effective January 12, 2010, by and among Luna Innovations Incorporated, Luna Technologies, nc. and Intuitive Surgical, Inc. (Exhibit 10.8)

ndustrial Lease Agreement, dated as of March 21, 2006, by and between Luna Innovations Incorporated and the conomic Development Authority of Montgomery County, Virginia, as amended by a First Amendment effective as f May 11, 2006, a Second Amendment effective as of July 15, 2009 and a Third Amendment effective as of March 23, 2010 (Exhibit 10.14)

oan and Security Agreement, dated February 18, 2010, by and between Luna Innovations Incorporated, Luna echnologies, Inc. and Silicon Valley Bank (Exhibit 10.5)

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ird Amendment to Commercial Lease dated June 21, 2010, by and between Canvasback Real Estate & Investments, LC and Luna Innovations, Incorporated (Exhibit 10.5)
rst Loan Modification Agreement, dated as of March 7, 2011, by and between Luna Innovations Incorporated and icon Valley Bank (Exhibit 10.1)
urth Amendment to Industrial Lease Agreement, dated as of March 1, 2011, by and between The Economic evelopment Authority of Montgomery County and Luna Innovations Incorporated (Exhibit 10.3)
cond Loan Modification Agreement, dated as of May 18, 2011, by and between Luna Innovations Incorporated, na Technologies, Inc. and Silicon Valley Bank (Exhibit 10.1)
fth Amendment to Industrial Lease Agreement, dated as of November 1, 2011, by and between The Economic evelopment Authority of Montgomery County and Luna Innovations Incorporated (Exhibit 10.39)
nployment Agreement dated December 5, 2017, by and between Scott A. Graeff and Luna Innovations Incorporated xhibit 10.25)
urth Amendment to Commercial Lease, dated as of April 15, 2012, by and between Canvasback Real Estate & vestments, LLC and Luna Innovations Incorporated (Exhibit 10.3)
ird Loan Modification Agreement, dated as of May 17, 2012, by and between Luna Innovations Incorporated, Luna chnologies, Inc. and Silicon Valley Bank (Exhibit 10.1)
urth Loan Modification Agreement, dated March 21, 2013, by and between Luna Innovations Incorporated, Luna chnologies, Inc. and Silicon Valley Bank (Exhibit 10.1)
oss-License Agreement by and among Luna Innovations Incorporated and Luna Technologies, Inc. and Intuitive rgical Operations, Inc. and Intuitive Surgical International, Ltd., dated as of January 17, 2014 (Exhibit 10.2)
nsent, Release and Fifth Loan Modification Agreement between Luna Innovations incorporated and Silicon Valley nk dated as of January 21, 2014 (Exhibit 10.3)
xth Amendment to Industrial lease Agreement by and between the Economic Development Authority of ontgomery County, Virginia and Luna Innovations Incorporated dated October 1, 2014 (Exhibit 10.47)
dustrial Lease Agreement by and between The Economic Development Authority of Montgomery County, Virginia d Luna Innovations Incorporated dated October 1, 2014 (Exhibit 10.48)
ase Agreement by and between SBA Tenant, LLC and Luna Innovations Incorporated dated November 2014 xhibit 10.49)
inder, Consent, and Sixth Loan Modification Agreement between Luna Innovations Incorporated, Luna chnologies, Inc., Advanced Photonix, LLC and Silicon Valley Bank, dated as of May 8, 2015 (Exhibit 10.1)
inder, Consent, and Seventh Loan Modification Agreement between Luna Innovations Incorporated, Luna chnologies, Inc., Advanced Photonix, LLC and Silicon Valley Bank, dated as of September 29, 2015 (Exhibit 10.1)
rst Amendment to Industrial Lease Agreement by and between the Economic Development Authority of ontgomery County, Virginia and Luna Innovation Incorporated, dated January 20, 2015 (Exhibit 10.3)
mended and Restated Non-Employee Director Compensation Policy, dated June 30, 2015 (Exhibit 10.1)
fth Amendment to Commercial Lease by and between Canvasback Real Estate and Investments, LLC and the egistrant, dated as of August 5, 2015 (Exhibit 10.2)
ghth Loan Modification Agreement, dated December 15, 2016, by and between Luna Innovations Incorporated, na Technologies, Inc., Advanced Photonix, LLC and Silicon Valley Bank (Exhibit 10.54)
nployment Agreement, dated May 1, 2018 by and between the Registrant and Dale E. Messick (Exhibit 10.1)
st of Subsidiaries
onsent of Grant Thornton LLP, Independent Registered Public Accounting Firm
wer of Attorney (see signature page)
ertification of the Principal Executive Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities change Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
ertification of the Principal Financial Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities change Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
ertification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of e Sarbanes-Oxley Act of 2002.

ertification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of
e Sarbanes-Oxley Act of 2002.

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wing materials from the Registrant's Annual Report on Form 10-K for the year ended December 31, 2018, are in XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets at December 31, 2018 and Consolidated Statements of Operations for the years ended December 31, 2018 and 2017, (iii) Consolidated s of Changes in Stockholder's Equity for the years ended December 31, 2018 and 2017 (iv) Consolidated Statements lows for the years ended December 31, 2018 and 2017, and (v) Notes to Audited Consolidated Financial s.

ed by reference to the exhibit to the Registrant's Quarterly Report on Form 10-A, Commission File No. 000-52008, ay 13, 2014. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ed by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, bruary 2, 2015. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ed by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, ne 8, 2006. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ed by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, nuary 15, 2010 (reporting under Items 1.01, 3.02, 3.03, 5.03 and 9.01). The number given in parentheses indicates onding exhibit number in such Form 8-K.
ed by reference to the exhibit to the Registrant's Registration Statement on Form S-1, Commission File 31764, filed on February 10, 2006. The number given in parentheses indicates the corresponding exhibit number in S-1.
ed by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, the Securities and Exchange Commission on May 10, 2010. The number in parentheses indicates the corresponding mber in such Form 8-K.
ed by reference to the exhibit to Amendment No. 5 of the Registrant's Registration Statement on Form S-1, on File No. 333-131764, filed on May 19, 2006. The number given in parentheses indicates the corresponding mber in such Form S-1.
ed by reference to the exhibit to Amendment No. 3 of the Registrant's Registration Statement on Form S-1, on File No. 333-131764, filed on April 28, 2006. The number given in parentheses indicates the corresponding mber in such Form S-1.
ed by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, ly 17, 2009 (reporting under Items 1.01, 5.02 and 9.01). The number given in parentheses indicates the ding exhibit number in such Form 8-K.
ated by reference to the exhibit to Amendment No. 1 to Registrant's Annual Report on Form 10-K, Commission 000-52008, filed on April 6, 2007. The number given in parentheses indicates the corresponding exhibit number in n 10-K/A.
ated by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, une 14, 2007. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ated by reference to the exhibit to Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008, May 9, 2008. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ated by reference to the exhibit to Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008, May 17, 2010. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ated by reference to the exhibit to Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008, August 16, 2010. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ated by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, March 9, 2011. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ated by reference to the exhibit to Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008, May 16, 2011. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ated by reference to the exhibit to Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008, August 12, 2011. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.

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ited by reference to the exhibit to the Registrant's Annual Report on Form 10-K, Commission File No. 000-52008,
Iarch 29, 2012. The number given in parentheses indicates the corresponding exhibit number in such Form 10-K.
ited by reference to the exhibit to the Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008,
ugust 9, 2012. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ited by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008,
uly 11, 2012. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008, filed on
, 2013. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the exhibit to the Registrant's Quarterly Report on Form 10-K, Commission File No. 000-52008,
Iarch 16, 2015. The number given in parentheses indicates the corresponding exhibit number in such Form 10-K.
ited by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008,
Iay 11, 2015. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008,
October 5, 2015. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the exhibit to the Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008,
Iay 14, 2015. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ited by reference to the exhibit to the Registrant's Current Report on Form 10-Q, Commission File No. 000-52008,
ugust 14, 2015. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ited by reference to the exhibit to the Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008,
November 13, 2015. The number given in parentheses indicates the corresponding exhibit number in such Form

ited by reference to the exhibit to the Registrant's Annual Report on Form 10-K, Commission File No. 000-52008,
Iarch 20, 2017. The number given in parentheses indicates the corresponding exhibit number in such Form 10-K.
ited by reference to the exhibit to the Registrant's Registration Statement on Form S-8, Commission File No.
02, filed on June 3, 2016. The number given in parentheses indicates the corresponding exhibit number in such
.
ited by reference to the exhibit to the Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008,
ugust 10, 2016. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ited by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008,
ugust 1, 2018. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the exhibit to the Registrant's Quarterly Report on Form 10-Q, Commission File No. 000-52008,
ugust 1, 2018. The number given in parentheses indicates the corresponding exhibit number in such Form 10-Q.
ited by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008,
October 16, 2018. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008,
Iarch 4, 2018. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the exhibit to the Registrant's Current Report on Form 8-K, Commission File No. 000-52008,
anuary 14, 2019. The number given in parentheses indicates the corresponding exhibit number in such Form 8-K.
ited by reference to the exhibit to the Registrant's Annual Report on Form 10-K, Commission File No. 000-52008,
Iarch 21, 2018. The number given in parentheses indicates the corresponding exhibit number in such Form 10-K.

Confidential treatment has been requested with respect to portions of this exhibit, indicated by asterisks, which has been filed separately with the Securities and Exchange Commission.

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

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ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

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

LUNA INNOVATIONS INCORPORATED

By: /s/ Dale E. Messick
Dale E. Messick
Chief Financial Officer

March 14, 2019

W ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and cott A. Graeff and Dale E. Messick, and each of them acting individually, as his true and lawful attorneys-in-fact and ull power of each to act alone, with full powers of substitution and resubstitution, for him and in his name, place and and all capacities, to sign any and all amendments to this Annual Report on Form 10-K with all exhibits thereto and ents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and full power of each to act alone, full power and authority to do and perform each and every act and thing requisite and ary to be done in connection therewith, as fully for all intents and purposes as he might or could do in person, hereby d confirming all that said attorneys-in-fact and agents, or his or their substitutes, may lawfully do or cause to be done by virtue hereof.

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

	Title	Date
raeff ff	President, Chief Executive Officer and Director (Principal Executive Officer)	March 14, 2019
essick ck	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	March 14, 2019
. Wise Vise	Director	March 14, 2019
stor r	Director	March 14, 2019
illiamson III amson III	Director	March 14, 2019
nderson erson	Director	March 14, 2019
Phelps, III elps, III	Director	March 14, 2019
gel	Director	March 14, 2019
. Roedel oedel	Chairman of the Board of Directors	March 14, 2019

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