

---

# SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

---

## Amendment No. 2 to FORM S-1 REGISTRATION STATEMENT

Under  
The Securities Act of 1933

---

# LUNA INNOVATIONS INCORPORATED

(Exact name of Registrant as specified in its charter)

**Delaware**  
(State or other jurisdiction of  
incorporation or organization)

**8731**  
(Primary Standard Industrial  
Classification Code Number)  
**10 South Jefferson Street, Suite 130**  
**Roanoke, Virginia 24011**  
**(540) 552-5128**

**54-1560050**  
(I.R.S. Employer  
Identification Number)

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

---

**Kent A. Murphy, Ph.D.**  
**President, Chief Executive Officer and Chairman**  
**Luna Innovations Incorporated**  
**10 South Jefferson Street, Suite 130**  
**Roanoke, Virginia 24011**  
**(540) 552-5128**

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

---

*Copies to:*

**Trevor J. Chaplick, Esq.**  
**Mark R. Fitzgerald, Esq.**  
**Wilson Sonsini Goodrich & Rosati,**  
Professional Corporation  
**Two Fountain Square,**  
**Reston Town Center**  
**11921 Freedom Drive, Suite 600**  
**Reston, Virginia 20190**  
**(703) 734-3100**

**Aaron S. Hullman, Esq.**  
**Vice President and General Counsel**  
**Luna Innovations Incorporated**  
**10 South Jefferson Street, Suite 130**  
**Roanoke, Virginia 24011**  
**(540) 552-5128**

**Marjorie Sybul Adams, Esq.**  
**Daniel I. Goldberg, Esq.**  
**DLA Piper Rudnick Gray Cary US LLP**  
**1251 Avenue of the Americas**  
**New York, New York 10020**  
**(212) 835-6000**

---

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

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, 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, 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, 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(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

**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), may determine.**

---

---

[Table of Contents](#)

The information contained in this preliminary 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 preliminary 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.

PRELIMINARY PROSPECTUS

SUBJECT TO COMPLETION, DATED APRIL 10, 2006



**Shares  
Common Stock  
\$ per Share**

---

This is the initial public offering of shares of common stock by Luna Innovations Incorporated.

We are offering \_\_\_\_\_ shares of our common stock. We expect the initial public offering price to be between \$ \_\_\_\_\_ and \$ \_\_\_\_\_ per share. Prior to this offering, there has been no public market for our common stock.

We have applied to have the common stock included for quotation on the Nasdaq National Market under the symbol "LUNA."

**Investing in our common stock involves risks. See "[Risk factors](#)" beginning on page 8 to read about factors you should consider before buying shares of our common stock.**

**Neither the Securities and Exchange Commission nor any state securities commission 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.**

---

	<b>Per Share</b>	<b>Total</b>
Initial public offering price	\$ _____	\$ _____
Underwriting discount	\$ _____	\$ _____
Proceeds, before expenses, to Luna Innovations Incorporated	\$ _____	\$ _____

---

We have granted the underwriters the right to purchase up to an additional \_\_\_\_\_ shares of common stock from us at the initial public offering price less the underwriting discount to cover any over-allotments. The underwriters can exercise this right at any time within 30 days after the offering. We expect that delivery of the shares will be made to investors on or about \_\_\_\_\_, 2006.

---

**ThinkEquity Partners LLC**

**WR Hambrecht + Co**

**Merriman Curhan Ford & Co.**

, 2006

## Table of contents

	<b>Page</b>
<a href="#">Prospectus summary</a>	1
<a href="#">Risk factors</a>	8
<a href="#">Information regarding forward-looking statements</a>	27
<a href="#">Use of proceeds</a>	28
<a href="#">Dividend policy</a>	28
<a href="#">Capitalization</a>	29
<a href="#">Dilution</a>	31
<a href="#">Selected consolidated financial data</a>	33
<a href="#">Management's discussion and analysis of financial condition and results of operations</a>	35
<a href="#">Business</a>	46
<a href="#">Management</a>	71
<a href="#">Certain relationships and related party transactions</a>	82
<a href="#">Principal stockholders</a>	85
<a href="#">Description of capital stock</a>	87
<a href="#">Shares eligible for future sale</a>	91
<a href="#">U.S. federal income and estate tax consequences to non-U.S. holders</a>	94
<a href="#">Underwriting</a>	97
<a href="#">Legal matters</a>	100
<a href="#">Experts</a>	100
<a href="#">Where you can find more information</a>	101
<a href="#">Index to financial statements</a>	F-1

---

You should rely only on the information contained in this prospectus. We have not, and the underwriters have not, authorized anyone to provide you with different information. We are not making an offer of these securities in any state where the offer or sale is not permitted. You should not assume that the information contained in this prospectus is complete and accurate as of any date other than the date on the front cover, regardless of the time of delivery, of this prospectus.

We obtained statistical data and certain other industry forecasts used throughout this prospectus from publicly available information, including market research and industry publications. We have not independently verified such data or sought the consent of the sources to refer to their reports in this prospectus.

Until \_\_\_\_\_, all dealers that effect transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to the dealers' obligation to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

---

## Prospectus summary

This summary highlights information contained elsewhere in this prospectus. This summary does not contain all of the information you should consider before buying shares in this offering. Therefore, you should read this entire prospectus carefully, including the “Risk factors” section beginning on page 8 and the financial statements and the related notes. Unless the context requires otherwise, the words “we,” “us” and “our” refer to Luna Innovations Incorporated and its consolidated subsidiaries.

### Overview

We research, develop and commercialize innovative technologies in two primary areas: molecular technology solutions and sensing solutions. We have a disciplined and integrated business model that is designed to accelerate the process of bringing new and innovative products to market. We identify technologies that can fulfill identified market needs and then take these technologies from the applied research stage through commercialization in our two areas of focus:

- **Molecular Technology Solutions.** We develop molecular technology solutions, which are substances and materials with enhanced performance characteristics obtained by harnessing chemical, physical and biological properties of novel combinations of matter. We focus on substances and materials at the molecular level, including nanomaterials, which are materials whose size can be measured in nanometers, or one billionth of a meter. Examples of our solutions in this area include flame retardants, protective coatings, and materials that can help physicians identify diseased tissues using magnetic resonance imaging, or MRI.
- **Sensing Solutions.** We develop integrated sensing solutions, which are products that combine sensors, software and hardware to measure, monitor and control chemical, physical and biological properties. We have particular expertise in optical, acoustic and wireless technologies. Examples of our solutions in this area include medical monitoring products and industrial instrumentation for aerospace, energy generation and distribution, and defense applications.

We have a successful track record in executing our market-driven business model. Since our inception, we have developed more than a dozen products serving various industries including energy, telecommunications, life sciences and defense. We have created five companies in our areas of focus, sold two of them to industry leaders in their fields, raised private capital for two of our companies, formed one joint venture and entered into four licensing agreements.

Our aggregate revenues from January 1, 2003 through December 31, 2005 were \$56.6 million, and our aggregate cost of revenues during that same period were \$37.3 million. However, we had a net loss of \$2.0 million for the year ended December 31, 2005, and we expect to incur significant additional expenses as we expand our business. We also expect significantly greater losses for the foreseeable future primarily due to increased expenditures related to our nanomaterial and medical device product development efforts.

Our company is organized into three main groups: our Contract Research Group, our Commercialization Strategy Group and our Products Group. These groups work closely together to turn ideas into products.

**Contract Research Group.** Our Contract Research Group provides applied research to customers in our areas of focus. Our engineers and scientists collaborate with our network of government, academic and industry experts to identify technologies and ideas with promising market potential. After these promising technologies are identified, our Contract Research Group competes to win fee-for-service contracts from government agencies and industrial clients who seek innovative solutions to practical problems that require new technology. We focus primarily on contract research opportunities where we can retain partial or full rights to the intellectual property developed, and generally obtain full funding of the costs of contracts we undertake from our customers. This approach allows us to cover the costs of early-stage technology development with

Prospectus summary

---

contract research revenues. Our contract research revenues grew from \$10.4 million in 2003 to \$13.8 million in 2004 and to \$15.4 million in 2005. During this same period, our contract research costs increased from \$8.9 million in 2003, to \$11.0 million in 2004, and to \$12.6 million in 2005. Our Contract Research Group seeks to continually supply our product pipeline with new opportunities.

**Commercialization Strategy Group.** Our Commercialization Strategy Group works closely with our network of federal and industrial customers to identify new market opportunities for our technologies. After ideas are driven to proof of concept in the Contract Research Group, our Commercialization Strategy Group develops detailed business plans for commercially viable products. It is at this stage that we first consider investing our own funds to finance the continued development of a product, which is then managed in our Products Group.

**Products Group.** Our Products Group currently consists of the following three divisions:

- **Luna Advanced Systems Division.** Most new product opportunities that are approved for further development by our management team are initially allocated to our Luna Advanced Systems Division. Products currently managed in this division include medical diagnostic instruments using our innovative ultrasound technologies, non-destructive industrial testing and homeland security devices, remote and secure wireless asset monitoring systems, flame retardants, multi-functional protective coating systems and blast and ballistic resistant materials. We transfer products to existing or new divisions within our Products Group with the resources needed for the successful commercialization of the technology if we determine that a product line is broad enough or that the market opportunity is sufficiently large.
- **Luna nanoWorks Division.** Our Luna nanoWorks Division develops and commercializes innovative products based on nanomaterials made from carbon, or carbon nanomaterials, that have broad potential applications. This division is developing MRI contrast agents, which are materials that can help physicians identify diseased tissues using MRI and that are designed to be potentially safer than, and technically superior to, contrast agents currently on the market. We currently supply nanomaterials to research laboratories and plan to supply proprietary high value-added carbon nanomaterials to customers who manufacture products such as solar cells, strong and light-weight composites and coatings to shield devices from electromagnetic interference.
- **Luna Technologies Division.** Our Luna Technologies Division manufactures and markets test and measurement equipment and integrated sensing solutions. This division's products are used for process and control monitoring in telecommunications, manufacturing, power generation and distribution, down-hole oil and gas production, aerospace and defense applications. Our products have won numerous awards and are sold and distributed throughout North America, Europe, the Middle East and Asia.

We expect that the capital raised in this offering will provide us greater flexibility in funding the commercialization of new technologies and will provide us the opportunity to increase the speed, quality and volume of products that we can develop.

### **Our Growth Strategy**

We have the following key strategies to achieve our goal of accelerating the development and commercialization of innovative technologies and to create successful products in our areas of focus:

- **Focus on developing and commercializing a growing portfolio of innovative products.** We intend to build and commercialize a growing portfolio of high value-added products using innovative technologies and utilize our existing relationships to identify, prioritize and allocate resources to respond rapidly to market needs, and shorten the time to market for new products.
  - **Transition our mix of revenues to a higher percentage of product sales and license revenues.** We plan to commercialize a growing number of products in order to increase the amount of revenues that we generate
-

Prospectus summary

---

from product sales and license payments. To this end, we will seek to expand our distribution network and our ability to service our customers. We will also seek to allocate resources to improve our ability to manufacture and shorten the cycle time from idea to market and to monetize our intellectual property portfolio by licensing our technologies. As a result, we believe that product sales and license revenues will comprise a greater portion of our total revenues in the future.

- **Continue to strengthen our Contract Research Group.** We will seek to strengthen our Contract Research Group through increased resource allocation and hiring and by expanding our network of relationships with federal laboratories, major research universities and industry leaders. These steps will provide us the opportunity to grow our applied research business, remain informed of the latest technological advances and increase the quality and volume of high potential technologies that will support our product pipeline.
- **Expand our intellectual property portfolio in our areas of focus.** We will seek to expand our intellectual property portfolio by applying our disciplined processes to generate know-how and intellectual property through our network of relationships and our own research and development efforts. By continuing to expand our intellectual property, we will seek to enhance our competitive position and develop additional products in these areas.

### **Challenges in Executing our Growth Strategy**

We face several challenges to the successful implementation of our growth strategy. In addition, our business is subject to numerous risks, which we highlight in the section entitled “Risk factors” immediately following this prospectus summary. For example, our ability to grow by developing and commercializing multiple products simultaneously requires that we manage a diverse range of projects, expand our personnel resources and broaden our geographic presence. Our inability to do any of these could prevent us from successfully implementing our growth strategy. In addition, the success of our business model depends on our ability to identify correctly market needs for new technologies. If we are not successful in identifying market needs or in developing new products to meet those needs, we may not be successful in growing our product revenues or transitioning our revenues mix from contract research revenues to product sales and license revenues.

We believe that sustained growth at a higher rate will place a strain on our management, as well as on our other human resources. If we are unable to attract and retain qualified personnel as we grow our operations, we may be unable to staff and manage projects adequately, which may slow the development process, result in the commercialization of fewer products or compromise the quality of our work. Moreover, the products that we have developed or are currently developing will compete with other technologically innovative products as well as products incorporating conventional materials and technologies. Our competitors may be able to adapt more quickly to new or emerging technologies and changes in customer requirements. If we are unable to compete successfully against current or new competitors, our product revenues may not increase or may decline.

In addition, our commercial success will depend in part on our obtaining and maintaining intellectual property protection for our technologies as well as successfully enforcing and defending our intellectual property rights against third-party challenges. Moreover, if the commercial versions of our products that are currently under development do not incorporate our proprietary technologies, our intellectual property portfolio may not afford us a competitive advantage.

---

Prospectus summary

---

### **Company Information**

We were incorporated as a Virginia corporation in July 1990. In December 1998 we changed our name from FEORC, Inc. to F&S Technologies, Inc., and in July 1999, we changed our name to Luna Innovations Incorporated. In April 2003, we reincorporated through a merger as a Delaware corporation and retained the name Luna Innovations Incorporated. Our principal offices are located at 10 South Jefferson Street, Suite 130, Roanoke, Virginia 24011. Our telephone number is (540) 552-5128. You can access our web site at [www.lunainnovations.com](http://www.lunainnovations.com). Information contained on our website does not constitute part of this prospectus.

LUNA INNOVATIONS is a registered trademark in the United States. Our unregistered trademarks include: our logo (a black and white image of a moth design); TRIMETASPHERES; EDAC; and ACCELERATING THE INNOVATION PROCESS.

---

## The Offering

Proposed Nasdaq National Market symbol	“LUNA”
Common stock offered by us	shares
Common stock outstanding after this offering	shares
Use of proceeds	We intend to use the net proceeds from this offering principally to fund further development and expansion of our products and product candidates, in particular our nanomaterial and ultrasound-related product candidates, and for general working capital purposes. We may also use such proceeds for potential acquisitions of complementary products, technologies or businesses. See “Use of proceeds.”

The number of shares of common stock that will be outstanding after this offering is based on 10,630,935 shares outstanding as of December 31, 2005 and excludes:

- 7,033,517 shares of common stock issuable upon exercise of options outstanding at a weighted-average exercise price of \$0.38 per share, which includes 5,246,017 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$0.20 per share, 200,000 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$0.22 per share and 1,587,500 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$1.00 per share;
- 409,860 shares of common stock reserved for future issuance upon the exercise of options available for grant under our 2003 Stock Plan;
- 6,494 shares of common stock issuable upon exercise of warrants (not subject to escrow) outstanding at a weighted-average exercise price of \$12.92 per share, which includes 3,858 shares of common stock issuable upon exercise of outstanding warrants at an exercise price of \$21.06 per share and 2,636 shares of common stock issuable upon exercise of outstanding warrants at an exercise price of \$1.00 per share;
- 1,885,490 shares of common stock issuable upon the conversion of the principal amount outstanding under senior convertible promissory notes issued to Carilion Health System on December 30, 2005 and, assuming we elect to convert all of the accrued interest on these notes into shares of common stock after these notes remain outstanding for a maximum period of up to eight years, up to an additional 905,035 shares of common stock; and
- 122,745 shares of common stock issued or reserved for issuance in connection with the acquisition of Luna Technologies, Inc. that were held in escrow on that date, and 429 shares of common stock issuable upon the exercise of warrants at an exercise price of \$21.06 per share held in escrow as of that date.

Since December 31, 2005, we granted options to purchase an additional 1,537,250 shares pursuant to our 2003 Stock Plan at an exercise price of \$1.00 per share. We also adopted our 2006 Equity Incentive Plan, subject to stockholder approval, which will be effective upon the completion of this offering. In addition, on February 8, 2006, we issued warrants to purchase 101,773 shares at an exercise price of \$1.00 per share.

Unless otherwise indicated, all information in this prospectus assumes:

- a -for- split of our common stock, to be effected immediately prior to the effectiveness of this offering;
- the conversion, in accordance with our certificate of incorporation, of all our shares of outstanding Class A Common Stock, Class B Common Stock and Class C Common Stock into shares of our common stock;
- that the underwriters do not exercise their over-allotment option; and
- the adoption of our amended and restated certificate of incorporation and bylaws.

## Summary historical and pro forma financial data

The following table presents summary historical and unaudited pro forma consolidated financial data. We derived the summary consolidated statements of operations data for the years ended December 31, 2003, 2004 and 2005 from our audited consolidated financial statements.

The unaudited pro forma consolidated statement of operations data give effect to our September 30, 2005 purchase of Luna Technologies, Inc. and the issuance of shares of our common stock to former Luna Technologies stockholders in connection with that transaction as if it had occurred on January 1, 2005.

You should read the following information together with the more detailed information contained in "Selected consolidated financial data," "Management's discussion and analysis of financial condition and results of operations," and the financial statements and the accompanying notes included elsewhere in this prospectus.

(in thousands, except share and per share data)	Years Ended December 31,		
	2003	2004	2005
<b>Consolidated Statements of Operations Data:</b>			
Revenues:			
Contract research revenues	\$10,358	\$13,835	\$15,380
Product sales and license revenues	7,234	8,752	1,074
Total revenues	17,592	22,587	16,454
Cost of revenues:			
Contract research costs	8,949	10,985	12,552
Product sales and license costs	1,543	2,881	410
Total cost of revenues	10,492	13,866	12,962
Gross profit	7,099	8,721	3,492
Operating expense	4,856	4,190	6,004
Operating income (loss)	2,243	4,532	(2,512)
Other income (expense)(1)	(138)	(257)	2
Interest income (expense), net	(87)	(90)	(41)
Income (loss) before income taxes	2,018	4,184	(2,551)
Income tax expense (benefit)	886	128	(557)
Net income (loss)	\$1,132	\$4,056	\$(1,994)
Net income (loss) per common share:			
Basic	\$0.23	\$0.79	\$(0.30)
Diluted	\$0.22	\$0.64	\$(0.30)
Weighted-average shares:			
Basic	5,030,428	5,136,001	6,609,364
Diluted	5,141,003	6,301,484	6,609,364

(1) Includes minority interests and excludes interest expense.

[Table of Contents](#)

## Summary historical and pro forma financial data

(in thousands, except share and per share data)	Pro Forma Year Ended December 31, 2005	
	(unaudited)	
<b>Pro Forma Consolidated Statement of Operations Data:</b>		
Revenues		\$18,642
Cost of revenues		14,036
Gross profit		4,606
Operating expense		7,497
Operating income (loss)		(2,891)
Miscellaneous income		1
Interest income (expense), net		(53)
Income (loss) before income taxes		(2,943)
Income tax expense (benefit)		(557)
Net income (loss)		\$(2,386)
Net income (loss) per common share:		
Basic		\$(0.36)
Diluted		\$(0.36)
Weighted-average number of shares used in per share calculations:		
Basic		6,609,364
Diluted		6,609,364

The following table presents selected balance sheet data as of December 31, 2005 on an actual basis and on an as adjusted basis to give effect to the sale by us of \_\_\_\_\_ shares of our common stock in this initial public offering at an assumed price of \$ \_\_\_\_\_ per share, the mid-point of the range on the front cover of this prospectus, after deducting the underwriting discount and estimated offering expenses.

(in thousands)	As of December 31, 2005	
	Actual	As Adjusted
<b>Consolidated Balance Sheet Data:</b>		
Cash and cash equivalents	\$12,515	\$
Working capital (deficit)	11,843	
Total assets	24,134	
Total current liabilities	6,993	
Total debt(1)	5,431	
Stockholders' equity	10,854	

(1) Includes capital lease obligations.

## Risk factors

*An investment in our common stock offered by this prospectus involves a substantial risk of loss. You should carefully consider these risk factors, together with all of the other information included in this prospectus, before you decide to purchase shares of our common stock. The occurrence of any of the following risks could harm our business. In that case, the trading price of our common stock could decline, and you may lose part or all of your investment.*

### Risks Related to Our Business and Technologies

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

While historically we have developed and commercialized only a few products at a time, we plan to grow by developing and commercializing multiple products concurrently across many industries, technologies and markets. Our ability to grow by developing and commercializing multiple products simultaneously requires that we manage a diverse range of projects, expand our personnel resources and broaden our geographic presence. Our inability to do any of these could prevent us from successfully implementing our growth strategy, and our revenues and profits could be adversely affected.

As of December 31, 2005, we had 68 research contracts covering a broad range of technologies, industries and markets. To advance the development of multiple promising potential products concurrently, we need to manage effectively the logistics of maintaining the requisite corporate, operational, administrative and financing functions for each of these products. Expanding our operations into new geographic areas and relying on multiple facilities to develop and manufacture different products concurrently pose additional challenges. We have little experience in managing these functions simultaneously for multiple projects in development or in building new infrastructure and integrating the operations of various facilities. If we cannot manage this process successfully, we may be subject to operating difficulties, additional expenditures and reduced revenues.

We need to expand our personnel resources to grow our business effectively. We believe that sustained growth at a higher rate will place a strain on our management, as well as on our other human resources. To manage this growth, we must continue to attract and retain qualified management, professional, scientific and technical and operating personnel. If we are unable to do so, we may be unable to staff and manage projects adequately, which may slow the development process, result in the commercialization of fewer products or compromise the quality of our work.

*We have incurred recent losses, and because our strategy for expansion may be costly to implement, we may experience continuing losses which may be significant.*

We incurred consolidated net losses of approximately \$2.0 million for the year ended December 31, 2005. We expect to continue to incur significant additional expenses as we expand our business, including increased expenses for research and development, sales and marketing, manufacturing, finance and accounting personnel and expenses associated with being a public company. We may also grow our business in part through acquisitions of additional companies and complementary technologies which could cause us to incur greater than anticipated transaction expenses, amortization or write-offs of intangible assets and other acquisition-related expenses. As a result, we expect that we may likely continue to incur losses for the foreseeable future, and these losses could be substantial.

Because of the numerous risks and uncertainties associated with our business and our expansion strategy, we are unable to predict when or if we will be able to achieve profitability again. If our revenues do not increase, or if our expenses increase at a greater rate than our revenues, we will continue to experience losses. Even if we do achieve profitability, we may not be able to sustain or increase our profitability on a quarterly or annual basis.

*We may not be successful in identifying market needs for new technologies and developing new products to meet those needs.*

The success of our business model depends on our ability to identify correctly market needs for new technologies. We intend to identify new market needs, but we may not always have success in doing so, in part, because our contract research largely

## Risk factors

centers on technologies characterized by constant change and unpredictable markets. Furthermore, we must identify the most promising technologies from a sizable pool of projects. For example, we had 68 contract research projects as of December 31, 2005. If our Commercialization Strategy Group fails to identify the projects with the highest commercial potential or if management does not ensure that only the highest potential projects advance to the commercialization stage, we may not successfully commercialize new products and grow our revenues.

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

***We rely and will continue to rely on contract research for a significant portion of our revenues. Any decrease in these revenues, including Small Business Innovation Research, or SBIR, revenues, could adversely affect our business.***

We derive a significant portion of our revenues from contract research which we perform for third parties. Contract research accounted for approximately 61.3% and 93.5% of our consolidated total revenues for the years ended December 31, 2004 and 2005, respectively. SBIR revenues accounted for approximately 43.3% and 59.8% of our consolidated total revenues for the years ended December 31, 2004 and 2005, respectively, and 40.2% and 52.8% of our pro forma consolidated total revenues, which include the operations of Luna Technologies for the years ended December 31, 2004 and 2005, respectively. Contract research will remain a significant portion of our consolidated total revenues for the foreseeable future. Our strategy for developing innovative technologies and products depends in large part on our ability to continue to enter into and generate revenues from contract research, including SBIR contracts, for which we must comply with certain eligibility criteria. Our contract research customer base includes government agencies, academic institutions and corporations. Our customers are not obligated to extend their agreements with us. In addition, our contracts with government agencies, which accounted for approximately 86.1% and 93.3% of our contract research revenues for the years ended December 31, 2004 and 2005, respectively, provide that the U.S. government may terminate funding prior to the expiration of these contracts, regardless of whether we have demonstrated technological feasibility or have met specified milestones. In addition, we may not be successful in securing future contracts. Our customers' priorities regarding funding for certain projects may change and funding resources may no longer be available at previous levels.

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

We may not qualify to participate in the Small Business Administration's, or SBA's, SBIR program or receive an SBIR award from any federal agency in the future. In order to qualify for SBIR contracts and grants, at least 51% of our equity must be

## Risk factors

owned and controlled by U.S. citizens or permanent resident aliens, or by another entity that is at least 51% owned or controlled by U.S. citizens or permanent resident aliens, and we must have 500 or fewer employees. These eligibility criteria are applied as of the time of the award of a contract or grant. In determining whether we satisfy the 51% equity ownership requirement, agreements to merge, stock options, convertible debt and other similar instruments are given "present effect" by the SBA, as though the underlying security were actually issued unless the exercisability or conversion of such securities is speculative, remote or beyond the control of the security holder. We therefore believe our outstanding options and warrants held by eligible individuals may be counted as, and our convertible debt may be excluded from, outstanding equity for purposes of meeting the 51% equity ownership requirement. As of December 31, 2005, giving present effect to our outstanding options, approximately 73% of our equity was owned by U.S. citizens or permanent resident aliens. Upon the completion of this offering, approximately % of our equity will be owned by U.S. citizens or permanent resident aliens (and approximately % assuming exercise of the underwriters' over-allotment option).

We believe that we are currently in compliance with the SBIR eligibility criteria but we cannot provide assurance that the SBA will interpret its regulations in our favor. We must be able to certify that we meet the SBIR ownership and size requirements as of the time we enter into each SBIR contract or grant, and SBA may review our size status in connection with each SBIR contract or grant. As we grow our business, it is foreseeable that we will eventually exceed the SBIR eligibility limitations and we may need to find other sources to fund our research and development efforts. If we are unsuccessful in obtaining additional contracts or funding grants because we cannot meet the eligibility requirements or if our customers decide to reduce or discontinue support of our products, we may be required to seek alternative sources of revenues or capital.

***The SBA could determine that, as a result of Carilion Health System's equity ownership, the number of our employees exceeds the size limitation placed on SBA contract and SBIR grant recipients, and therefore we will not be eligible to receive future SBA contracts and SBIR grants.***

In addition to the U.S. ownership eligibility criteria discussed above, to be eligible for SBA contracts and SBIR grants, the number of our employees including those of any entities that are considered to be affiliated with us, cannot exceed 500. As of December 31, 2005, we, including all of our divisions, had 131 full-time and 12 part-time employees. However, in determining whether we are affiliated with any other entity, the SBA analyzes whether another entity controls or has the power to control us. If the SBA determines that another entity controls or has the power to control us, it will aggregate that entity's employees (and the employees of its subsidiaries and affiliates) with our own for purposes of applying the 500 employee test.

The SBA may make an affiliation determination based on stock ownership. For example, the SBA may presume that two or more entities have the power to control a company if the entities each own, control or has the power to control, less than 50 percent of the company's stock, such minority holdings are equal or approximately equal in size, and the aggregate of the minority holdings is large as compared to any other stock holding. However, this presumption may be rebutted by showing that such control or power to control does not in fact exist. Prior to this offering, Carilion Health System held 35.5% of the voting power of our common stock, and Dr. Kent Murphy owned 43.9% of the voting power of our common stock, and after the offering, these ownership percentages will be approximately equal to % and %, respectively. Thus, applying the criteria stated above, the SBA could find that both Carilion Health System and Dr. Murphy own less than 50% of the stock, their percentages are roughly equal, and their respective percentages are large compared to any other stock holding. We believe that the relative beneficial ownership of our individual stockholders rebuts the presumption of control by Carilion Health System because the shares held by our executive officers and directors constitute the controlling interest in us. However, if the SBA were to make a determination that we are affiliated with Carilion Health System, we would exceed the size limitations as Carilion Health System has over 500 employees, and we therefore would lose eligibility for SBA contracts, public contracts, grants and other awards that are set aside for small businesses, including SBIR grants.

Risk factors

***We depend on government-funded research contracts for most of our contract research revenues, and a decline in government funding of existing or future government research contracts could adversely affect our revenues and cash flows and our ability to fund our growth.***

Government-funded research accounted for approximately 86.1% and 93.3% of our contract research revenues and 52.8% and 87.2% of our consolidated total revenues for the years ended December 31, 2004 and 2005, respectively. On a pro forma consolidated basis, which includes the results of operations of Luna Technologies as if acquired on January 1, 2004, government-funded research accounted for 49.0% and 76.9% of our pro forma consolidated total revenues for the years ended December 31, 2004 and 2005, respectively. As a result, we are vulnerable to adverse changes in our revenues and cash flows if a significant number of our government research contracts and subcontracts are simultaneously delayed or canceled for budgetary, performance or other reasons. The U.S. government may cancel these contracts at any time without cause and without penalty or may change its requirements, programs or contract budget, any of which could reduce our revenues and cash flows from U.S. government research contracts. Our revenues and cash flows from U.S. government research contracts could also be reduced by declines or other changes in U.S. defense, homeland security and other federal agency budgets. In addition, we compete as a small business for some of these contracts, and in order to maintain our eligibility to compete as a small business, we (together with any affiliates) must continue to meet size and revenue limitations established by the U.S. government.

In addition to contract cancellations and changes in agency budgets, our future financial results may be adversely affected by curtailment of the U.S. government's use of contract research providers, including curtailment due to government budget reductions and related fiscal matters. These or other factors could cause U.S. defense and other federal agencies to conduct research internally rather than through commercial research organizations, to reduce their overall contract research requirements or to exercise their rights to terminate contracts. Any of these actions could limit our ability to obtain new contract awards and adversely affect our revenues and cash flows and our ability to fund our growth.

***If we cannot successfully transition our revenues 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 revenues mix that contains significantly larger product sales and license revenues components. Product sales and license revenues potentially offer greater scalability than services-based contract research revenues. Our current plan is to increase our portfolio of commercial products and, accordingly, we expect that our future product sales and license revenues will represent a larger percentage of total revenues. However, if we are unable to develop and grow our product sales and license revenues to augment our contract research revenues, our ability to execute our business model or grow our business could suffer.

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

We face or will face substantial competition from a variety of companies in several different markets. Our competitors in contract research include, but are not limited to, companies such as General Dynamics Corporation, Lockheed Martin Corporation, SAIC, Inc. and SRA International, Inc. In the molecular technology solutions products market, our competitors include, but are not limited to, large public manufacturers such as The Dow Chemical Company, E.I. du Pont de Nemours and Company, Rohm and Haas Company and 3M Company, as well as emerging companies. In addition, in the MRI contrast agent market our competitors include Amersham Plc, Berlex Laboratories, Inc., Bracco Diagnostics, Inc., and Mallinckrodt Inc. In the sensor solutions products market, our competitors include, but are not limited to, large companies such as Agilent Technologies, Inc., Analog Devices, Inc., Freescale Semiconductor, Inc., JDS Uniphase Corp., Robert Bosch GmbH and Silicon Sensing, as well as emerging companies.

The products that we have developed or are currently developing will compete with other technologically innovative products as well as products incorporating conventional materials and technologies. We expect that our products will compete with

## Risk factors

companies in a wide range of industries, including semiconductors, electronics, biotechnology, textiles, alternative energy, military, defense, healthcare, telecommunications, industrial measurement, security applications and consumer electronics.

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

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

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

In addition, some of our licenses with academic institutions give us the right to use certain technology previously developed by researchers at these institutions. In certain cases we also have the right to practice improvements on the licensed technology to the extent they are encompassed by the licensed patents and within our field of use. Our licensors may currently own and may in the future obtain additional patents and patent applications that are necessary for the development, manufacture and commercial sale of our anticipated products. We may be unable to agree with one or more academic institutions from which we have obtained licenses that certain intellectual property developed by researchers at these academic institutions is covered by our existing licenses. In the event that the new intellectual property is not covered by our existing licenses, we would be required to negotiate a new license agreement. We may not be able to reach agreement with current or future licensors on commercially reasonable terms, if at all, or the terms may not permit us to sell our products at a profit after payment of royalties, which could harm our business.

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

## Risk factors

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

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

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

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

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

We also rely on trade secrets to protect our technology, especially where we believe patent protection is not appropriate or obtainable. However, trade secrets are difficult to protect. We vigorously pursue confidentiality agreements and contractual provisions with our collaborators, employees, and consultants to protect our trade secrets and proprietary know-how. These agreements may be breached and or may not have adequate remedies for such breach. While we use reasonable efforts to protect our trade secrets, our employees, consultants, contractors or scientific and other advisors, or those of our strategic partners, may unintentionally or willfully disclose our information to competitors. If we were to enforce a claim that a third party

## Risk factors

had illegally obtained and was using our trade secrets, our enforcement efforts would be expensive and time consuming, and the outcome would be unpredictable. In addition, courts outside the United States are sometimes unwilling to protect trade secrets. Moreover, if our competitors independently develop equivalent knowledge, methods and know-how, it will be more difficult for us to enforce our rights and our business could be harmed.

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

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

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

Various U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in our technology areas. Such third parties may claim that we infringe their patents. Because patent applications can take several years to result in a patent issuance, there may be currently pending applications, unknown to us, which may later result in issued patents that our technologies may infringe. For example, we are aware of competitors with patents in technology areas applicable to our optical test equipment products. Such competitors may allege that we infringe these patents. There could also be existing patents of which we are not aware that our technologies may inadvertently infringe. If third parties assert claims against us alleging that we infringe their patents or other intellectual property rights—including third parties that have asserted claims against businesses that we have acquired prior to our acquisition of these businesses—we could incur substantial costs and diversion of management resources in defending these claims, and the defense of these claims could have a material adverse effect on our business, financial condition, and results of operations. In addition, if third parties assert claims against us and we are unsuccessful in defending against these claims, these third parties may be awarded substantial damages, as well as injunctive or other equitable relief against us, which could effectively block our ability to make, use, sell, distribute, or market our products and services in the United States or abroad. For example, we acquired a business that had received a letter in 2002 from a competitor alleging infringement of certain patents. The competitor sent an additional letter on January 14, 2004 to the business that we acquired, again alleging infringement of the competitor's patents. Neither we nor the business that we acquired have received any further communications from this third party. We cannot currently predict whether this third party, or any other third party, will assert a claim against us, or whether any third parties that have asserted such claims against businesses that we have acquired will assert claims or pursue infringement litigation against us; nor can we predict the ultimate outcome of any such potential claims or litigation.

Commercial application of nanotechnologies, or technologies involving nanomaterials, is new and the scope and breadth of patent protection is uncertain. Consequently, the patent positions of companies involved in nanotechnologies have not been tested and complex legal and factual questions for which important legal principles will be developed or may remain unresolved. In addition, it is not clear whether such patents will be subject to interpretations or legal doctrines that differ from conventional patent law principles. Changes in either the patent laws or in interpretations of patent laws in the United States and other countries may diminish the value of our nanotechnology-related intellectual property. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our nanotechnology-related patents or in third party patents.

In the event that a claim relating to intellectual property is asserted against us, or third parties not affiliated with us hold pending or issued patents that relate to our products or technology, we may seek licenses to such intellectual property or

---

[Table of Contents](#)

Risk factors

challenge those patents. However, we may be unable to obtain these licenses on commercially reasonable terms, if at all, and our challenge of the patents may be unsuccessful. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of our products and, therefore, could have a material adverse effect on our business, financial condition, and results of operations.

For example, we are a party to an exclusive license agreement with NASA for certain patented ultrasound technology. The field of this license is limited to measurement of intracranial pressure and compartment syndrome. We currently engage in ultrasound product development activities in bone strength measurement, embolus detection and detection of concealed weapons. To the extent that these activities are covered by the licensed NASA patents, we may be required to acquire an additional license from NASA. We cannot currently predict whether NASA would grant an additional license to us for these fields of use, if such a license were required.

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

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

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

In March 2003, the Office of Inspector General of the Department of Commerce advised us that the government was investigating anonymous allegations of contract improprieties. We have cooperated fully and extensively with that investigation through interviews and document production. In April 2003, the government advised our regulatory counsel that to date no wrongdoing had been identified, although the government indicated that we may not have fully complied with contractual reporting requirements in one or two instances, which the government did not specify. We believe that the investigation has been resolved favorably, based on statements by the government investigator to our employees in June 2003, and that this matter effectively is at an end absent any advice or communication from the government to the contrary. However, there can be no assurance as to how or whether our relationships, business, financial condition or results of operations will ultimately be affected, if at all, by the investigation.

On November 9, 2004, we received a subpoena from the Department of Defense Office of the Inspector General covering certain government research contracts awarded to us between January 1, 1998 and November 9, 2004 to determine if we had duplicated work in our submission of project reports to the government. In connection with the investigation, the government alleged that duplication occurred in three research reports that we prepared under the contracts. We submitted a response to the Inspector General in September 2005 challenging the government's findings. On November 15, 2005, we entered into a

## Risk factors

settlement agreement with the government and received a general release with respect to the civil and administrative claims in this matter in return for a payment of \$165,333.

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

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

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

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

The European Union Directive 2002/96/EC on Waste Electrical and Electronic Equipment, known as the "WEEE Directive," requires producers of certain electrical and electronic equipment, including monitoring instruments, to be financially responsible for specified collection, recycling, treatment and disposal of past and present covered products placed on the market in the European Union. As a manufacturer of covered products, we may be required to register as a producer in some European Union countries, and we may incur some financial responsibility for the collection, recycling, treatment and disposal of both new product sold, and product already sold prior to the WEEE Directive's enforcement date, including the products of other manufacturers where these are replaced by our own products. European Union Directive 2002/95/EC on the Restriction of the use of Hazardous Substances in electrical and electronic equipment, known as the "RoHS Directive," restricts the use of certain hazardous substances, including mercury, lead and cadmium in specified covered products; however, the RoHS Directive currently exempts monitoring instruments from its requirements. If the European Commission were to remove this exemption in the future, we would be required to change our manufacturing processes and redesign products regulated under the RoHS Directive in order to be able to continue to offer them for sale within the European Union. For some products, substituting certain components containing regulated hazardous substances may be difficult, costly or result in production delays. We will continue to review the applicability and impact of both directives on the sale of our products within the European Union, and although we cannot currently estimate the extent of such impact, they are likely to result in additional costs and could require us to redesign or change how we manufacture our products, any of which could adversely affect our operating results. Failure to comply with the directives could result in the imposition of fines and penalties, inability to sell covered products in the European Union and loss of revenues.

## Risk factors

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

***Our ability to develop and market certain of our current and potential products may be hindered as a result of FDA regulatory requirements and a lengthy and expensive approval process.***

Certain of our current and potential products will require regulatory clearances or approvals prior to commercialization. In particular, our Trimetasphere™ nanomaterial-based MRI contrast agent and our ultrasound diagnostic devices for measuring certain medical conditions will be considered a drug and medical devices, respectively, under the Federal Food, Drug & Cosmetic Act, or FDC Act. Drugs and medical devices are subject to rigorous preclinical testing and other approval requirements by the Food and Drug Administration, or FDA, pursuant to the FDC Act, and regulations under the FDC Act, as well as by similar health authorities in foreign countries. Various federal statutes and regulations also govern or influence the testing, manufacturing, safety, labeling, packaging, advertising, storage, registration, listing and recordkeeping related to marketing of these products. The process of obtaining these clearances or approvals and the subsequent compliance with appropriate federal statutes and regulations require the expenditure of substantial resources. We cannot be certain that any required FDA or other regulatory approval will be granted or, if granted, will not be withdrawn. Our failure to obtain the necessary regulatory approvals, or our failure to obtain them in a timely manner, will prevent or delay our commercialization of new products and our business could suffer.

***Our failure to attract, train and retain skilled employees would adversely affect our business and operating results.***

The availability of highly trained and skilled technical and professional personnel is critical to our future growth and profitability. Competition for scientists, engineers, technicians and professional personnel is intense and competitors aggressively recruit key employees. Although we have not previously experienced material difficulties in hiring or retaining these personnel, our growth strategy and future needs for additional experienced personnel, particularly in highly specialized areas such as nanomaterial manufacturing and innovative ultrasound technologies, may make it more difficult to meet all of our needs for these employees in a timely manner. Although we intend to continue to devote significant resources to recruit, train and retain qualified employees, we may not be able to attract and retain these employees, especially in technical fields where the supply of experienced qualified candidates is limited. Any failure to do so would have an adverse effect on our business.

In addition, our future success depends in a large part upon the continued service of key members of our senior management team. In particular, our Chairman, CEO and founder, Kent A. Murphy, Ph.D., is essential to our overall management as well as the development of our technologies, our culture and our strategic direction. All of our executive officers and key employees are at-will employees, and, except with respect to Kent A. Murphy, Ph.D., we do not maintain any key-person life insurance policies. The loss of any of our management or key personnel could seriously harm our business.

***We might require additional capital to support business growth, and this capital might not be available.***

We intend to continue to make investments to support our business growth and may require additional funds to respond to business challenges, including the need to develop new products or enhance our existing products, enhance our operating infrastructure, complete our development activities, build our commercial scale manufacturing facilities and acquire complementary businesses and technologies. Accordingly, we may need to engage in equity or debt financings to secure additional funds for these investments. If we raise additional funds through issuances of equity or convertible debt securities,

## Risk factors

our existing stockholders could suffer significant dilution, and any new equity securities we issue could have rights, preferences and privileges superior to those of holders of our common stock, including shares of common stock sold in this offering. Furthermore, such financings may jeopardize our ability to apply for SBIR grants or qualify for SBIR contracts or grants, and our dependence on SBIR grants may restrict our ability to raise additional outside capital. Our ability to obtain additional capital could be restricted by the covenants in our existing senior secured credit facility with First National Bank. Among other things, these covenants restrict us, without the prior approval of First National Bank, from guaranteeing the debt of an affiliate or subsidiary or incurring in excess of \$200 thousand non-First National Bank debt annually. Any debt financing obtained by us in the future could involve restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and to pursue business opportunities, including potential acquisitions. In addition, we may not be able to obtain continued SBIR funding, or other additional financing on terms favorable to us, if at all. In order to retain SBIR eligibility, we may be restricted in our ability to raise certain forms of equity capital from institutional investors. For example, in connection with the closing of our financing with Carilion Health System on December 30, 2005, we were not able to raise all proceeds through the issuance of equity without potentially jeopardizing our SBIR eligibility. We therefore elected to issue debt in the amount of \$5.0 million of the total \$8.0 million raised in such financing to maintain SBIR eligibility. Under the terms of these notes, we agreed that we will not draw down any amount under our existing senior secured credit facility with First National Bank or incur additional indebtedness other than under certain limited conditions. If we are unable to obtain adequate financing or financing on terms satisfactory to us, when we require it, our ability to continue to support our business growth and to respond to business challenges could be significantly limited.

***We have limited experience manufacturing our products in commercial quantities in a cost-effective manner, which could adversely impact our business.***

We have produced most of our products on a custom order basis rather than pursuant to large contracts that require production on a large volume basis. Accordingly, other than the commercial manufacture of products by our Luna Technologies Division, we have no experience manufacturing products in large volume. Because our experience in large scale manufacturing is limited, we may encounter unforeseen difficulties in our efforts to manufacture other products or materials in commercial quantities. For example, we may need to develop or in-license Trimetasphere™ nanomaterial purification and isolation technology, which would result in manufacturing delays or shortfalls. We may also encounter difficulties and delays in manufacturing our products for the following reasons:

- we plan to expand our manufacturing operations, and our production processes may have to change to accommodate this growth;
- to increase our manufacturing output significantly, we will have to attract and retain qualified employees, who are in short supply, for the assembly and testing operations;
- we might have to sub-contract to outside manufacturers which might limit our control of costs and processes; and
- our manufacturing operations may have to comply with government specifications including FDA regulations.

If we are unable to keep up with demand for our products, our revenues could be impaired, market acceptance for our products could be adversely affected and our customers might instead purchase our competitors' products. Moreover, failure to develop and maintain a U.S. market for goods developed with U.S. government-licensed technology may result in the cancellation of the relevant U.S. government licenses. Our inability to manufacture our products successfully would have a material adverse effect on our revenues.

Even if we are able to manufacture our products on a commercial scale, the cost of manufacturing our products may be higher than we expect. If the costs associated with manufacturing are not significantly less than the prices at which we can sell our products, we may not be able to operate at a profit.

## Risk factors

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

We primarily rely on third-party vendors for the manufacture of the specialized components used in our products. Although we do not have any sole source suppliers of materials, the highly specialized nature of our supply requirements poses risks that we may not be able to locate additional sources of the specialized components required in our business. For example, we are aware of only two manufacturers that produce the special lasers used in our optical test equipment. Moreover, none of these third-party vendors is obligated to continue to supply us with components. Our reliance on these vendors subjects us to a number of risks that could impact our ability to manufacture our products and harm our business, including interruption of supply.

Any significant delay or interruption in the supply of components, or our inability to obtain substitute components or materials from alternate sources at acceptable prices in a timely manner, could impair our ability to meet the demand of our customers and harm our business.

***Our nanotechnology-enabled products are new and may be, or may be perceived as being, harmful to human health or the environment.***

While we believe that none of our current products contain chemicals known by us to be hazardous or subject to environmental regulation, it is possible our current or future products, particularly carbon-based nanomaterials, may become subject to environmental regulation. We intend to develop and sell carbon-based nanomaterials as well as nanotechnology-enabled products, which are products that include nanomaterials as a component to enhance those products' performance. Nanomaterials and nanotechnology-enabled products have a limited historical safety record. Because of their size or shape or because they may contain harmful elements, such as gadolinium and other rare-earth metals, our products could pose a safety risk to human health or the environment. These characteristics may also cause countries to adopt regulations in the future prohibiting or limiting the manufacture, distribution or use of nanomaterials or nanotechnology-enabled products. Such regulations may inhibit our ability to sell some end user products containing those materials and thereby harm our business or impair our ability to develop commercially viable products.

The subject of nanotechnology has received negative publicity and has aroused public debate. Government authorities could, for social or other purposes, prohibit or regulate the use of nanotechnology. Ethical and other concerns about nanotechnology could adversely affect acceptance of our potential products or lead to government regulation of nanotechnology-enabled products.

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

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

- changes in or interpretations of foreign regulations that may adversely affect our ability to sell our products, perform services or repatriate profits to the United States;
- the imposition of tariffs;
- hyperinflation or economic or political instability in foreign countries;
- imposition of limitations on or increase of withholding and other taxes on remittances and other payments by foreign subsidiaries or joint ventures;
- conducting business in places where business practices and customs are unfamiliar and unknown;
- the imposition of restrictive trade policies;

Risk factors

- the imposition of inconsistent laws or regulations;
- the imposition or increase of investment and other restrictions or requirements by foreign governments;
- uncertainties relating to foreign laws and legal proceedings;
- having to comply with a variety of U.S. laws, including the Foreign Corrupt Practices Act;
- having to comply with U.S. export control regulations and policies that restrict our ability to communicate with non-U.S. employees and supply foreign affiliates and customers; and
- having to comply with licensing requirements.

We do not know the impact that these regulatory, geopolitical and other factors may have on our international business in the future.

**Risks Related to This Offering**

*Our common stock has never been publicly traded, and we expect that the price of our common stock will fluctuate substantially.*

Before this initial public offering, there has been no public market for our common stock. An active public trading market may not develop after completion of this offering or, if developed, may not be sustained. The initial public offering price may not be indicative of prices that will prevail in the trading market. The public trading price for our common stock after this offering will be affected by a number of factors, including:

- changes in earnings estimates, investors' perceptions, recommendations by securities analysts or our failure to achieve analysts' earning estimates;
- changes in our status as an entity eligible to receive SBIR contracts and grants;
- quarterly variations in our or our competitors' results of operations;
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors;
- announcements by us, or our competitors, of acquisitions, new products, significant contracts, commercial relationships or capital commitments;
- commencement of, or involvement in, litigation;
- any major change in our board of directors or management;
- changes in governmental regulations or in the status of our regulatory approvals;
- announcements related to patents issued to us or our competitors and to litigation;
- a lack of, limited or negative industry or security analyst coverage; and
- developments in our industry.

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

Risk factors

***New investors in our common stock will experience immediate and substantial dilution.***

Our initial public offering price is substantially higher than the book value per share of our common stock. If you purchase common stock in this offering, you will incur immediate dilution of \$ \_\_\_\_\_ in net tangible book value per share of common stock. This amount represents the difference between the assumed initial public offering price of \$ \_\_\_\_\_ per share, which is based on the mid-point of the range on the front cover of this prospectus, and the net tangible book value per share of common stock after the offering of \$ \_\_\_\_\_. In addition, the number of shares available for issuance under our stock plans may increase annually without further stockholder approval. Investors will incur additional dilution upon the exercise of stock options and warrants. See "Dilution."

***If there are substantial sales of our common stock, our stock price could decline.***

If our existing stockholders sell a large number of shares of our common stock or the public market perceives that these sales may occur, the market price of our common stock could decline. Upon the closing of this offering, assuming no outstanding options are exercised prior to the closing of this offering, we will have approximately \_\_\_\_\_ shares of common stock outstanding. The \_\_\_\_\_ shares to be sold under this prospectus will be freely tradable without restriction or further registration under the federal securities laws, unless purchased by our affiliates. Taking into consideration the effect of the 180-day lock-up agreements that have been entered into by certain of our stockholders, we estimate that the remaining \_\_\_\_\_ shares of our common stock outstanding upon the closing of this offering will be available for sale pursuant to Rule 144, Rule 144(k) and Rule 701, as follows:

- \_\_\_\_\_ shares will be immediately eligible for sale in the public market without restriction pursuant to Rule 144(k);
- \_\_\_\_\_ additional shares will be eligible for sale in the public market under Rule 144 or Rule 701 beginning 90 days after the date of this prospectus, subject to volume, manner of sale, and other limitations under those rules;
- \_\_\_\_\_ additional shares will become eligible for sale, subject to the provisions of Rule 144, Rule 144(k) or Rule 701, beginning 180 days after the date of this prospectus, upon the expiration of agreements not to sell such shares entered into between the underwriters and such stockholders; and
- \_\_\_\_\_ additional shares will be eligible for sale from time to time thereafter upon expiration of their respective one-year holding periods, but could be sold earlier if the holders exercise any available registration rights. Of such shares subject to the provisions of Rule 144, 2,639,688 and 1,131,294 shares may be sold by Carilion Health System beginning August 4, 2006 and December 30, 2006, respectively, and 183,120 shares may be sold by three individuals beginning November 22, 2006.

Existing stockholders holding an aggregate of \_\_\_\_\_ shares of common stock (including shares of our common stock purchasable pursuant to warrants to purchase our common stock), based on shares outstanding as of December 31, 2005, have rights with respect to the registration of these shares of common stock with the SEC. See "Description of capital stock—Registration Rights." If we register these shares of common stock, these holders will be able to sell immediately those shares in the public market.

Within three months following the completion of this offering, we intend to file a registration statement to register 12,715,000 shares of common stock reserved for issuance under our 2003 Stock Plan (including an increase of 1,715,000 shares since December 31, 2005) and 2006 Equity Incentive Plan, thus permitting the resale of such shares. As of December 31, 2005, \_\_\_\_\_ shares were subject to outstanding options, \_\_\_\_\_ of which options were vested.

Once we register these shares, they can be freely sold in the public market upon issuance, subject to the underwriter lock-up agreements, our stock purchase restriction agreements and restrictions on our affiliates.

## Risk factors

In addition, holders of warrants exercisable for up to \_\_\_\_\_ shares of common stock may exercise those rights and subsequently sell the underlying shares in the public market.

ThinkEquity Partners LLC, on behalf of the underwriters, may in its sole discretion, at any time without notice, release all or any portion of the shares subject to the lock-up agreements, which would result in more shares being available for sale in the public market at earlier dates. Sales of common stock by existing stockholders in the public market, the availability of these shares for sale, our issuance of securities or the perception that any of these events might occur could materially and adversely affect the market price of our common stock.

In addition, employees holding options exercisable for \_\_\_\_\_ shares of our common stock have entered into an agreement not to sell more than 20.0% of such shares in any year during the five years following the effective date of this offering, provided, any share subject to such annual limit not sold in a year may be sold in subsequent years notwithstanding such limitation. Certain members of our management holding options exercisable for \_\_\_\_\_ shares of our common stock have entered into an agreement not to sell more than 15.0% of such shares in any year during the five years following the effective date of this offering, provided, any share subject to such annual limit not sold in a year may be sold in subsequent years notwithstanding such limitation. We have the right to waive any of these resale restrictions for employees and management at our discretion, and in such instance, the shares would become freely tradable.

***Our management will have broad discretion over the use of the proceeds to us from this offering and might not apply the proceeds of this offering in ways that increase the value of your investment.***

Our management will have broad discretion to use the net proceeds from this offering, and you will be relying on the judgment of our management regarding the application of these proceeds. They might not apply the net proceeds of this offering in ways that increase the value of your investment. We expect to use the net proceeds from this offering for general corporate purposes, which may include working capital, capital expenditures, other corporate expenses and potential acquisitions of complementary products, technologies or businesses. We have not allocated these net proceeds for any specific purposes. Our management might not be able to yield a significant return, if any, on any investment of these net proceeds.

***Our directors and management will collectively control over \_\_\_\_\_ % of our outstanding common stock.***

Immediately after this offering, our directors and executive officers and their affiliates will collectively control approximately \_\_\_\_\_ % of our outstanding common stock or approximately \_\_\_\_\_ % if the underwriters exercise their over-allotment option in full. As a result, these stockholders, if they act together, will be able to influence our management and affairs and all matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions. You and other stockholders will have minimal influence over these actions. This concentration of ownership may have the effect of delaying or preventing a change in control of our company and might adversely affect the market price of our common stock.

***Our financial results may vary significantly from period to period which may reduce our stock price.***

Our financial results may fluctuate as a result of a number of factors, many of which are outside of our control, which may cause the market price of our common stock to fall. For these reasons, comparing our operating results on a period-to-period basis may not be meaningful, and you should not rely on our past results as an indication of our future performance. Our financial results may be negatively affected by any of the risk factors listed in this "Risk factors" section and, in particular, the following risks:

- a reduction of contract research funding;
- decisions by government agencies, academic institutions or corporations not to exercise contract options or to modify, curtail or terminate our major contracts;

---

[Table of Contents](#)

Risk factors

- failure to estimate or control contract costs;
- adverse judgments or settlements in legal disputes;
- expenses related to acquisitions, mergers or joint ventures; and
- other one-time financial charges.

***We will incur increased costs as a result of being a public company.***

As a public company, we will incur significant legal, accounting and other expenses that we did not incur as a private company. We will incur costs associated with our public company reporting requirements. We also anticipate that we will incur costs associated with corporate governance requirements, including requirements under the Sarbanes-Oxley Act of 2002, as well as new rules implemented by the SEC and the National Association of Securities Dealers, Inc., or NASD. We expect these rules and regulations to increase our legal and financial compliance costs and to make some activities more time-consuming and costly. We also expect these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, it may be more difficult for us to attract and retain qualified individuals to serve on our board of directors or as executive officers. We cannot predict or estimate the amount of additional costs we may incur or the timing of such costs.

***Investors could lose confidence in our financial reports, and our stock price may be adversely affected, if our internal control over financial reporting are found not to be effective by management or by an independent registered public accounting firm or if we make disclosure of existing or potential significant deficiencies or material weaknesses in those controls.***

Beginning with our Annual Report for the year ending December 31, 2007, Section 404 of the Sarbanes-Oxley Act of 2002 requires us to include an internal control report with our Annual Report on Form 10-K. That report must include management's assessment of the effectiveness of our internal control over financial reporting as of the end of the fiscal year. Additionally, our independent registered public accounting firm will be required to issue a report on management's assessment of our internal control over financial reporting and a report on their evaluation of the operating effectiveness of our internal control over financial reporting.

We continue to evaluate our existing internal control over financial reporting against the standards adopted by the Public Company Accounting Oversight Board, or PCAOB. During the course of our ongoing evaluation of the internal controls, we may identify areas requiring improvement, and may have to design enhanced processes and controls to address issues identified through this review. Remedying any deficiencies, significant deficiencies or material weaknesses that we or our independent registered public accounting firm may identify, may require us to incur significant costs and expend significant time and management resources. We cannot assure you that any of the measures we implement to remedy any such deficiencies will effectively mitigate or remedy such deficiencies. Investors could lose confidence in our financial reports, and our stock price may be adversely affected, if our internal controls over financial reporting are found not to be effective by management or by an independent registered public accounting firm or if we make disclosure of existing or potential significant deficiencies or material weaknesses in those controls.

***Our independent auditors have identified material weaknesses and significant deficiencies in our internal controls, and if we are unable to develop, implement and maintain appropriate controls we will not be able to comply with applicable regulatory requirements imposed on reporting companies.***

In connection with the audit of our financial statements for each of the three years in the period ended December 31, 2005, our independent registered public accounting firm identified certain weaknesses in our internal control over financial reporting,

## Risk factors

which they considered to be material weaknesses and significant deficiencies. Specifically, because we lack appropriate resources and personnel with sufficient experience, our independent registered public accounting firm noted weaknesses in our ability to account for certain complex accounting transactions relating to business combinations and consolidation matters, to account for share-based payments to employees and consultants, as well as weaknesses in our ability to prepare timely consolidated financial statements in accordance with U.S. generally accepted accounting principles and Regulation S-X under the Securities Exchange Act of 1934, as amended. We also lack adequate cutoff and accrual procedures which materially affected recognition of expenses and, in certain instances, related revenues. These weaknesses led to significant audit adjustments for each of the three years in the period ended December 31, 2005 which had a material effect on our financial statements.

Our business operations were relatively small for several years and, as a result, we have operated with very limited staffing of key accounting functions. Such limited staffing made it difficult for us to segregate certain accounting functions. Because of these circumstances, we have relied on outside consultants to supplement our internal accounting staff and to meet our financial reporting obligations.

We are actively recruiting key senior accounting and finance employees to include a new Chief Financial Officer and other accounting staff to enhance our internal control and procedures over financial reporting. Upon hiring a new Chief Financial Officer, our current Chief Financial Officer will continue to serve as our Executive Vice President, Corporate Development. We have recently hired a Chief Accounting Officer as well as an additional senior accountant. These individuals have prior experience handling external financial reporting in a public company environment and should improve our ability to prepare timely consolidated financial statements as well to address more complex accounting matters, such as business combinations and share-based payments. We also hired an additional accounts payable and payroll accountant to improve segregation of duties and redistribute the overall workload on our accounting staff.

We also intend to establish new and enhanced systems of internal control that we believe will be necessary to allow management to report on, and our independent auditors to attest to, our internal controls. To improve the timeliness of our financial reporting, we have instituted a new detailed closing schedule to enhance overall completeness and quality of our reporting. The new schedule was first implemented in March 2006 and provides guidance on routine processes, such as procedures for handling key account reconciliations, month end cutoff procedures for accounts payable and accrued expenses as well as cutoff procedures for revenue and related receivables. The documentation will be expanded in later periods to provide detailed guidance of our entire closing process including preparation of interim and year-end consolidated financial statements and related notes. We have also taken measures to improve our cutoff and accrual procedures. Specifically, we have implemented a process to improve our estimation of subcontractor expenses to ensure completeness of our direct costs and related revenue. We will continue to review this process to monitor the sufficiency of such policies and procedures.

Although we do not believe we have material weaknesses or significant deficiencies related to our policies and procedures that pertain to maintenance of records, authorizations of receipts and expenditures, or prevention or timely detection of unauthorized acquisition, use, or disposition of our assets, we have not performed specific tests to determine the effectiveness of key controls within these policies and procedures. We intend to monitor those policies and procedures in connection with the establishment of a formally documented system of internal control. We are beginning a comprehensive documentation of our internal controls processes in order to identify additional areas for improvement as well as in anticipation of our future requirements under the Sarbanes-Oxley Act of 2002. We have assigned personnel to begin the process with the expectation of completing documentation of certain key processes by the end of the second quarter of 2006.

While we anticipate being able to implement fully the requirements relating to internal controls and all other applicable requirements of the Sarbanes-Oxley Act of 2002 in a timely fashion, we cannot be certain as to the timing of the completion of our evaluation and testing and any necessary remediation or the impact of the same on our operations. Our development,

## Risk factors

implementation and maintenance of appropriate internal controls will depend materially both on our successful hiring and retention of key senior accounting personnel. If we are not able to complete the assessment required under Section 404 in a timely manner, we and our independent registered public accounting firm would be unable to conclude that our internal control over financial reporting is effective as of December 31, 2007.

If we are unable to attract and retain qualified personnel, to implement and integrate financial reporting and accounting systems or if we are unable to scale these systems to our growth, we may not have adequate, accurate or timely financial information, and we may be unable to meet our reporting obligations or comply with the requirements of the SEC, the Nasdaq National Market or the Sarbanes-Oxley Act of 2002, which could result in the imposition of sanctions, including the suspension or delisting of our common stock from the Nasdaq National Market and the inability of registered broker dealers to make a market in our common stock, or investigation by regulatory authorities. Any such action or other negative results caused by our inability to meet our reporting requirements or comply with legal and regulatory requirements or by disclosure of an accounting, reporting or control issue could adversely affect the price of our class common stock. Further and continued determinations that there are significant deficiencies or material weaknesses in the effectiveness of our internal control over financial reporting could also reduce our ability to obtain financing or could increase the cost of any financing we obtain and require additional expenditures to comply with applicable requirements.

### ***Anti-takeover provisions in our amended and restated certificate of incorporation and bylaws and Delaware law could discourage a takeover.***

Our amended and restated certificate of incorporation and bylaws and Delaware law contain provisions that might enable our management to resist a takeover. These provisions include:

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

These provisions might discourage, delay or prevent a change in control of our company or a change in our management. The existence of these provisions could adversely affect the voting power of holders of common stock and limit the price that investors might be willing to pay in the future for shares of our common stock. See "Description of capital stock."

### ***Changes in, or interpretations of, accounting rules and regulations, such as expensing of stock options, could result in unfavorable accounting charges or require us to change our compensation policies.***

Accounting methods and policies, including policies governing revenues recognition, expenses, and accounting for stock options are subject to further review, interpretation and guidance from relevant accounting authorities, including the SEC. Changes to, or interpretations of, accounting methods or policies in the future may require us to reclassify, restate or otherwise change or revise our financial statements, including those contained in this prospectus. Prior to January 1, 2006, we were not required to record stock-based compensation charges if the employee's stock option exercise price equals or exceeds the fair market value of our common stock at the date of grant.

On December 16, 2004, the FASB issued SFAS No. 123 (revised 2004), *Share-Based Payment*, which is a revision of SFAS No. 123, *Accounting for Stock-Based Compensation* (SFAS No. 123R). SFAS No. 123R supersedes APB Opinion No. 25, *Accounting for Stock Issued to Employees*, and amends SFAS No. 95, *Statement of Cash Flows*. Generally, the approach in SFAS No. 123R is similar to the approach described in SFAS No. 123. However, SFAS No. 123R requires all share-based

---

[Table of Contents](#)

Risk factors

payments to employees, including grants of employee stock options, to be recognized in the income statement based on their fair values. Pro forma disclosure is no longer an alternative. We are required to adopt SFAS No. 123R on January 1, 2006, and have adopted it as of that date.

As permitted by SFAS No. 123, we accounted for share-based payments to employees through December 31, 2005 using APB Opinion No. 25's intrinsic value method and, as such, generally recognized no compensation cost for employee stock options. Accordingly, the adoption of SFAS No. 123R's fair value method will have a significant impact on the presentation of our results of operations, although it will have no impact on our overall financial position. The impact of adoption of SFAS No. 123R cannot be predicted at this time because it will depend on levels of share-based payments granted in the future and the assumptions for the variables which impact the computation.

We rely heavily on stock options to motivate existing employees and to attract new employees. When we are required to expense stock options, we may then choose to reduce our reliance on stock options as a motivation tool. If we reduce our use of stock options, it may be more difficult for us to attract and retain qualified employees. If we do not reduce our reliance on stock options, our reported earnings will decrease.

## **Information regarding forward-looking statements**

This prospectus, including the sections entitled “Summary,” “Risk factors,” “Management’s discussion and analysis of financial condition and results of operations” and “Business” may contain forward-looking statements. These statements may relate to, but are not limited to, expectations of future operating results or financial performance, capital expenditures, introduction of new products, regulatory compliance, plans for growth and future operations, as well as assumptions relating to the foregoing. Forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified. These risks and other factors include, but are not limited to, those listed under “Risk factors.” In some cases, you can identify forward-looking statements by terminology such as “may,” “will,” “should,” “could,” “expect,” “plan,” “anticipate,” “believe,” “estimate,” “predict,” “intend,” “potential,” “continue,” “seek” or the negative of these terms or other comparable terminology. These statements are only predictions. Actual events and/or results may differ materially.

We believe that it is important to communicate our future expectations to our investors. However, there may be events in the future that we are not able to accurately predict or control and that may cause our actual results to differ materially from the expectations we describe in our forward-looking statements. Except as required by applicable law, including the securities laws of the United States and the rules and regulations of the SEC, we do not plan to publicly update or revise any forward-looking statements after we distribute this prospectus, whether as a result of any new information, future events or otherwise. Potential investors should not place undue reliance on our forward-looking statements. Before you invest in our common stock, you should be aware that the occurrence of any of the events described in the “Risk factors” section and elsewhere in this prospectus could harm our business, prospects, operating results and financial condition. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance or achievements. The forward-looking statements contained in this prospectus are excluded from the safe harbor protection provided by the Private Securities Litigation Reform Act of 1995 and Section 27A of the Securities Act of 1933, as amended.

## Use of proceeds

We estimate that the net proceeds from the sale of the \_\_\_\_\_ shares of our common stock that we are selling in this offering will be approximately \$ \_\_\_\_\_ million, based on an assumed initial public offering price of \$ \_\_\_\_\_ per share, the mid-point of the range on the front cover of this prospectus, after deducting the underwriting discount and estimated offering expenses. If the underwriters' over-allotment option is exercised in full, we estimate that we will receive additional net proceeds of approximately \$ \_\_\_\_\_ million.

We intend to use the net proceeds from this offering principally to fund further development and expansion of our products and product candidates, in particular our nanomaterial and ultrasound-related product candidates, and for general working capital purposes. Specifically, in 2006 we anticipate spending:

- approximately \$6 million to develop our nanomaterial manufacturing capabilities, disease-targeting MRI contrast agents and other nanomaterial applications; and
- approximately \$2 million to develop our innovative ultrasound platform technology and related medical device products.

Thereafter, we intend to use the net proceeds of this offering to partially fund FDA clinical trials of our MRI contrast agent and ultrasound medical device products, with the remainder being available for general working capital purposes. However, due to the uncertainties inherent in the clinical trial process and given that our product candidates have not yet entered clinical development, we are unable to estimate the total costs that will be required to complete FDA clinical trials. As a result, we cannot estimate what amount of the net proceeds will be available for general working capital purposes.

We have not made specific plans with respect to the remaining proceeds of this offering and, therefore, cannot specify all uses for the net proceeds. Accordingly, our management will have broad discretion over the use of the net proceeds in this offering. The amounts and timing of our actual expenditures will depend upon numerous factors, including the status of our development and commercialization efforts and the amount of proceeds actually raised in this offering.

Additional purposes of this offering are to establish a public market for our common stock and to facilitate our future access to public markets, if, for example, additional funds are required to complete FDA clinical trials. We may also use a portion of the net proceeds for the acquisition of, or investment in, companies, technologies, products or assets that complement our business. We have no present understandings, commitments or agreements to enter into any acquisitions or investments. Pending these uses, we intend to invest the net proceeds of this offering in short-term, investment-grade interest-bearing securities or guaranteed obligations of the United States government.

## Dividend policy

We have never declared or paid any dividends on our capital stock. We anticipate that we will retain any earnings to support operations and to finance the growth and development of our business. Therefore, we do not expect to pay cash dividends in the foreseeable future. Any future determination relating to our dividend policy will be made at the discretion of our board of directors and will depend on a number of factors, including earnings, capital requirements, financial condition, prospects and other factors that our board of directors may deem relevant.

## Capitalization

The following table sets forth our cash and cash equivalents and capitalization as of December 31, 2005:

- on an actual basis;
- on an as adjusted basis to give effect to the sale by us of \_\_\_\_\_ shares of common stock at an assumed initial public offering price of \$ \_\_\_\_\_ per share, the mid-point of the range on the front cover of this prospectus, less the underwriting discount.

	<b>As of December 31, 2005</b>	
	<b>Actual</b>	<b>As Adjusted</b>
	<b>(unaudited)</b>	
Cash and cash equivalents	\$12,514,839	\$
Senior convertible promissory notes	5,214,955	
Redeemable common stock, 545,295 shares issued and outstanding; _____ shares issued and outstanding, as adjusted(1)	504,984	
Stockholders' equity:		
Common stock, \$0.001 par value; 49,785,326 shares authorized, 10,085,641 _____ shares issued and outstanding, actual; 100,000,000 shares authorized, _____ shares issued and outstanding, as adjusted	10,085	
Additional paid-in capital	10,930,664	
Accumulated deficit	(86,872)	
<b>Total stockholders' equity and redeemable common stock</b>	<b>11,358,861</b>	
<b>Total capitalization</b>	<b>\$16,573,816</b>	

- (1) Certain stockholders receiving shares of our Class B Common Stock in connection with our acquisition of Luna Technologies have the right to redeem a percentage of the outstanding shares issued pursuant to that transaction. This redemption right is extinguished upon the effectiveness of this offering.

The table above excludes, as of December 31, 2005:

- 7,033,517 shares of common stock issuable upon exercise of options outstanding at a weighted-average exercise price of \$0.38 per share, which includes 5,246,017 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$0.20 per share, 200,000 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$0.22 per share, and 1,587,500 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$1.00 per share;
- 409,860 shares of common stock reserved for future issuance upon the exercise of options available for grant under our 2003 Stock Plan;
- 6,494 shares of common stock issuable upon exercise of warrants (not subject to escrow) outstanding at a weighted-average exercise price of \$12.92 per share, which includes 3,858 shares of common stock issuable upon exercise of outstanding warrants at an exercise price of \$21.06 per share and 2,636 shares of common stock issuable upon exercise of outstanding warrants at an exercise price of \$1.00 per share;

---

[Table of Contents](#)

Capitalization

- 1,885,490 shares of common stock issuable upon the conversion of the principal amount outstanding under senior convertible promissory notes issued to Carilion Health System on December 30, 2005 and, assuming we elect to convert all of the accrued interest on these notes into shares of common stock after these notes remain outstanding for a maximum period of up to eight years, up to an additional 905,035 shares of common stock; and
- 122,745 shares of common stock issued or reserved for issuance in connection with the acquisition of Luna Technologies that were held in escrow on that date, and 429 shares of common stock issuable upon the exercise of warrants at an exercise price of \$21.06 per share held in escrow as of that date.

Since December 31, 2005, we granted options to purchase an additional 1,537,250 shares pursuant to our 2003 Stock Plan at an exercise price of \$1.00 per share. We also adopted our 2006 Equity Incentive Plan, subject to stockholder approval which will be effective upon the completion of this offering. In addition, on February 8, 2006, we issued warrants to purchase 101,773 shares at an exercise price of \$1.00 per share.

The table should be read in conjunction with “Management’s discussion and analysis of financial condition and results of operations” and our consolidated financial statements and related notes included elsewhere in this prospectus.

## Dilution

If you invest in our common stock, your interest will be diluted immediately to the extent of the difference between the assumed initial public offering price of \$ per share of our common stock and the as adjusted net tangible book value per share of our common stock after this offering. Net tangible book value as of December 31, 2005 was \$9.1 million, or \$0.86 per share. Our net tangible book value per share set forth below represents our total tangible assets (total assets less intangible assets) less total liabilities, divided by the number of shares of our common stock outstanding on December 31, 2005.

Dilution per share to new investors represents the difference between the amount per share paid by new investors who purchase shares of common stock in this offering and the as adjusted net tangible book value per share of common stock immediately after the completion of this offering. Giving effect to the sale of shares of our common stock offered by us at the assumed initial public offering price of \$ per share, the mid-point of the range on the front cover of this prospectus, and after deducting the underwriting discount and estimated offering expenses, our as adjusted net tangible book value as of December 31, 2005 would have been approximately \$ million. This amount represents an immediate increase in net tangible book value of \$ per share to our existing stockholders and an immediate dilution in net tangible book value of \$ per share to new investors purchasing shares of our common stock in this offering. The following table illustrates this dilution:

Assumed initial public offering price per share	\$
Net tangible book value per share as of December 31, 2005	\$0.86
Increase in net intangible book value per share attributable to this offering per share to existing investors	
As adjusted net tangible book value per share after this offering	
Dilution per share to new investors	\$

The following table sets forth, on an as adjusted basis, as of December 31, 2005, the differences between the number of shares of common stock purchased from us, the total consideration paid, and the average price per share paid by existing stockholders and new investors purchasing shares of our common stock in this offering, before deducting the underwriting discount and estimated offering expenses at an assumed initial public offering price of \$ per share, the mid-point of the range on the front cover of this prospectus.

	Shares Purchased		Total Consideration		Average Price Per Share
	Number	Percent	Amount	Percent	
Existing stockholders	10,630,935	%	\$11,445,733	%	\$1.08
New investors					
Total		100.0%	\$	100.0%	

The table above excludes, as of December 31, 2005:

- 7,033,517 shares of common stock issuable upon exercise of options outstanding at a weighted-average exercise price of \$0.38 per share, which includes 5,246,017 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$0.20 per share, 200,000 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$0.22 per share, and 1,587,500 shares of common stock issuable upon exercise of options outstanding at an exercise price of \$1.00 per share;

## Dilution

- 409,860 shares of common stock reserved for future issuance upon the exercise of options available for grant under our 2003 Stock Plan;
- 6,494 shares of common stock issuable upon exercise of warrants (not subject to escrow) outstanding at a weighted-average exercise price of \$12.92 per share, which includes 3,858 shares of common stock issuable upon exercise of outstanding warrants at an exercise price of \$21.06 per share and 2,636 shares of common stock issuable upon exercise of outstanding warrants at an exercise price of \$1.00 per share;
- 1,885,490 shares of common stock issuable upon the conversion of the principal amount outstanding under senior convertible promissory notes issued to Carilion Health System on December 30, 2005 and, assuming we elect to convert all of the accrued interest on these notes into shares of common stock after these notes remain outstanding for a maximum period of up to eight years, up to an additional 905,035 shares of common stock; and
- 122,745 shares of common stock issued or reserved for issuance in connection with the acquisition of Luna Technologies that were held in escrow on that date, and 429 shares of common stock issuable upon the exercise of warrants at an exercise price of \$21.06 per share held in escrow as of that date.

Assuming the conversion in full of the senior convertible promissory notes as well as exercise in full of all options and warrants outstanding or reserved for future issuance as of December 31, 2005 the number of shares purchased by existing stockholders would be increased by 10,363,570 shares to 20,994,505 shares, total consideration paid by them would be increased by approximately \$2,773,624 to \$14,219,357 average price per share paid by them would be decreased by \$0.40 per share to \$0.68 per share.

Since December 31, 2005, we granted options to purchase an additional 1,537,250 shares pursuant to our 2003 Stock Plan at an exercise price of \$1.00 per share. We also adopted our 2006 Equity Incentive Plan, subject to stockholder approval which will be effective upon the completion of this offering. In addition, on February 8, 2006, we issued warrants to purchase 101,773 shares at an exercise price of \$1.00 per share.

If the underwriters exercise their over-allotment option in full, the percentage of shares of common stock held by existing stockholders will decrease to approximately % of the total number of shares of our common stock outstanding after this offering, and the number of shares held by new investors will be increased to , or approximately % of the total number of shares of our common stock outstanding after this offering.

Within three months following the completion of this offering, we intend to file a registration statement under the Securities Act to register the issuance of 12,715,000 shares of common stock reserved for issuance under the 2003 Stock Plan (including an increase of 1,715,000 shares since December 31, 2005) and the 2006 Equity Incentive Plan.

## Selected consolidated financial data

The tables below present selected consolidated statements of operations data for each of the five years ended December 31, 2001, 2002, 2003, 2004 and 2005 and selected consolidated balance sheet data as of December 31, 2001, 2002, 2003, 2004 and 2005. The consolidated statements of operations data for the years ended December 31, 2003, 2004 and 2005 and consolidated balance sheet data as of December 31, 2004 and 2005 were derived from our audited consolidated financial statements and notes thereto, which are included elsewhere in this prospectus. The consolidated statement of operations data for the year ended December 31, 2002 and consolidated balance sheet data as of December 31, 2003 were derived from our audited consolidated financial statements and notes thereto, which do not appear in this prospectus. The consolidated statements of operations data for the year ended December 31, 2001 and the consolidated balance sheet data as of December 31, 2001 and 2002 were derived from our unaudited consolidated financial statements, which do not appear in this prospectus.

When you read this selected consolidated financial data, it is important that you also read the historical consolidated financial statements and related notes included in this prospectus, as well as the section of this prospectus entitled "Management's discussion and analysis of financial condition and results of operations." Historical results are not necessarily indicative of future results.

	Years Ended December 31,				
	2001	2002	2003	2004	2005
<b>(In thousands, except share and per share data)</b>					
<b>(unaudited)</b>					
<b>Consolidated Statements of Operations Data:</b>					
Revenues:					
Contract research revenues	\$7,725	\$11,084	\$10,358	\$13,835	\$15,380
Product sales and license revenues	—	4,643	7,234	8,752	1,074
<b>Total revenues</b>	<b>7,725</b>	<b>15,726</b>	<b>17,592</b>	<b>22,587</b>	<b>16,454</b>
Cost of revenues:					
Contract research costs	4,646	9,143	8,949	10,985	12,552
Product sales and license costs	—	3,884	1,543	2,881	410
<b>Total cost of revenues</b>	<b>4,646</b>	<b>13,027</b>	<b>10,492</b>	<b>13,866</b>	<b>12,962</b>
Gross profit	3,079	2,699	7,099	8,721	3,492
Operating expense	4,531	4,491	4,856	4,190	6,004
<b>Operating income (loss)</b>	<b>(1,452)</b>	<b>(1,792)</b>	<b>2,243</b>	<b>4,532</b>	<b>(2,512)</b>
Other income (expense)(1)	(101)	41	(138)	(257)	2
Interest income (expense), net	(263)	(469)	(87)	(90)	(41)
<b>Income (loss) before income taxes</b>	<b>(1,816)</b>	<b>(2,220)</b>	<b>2,018</b>	<b>4,184</b>	<b>(2,551)</b>
Income tax expense (benefit)	(582)	(652)	886	128	(557)
<b>Net income (loss)</b>	<b>\$(1,234)</b>	<b>\$(1,568)</b>	<b>\$1,132</b>	<b>\$4,056</b>	<b>\$(1,994)</b>
Net income (loss) per common share:					
Basic	\$(0.23)	\$(0.31)	\$0.23	\$0.79	\$(0.30)
Diluted	\$(0.23)	\$(0.31)	\$0.22	\$0.64	\$(0.30)
Weighted-average number of shares used in per share calculations:					
Basic	5,363,318	5,092,545	5,030,428	5,136,001	6,609,364
Diluted	5,363,318	5,092,545	5,141,003	6,301,484	6,609,364

(1) Includes minority interests and excludes interest expense.

---

[Table of Contents](#)

## Selected consolidated financial data

---

(in thousands)	As of December 31,				
	2001	2002	2003	2004	2005
	(unaudited)	(unaudited)			
<b>Consolidated Balance Sheet Data:</b>					
Cash and cash equivalents	\$122	\$1,293	\$642	\$610	\$12,515
Working capital (deficit)	(1,762)	(5,325)	(3,008)	257	11,843
Total assets	1,967	6,807	5,497	7,747	24,134
Total current liabilities	3,610	9,802	7,211	4,474	6,993
Total debt(1)	0	24	286	303	5,431
Stockholders' equity	(1,221)	(3,088)	(1,932)	2,167	10,854

---

(1) Includes capital lease obligations and excludes amounts outstanding under our senior secured revolving credit facility, which is reflected in total current liabilities.

## Management's discussion and analysis of financial condition and results of operations

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

### Overview

We research, develop and commercialize innovative technologies in two primary areas: molecular technology solutions and sensing solutions. We have a disciplined and integrated business model that is designed to accelerate the process of bringing new and innovative products to market. We identify technologies that can fulfill large and unmet market needs and then take these technologies from the applied research stage through commercialization in our two areas of focus:

- **Molecular Technology Solutions.** We develop molecular technology solutions, which are substances and materials with enhanced performance characteristics obtained by harnessing chemical, physical and biological properties of novel combinations of matter. We focus on substances and materials at the molecular level, including nanomaterials, which are materials whose size can be measured in nanometers, or one billionth of a meter. Examples of our solutions in this area include flame retardants, protective coatings, and materials that can help physicians identify diseased tissues using magnetic resonance imaging, or MRI.
- **Sensing Solutions.** We develop integrated sensing solutions, which are products that combine sensors, software and hardware to measure, monitor and control chemical, physical and biological properties. We have particular expertise in optical, acoustic and wireless technologies. Examples of our solutions in this area include medical monitoring products and industrial instrumentation for aerospace, energy generation and distribution, and defense applications.

We have a successful track record in executing our market-driven business model. Since our inception, we have developed more than a dozen products serving various industries including energy, telecommunications, life sciences and defense. We have created five companies in our areas of focus, sold two of them to industry leaders in their fields, raised private capital for two of our companies, formed one joint venture and entered into four licensing agreements.

Our aggregate revenues from January 1, 2003 through December 31, 2005 were \$56.6 million, and our aggregate cost of revenues during that same period were \$37.3 million. However, we had a net loss of \$2.0 million for the year ended December 31, 2005, and we expect to incur significant additional expenses as we expand our business. We also expect significantly greater losses for the foreseeable future primarily due to increased expenditures related to our nanomaterial and medical device product development efforts.

Our company is organized into three main groups: our Contract Research Group, our Commercialization Strategy Group and our Products Group. These groups work closely together to turn ideas into products.

Our annual revenues were \$17.6 million in 2003, \$22.6 million in 2004, and \$16.5 million in 2005. We generate revenues through contract research, product sales and license fees. Historically, our contract research revenues have accounted for a large and growing proportion of our total revenues, and we expect that they will continue to represent a significant portion of our total revenues for the foreseeable future. Our contract research revenues grew from \$10.4 million in 2003 to \$13.8 million in 2004, and to \$15.4 million in 2005. As of December 31, 2005, our Contract Research Group was working on 68 contracts. In addition to these contracts, we regularly have a backlog of contracts for which work has been scheduled, but for which a

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

specified portion of work has not yet been completed. We define backlog as the dollar amount of obligations payable to us under negotiated contracts upon completion of a specified portion of work that has not yet been completed, exclusive of revenues previously recognized for work already performed under these contracts, if any. The approximate value of our backlog was \$16.5 million as of December 31, 2005.

Revenues from product sales currently represent a small proportion of our total revenues, and, historically, we have derived most of these revenues from the sales of our sensing systems and products that make use of light-transmitting optical fibers, or fiber optics. License revenues have been significant in the last three fiscal years due to the Luna Analytics, Luna Energy and Luna i-Monitoring transactions described below. Although we have been successful in licensing certain technology we do not expect license revenues to represent a significant portion of future revenues, however, over time we do intend to gradually increase such revenues. In the near term, we expect revenues from product sales to increase because of our acquisition of Luna Technologies on September 30, 2005. We also expect to increase our investments in product development and commercialization, which we anticipate will lead to increased product sales growth. In the future, we expect that revenues from product sales will represent a larger proportion 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.

In July 1998, we established Luna Technologies, and funded its growth by raising venture capital, which ultimately diluted our equity ownership to as little as approximately 7% during our holding period and to approximately 10% as of September 2005. In line with our strategy of building a growing portfolio of businesses and products, we acquired all of the outstanding shares in Luna Technologies we did not already own in exchange for issuing shares of our common stock in September 2005. Luna Technologies continues to operate as our Luna Technologies Division.

In February 2002, we established a joint venture limited liability company, Luna Energy, LLC together with Baker Hughes Oilfield Operations, Inc. Baker Hughes agreed to pay up to \$32.0 million in connection with this joint venture as follows: \$12.0 million in working capital contributed to Luna Energy over an estimated three-year collaboration period beginning in February 2002; \$10.0 million to us, which we recognized as license revenues ratably over the expected collaboration period; and up to \$10.0 million, which we earned including \$1.5 million, \$3.0 million and \$3.5 million during the years ended December 31, 2002, 2003 and 2004, respectively, upon achievement of such milestones. In December 2004, Baker Hughes acquired our remaining equity interest in Luna Energy and the license arrangement was terminated.

In October 2003, IHS Energy Group, Inc. acquired rights to certain intellectual property related to our sensor technology and our equity interest in Luna i-Monitoring, Inc. Prior to and in connection with this transaction, we transferred certain non-intellectual property assets to Luna i-Monitoring. In connection with these transactions, IHS Energy Group agreed to pay the following amounts: \$2.0 million in total working capital contributed to Luna i-Monitoring during the five years subsequent to the agreement; \$300 thousand to Luna i-Monitoring's creditors; \$400 thousand to us in consideration for our transfer and license of intellectual property rights to IHS Energy Innovations; \$100 thousand to us in consideration for our equity interest in Luna i-Monitoring; and \$200 thousand to the other equityholders for their interests in Luna i-Monitoring. In addition, IHS Energy Group agreed to pay up to an aggregate of \$6.5 million to the other equityholders and, following payment of the first \$0.9 million of this amount, up to an aggregate of \$2.5 million to us, based on a percentage of Luna i-Monitoring's sales from December 1, 2003 through November 30, 2008. As of December 31, 2005, the other equityholders of Luna i-Monitoring have received \$70 thousand in aggregate additional consideration. We have not received any additional consideration to date other than the \$664 thousand that was paid at the date of the sale. As a result, we do not anticipate that the amounts, if any, we may receive in the future from Luna i-Monitoring will be material to our business.

In December 2003, we entered into a product development agreement between our Luna Analytics, Inc. subsidiary and a biotechnology company. In connection with this arrangement, the biotechnology company agreed to pay the following amounts: \$2.0 million contributed in working capital to Luna Analytics in 2004; \$1.0 million to us, which we recognized as

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

license revenues over the collaboration period from December 2003 to December 2004; and up to an aggregate of \$6.0 million to us upon the achievement of certain milestones. We are entitled to receive certain payments in connection with sales of Luna Analytics products through December 2013. The aforementioned biotechnology company terminated its product development work as provided by the terms of the product development agreement on December 31, 2004. We have not received any payments pursuant to the terms of this agreement, and, as a result of the termination of the product development work, we do not currently expect to receive any payments in the future.

In June 2005, Luna Technologies entered into a Joint Cooperation Agreement with Luna Energy. Under this agreement, both parties have agreed to cooperate to develop a fiber optic sensing system product and have agreed to contribute materials, intellectual property, personnel and other resources to the development effort. Upon successful completion of product development, Luna Energy will receive a license to certain of Luna Technologies' intellectual property and will be required beginning in 2007 and continuing through December 31, 2017 to make payments to Luna Technologies with respect to revenues derived from products sold that utilize this intellectual property. As of December 31, 2005, Luna Energy had not yet sold products that would entitle Luna Technologies to royalty payments under this joint cooperation agreement, Luna Technologies had received aggregate development milestone payments of \$305 thousand as of that date under this agreement and is entitled to receive additional development milestone payments of up to \$120 thousand in the aggregate, subject to the satisfaction of certain conditions. Luna Technologies also has the right to receive royalty payments from sales of products in the future. The license of certain of the intellectual property from Luna Technologies to Luna Energy shall be an exclusive license if Luna Energy makes certain minimum royalty payments of \$420 thousand in the aggregate between 2007 and 2017, and shall be a non-exclusive license if Luna Energy fails to make these minimum royalty payments. Since December 2004, we have not held an ownership interest in Luna Energy. Luna Technologies continues to operate as our Luna Technologies Division after we acquired that entity in September 2005.

In connection with becoming a public company, we have and will incur significant additional expenses such as audit fees, professional fees, increased directors' and officers' insurance, advisory board and board of directors compensation, and expenses related to hiring additional personnel and expanding our administrative functions. Many of these expenses were not incurred by us in prior periods. We began to incur some of these expenses during the six-month period ended December 31, 2005, and we expect that these expenses will continue to increase. In addition, upon receiving the net proceeds from our initial public offering, we intend to implement a strategy for expansion that will significantly increase our operating expenses and will likely create substantial losses. We incurred consolidated net losses of approximately \$2.0 million for the year ended December 31, 2005. We expect to continue to incur significant additional expenses as we expand our business, including increased expenses for research and development, sales and marketing, manufacturing, finance and accounting personnel and expenses associated with being a public company. We may also grow our business in part through acquisitions of additional companies and complementary technologies which could cause us to incur greater than anticipated transaction expenses, amortization or write-offs of intangible assets and other acquisition-related expenses. As a result, we expect that we may likely continue to incur losses for the foreseeable future, and these losses could be substantial.

## **Description of Our Revenues, Costs and Expenses**

### *Revenues*

We generate revenues from contract research, product sales and license payments. We derive contract research revenues from providing research and development services to third parties, including government entities, academic institutions and corporations, and from achieving milestones established by some of these contracts and in collaboration agreements. In general, we complete contracted research over periods ranging from six months to three years, and recognize these revenues over the life of the contract as costs are incurred or upon the achievement of certain milestones built into the contracts. Our product revenues reflect amounts that we receive from sales of our products and currently represent a small portion of our total revenues. Our license revenues comprise up-front license fees paid to us in connection with licenses or sublicenses of certain patents and other intellectual property as well as royalties, which currently represent an insignificant portion of our license revenues.

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

*Cost of Revenues*

Cost of revenues associated with contract research revenues consists of research contract costs, including direct labor, amounts paid to subcontractors and overhead allocated to contract research activities.

Cost of revenues associated with product sales and license revenues consists of license fees for use of certain technologies; product manufacturing costs including all direct material and direct labor costs; amounts paid to our contract manufacturers; manufacturing, shipping and handling; provisions for product warranty; and inventory obsolescence, as well as overhead allocated to these activities. Product manufacturing activity is not yet a significant cost element due to our relatively low product sales activity in comparison with our other activities.

*Operating Expense*

Operating expense consists of selling, general and administrative expenses, as well as expenses related to research and development, depreciation of fixed assets and amortization of intangible assets. These expenses also include: compensation for employees in executive and operational functions; facilities costs; professional fees; salaries, commissions, travel expense and related benefits of personnel engaged in sales, product management and marketing activities; costs of marketing programs and promotional materials; salaries, bonuses and related benefits of personnel engaged in our own research and development beyond the scope and activities of our Contract Research Group; product development activities not covered by contracted research; and overhead costs related to these activities.

After completion of this offering, we anticipate our operating expenses will increase due to increased administrative costs for insurance, professional fees, external reporting requirements, Sarbanes-Oxley compliance and investor relations activities associated with operating as a publicly-traded company. These increases will also include the hiring of additional personnel.

*Interest Expense*

Interest expense relates primarily to interest we paid under our senior secured revolving credit facility. As of December 31, 2005, there was no amount outstanding on our credit facility, and we do not expect to draw on that facility in the near term.

**Critical Accounting Policies and Estimates**

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

In the selection of our critical accounting policies, the objective is to properly reflect our financial position and results of operations for each reporting period in a consistent manner that can be understood by the reader of our financial statements. Our accounting policies and procedures are explained in note 1 of the notes to the consolidated financial statements contained elsewhere in this prospectus. We have identified the following as the most critical accounting policies which may have a significant effect on our reported financial results.

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

*Contract Research Revenues*

We recognize revenue when a contract has been executed, the contract price is fixed and determinable, delivery of services or products has occurred, and collectibility of the contract price is considered probable and can be reasonably estimated. Revenue is earned under cost reimbursable, time and materials and fixed price contracts. Direct contract costs are expensed as incurred.

Under cost reimbursable contracts, we are reimbursed for allowable costs, and paid a fixed fee. Revenues on cost reimbursable contracts are recognized as costs are incurred plus an estimate of applicable fees earned. We consider fixed fees under cost reimbursable contracts to be earned in proportion of the allowable costs incurred in performance of the contract.

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

Fixed price contracts may include either a product delivery or specific service performance throughout a period. For fixed price contracts that are based on the proportionate 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 the deliverables required by the contract. For fixed price contracts that provide for the development and delivery of a specific prototype or product, revenues are recognized on under the percentage of completion method in accordance with Statement of Position (SOP) 81-1 *Accounting for Performance of Construction—Type and Certain Production—Type Contract*.

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

Contract revenue recognition inherently involves estimation, including the contemplated level of effort to accomplish the tasks under the contract, the cost of the effort, and an ongoing assessment of progress toward completing the contract. From time to time, as part of the normal management processes, facts develop that require revisions to estimated total costs or revenues expected. The cumulative impact of any revisions to estimates and the full impact of anticipated losses on any type of contract are recognized in the period in which they become known.

The allowability of certain costs under government contracts is subject to audit by the government. Certain indirect costs are charged to contracts using provisional or estimated indirect rates, which are subject to later revision based on government audits of those costs. Management is of the opinion that costs subsequently disallowed, if any, would not be significant.

*Intellectual Property License Revenues*

Amounts received from third parties for licenses to our intellectual property are recognized when earned under the terms of the agreements. Revenues are recognized upon transfer of the license unless we have continuing obligations for which fair value cannot be established, in which case the revenues are recognized over the period of the obligation. If there are extended payment terms, license fee revenues are recognized as these payments become due and collectibility is probable. We consider all arrangements with payment terms extending beyond 12 months not to be fixed and determinable.

Certain of our license arrangements have required us to enter into research and development agreements. We apply the guidance from the Emerging Issues Taskforce Consensus on Issue 00-21, *Revenue Arrangements with Multiple Deliverables* (EITF 00-21). Accordingly, we will allocate our arrangement fees to the various elements based upon objective and reliable

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

evidence of fair value, if available. We have a limited history of licensing our technology to others. As such, we have not been able to establish objective reliable evidence of fair value under these arrangements for purposes of allocating the arrangement fee to the various elements. Accordingly, we will defer revenues from any up-front payments received under these arrangements and will recognize them over the service period in the arrangement. Certain of these arrangements also include the payment of performance bonuses based upon the achievement of specific milestones. Generally, there are no assurances at the onset of these arrangements that the milestones will be achieved. As such, fees related to such milestones are excluded from the initial allocation of the arrangement fee in accordance with EITF 00-21 and are recognized upon achievement of the milestone provided that such fees are non-refundable and collection is probable.

*Product Sales Revenues*

Revenues from product sales are generated by the sale of commercial products and services under various sales programs to the end user and through distribution channels. We sell fiber optic sensing systems to end users for use in numerous fiber-optic based measurement applications.

Revenues from product sales that require no ongoing obligations are recognized as revenues when shipped to the customer, title has passed and collection is reasonably assured. In transactions where a right of return exists, revenues are deferred until acceptance has occurred and the period for the right of return has lapsed.

*Deferred Taxation*

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

*Stock-Based Compensation*

In connection with the grant of stock options to employees, we have recorded compensation expense under the intrinsic value method, pursuant to APB 25 and related interpretations, whenever the exercise price of an option grant is less than the fair market value of our common stock on the grant date. We have also recorded compensation expense whenever we have modified the terms of an option grant or directly or indirectly repriced outstanding options. Our Board of Directors is responsible for determining the fair value of our common stock for the purpose of establishing exercise prices for our option grants. Our Board has relied upon Market Place Transaction History as well as the assistance from independent valuation specialists for purposes of estimating the fair value of our common stock.

In August 2003, our board of directors authorized an option exchange program whereby holders of options for Class A Common Stock were given the opportunity to exchange their options for options to purchase Class B Common Stock on a one-for-one basis. The new options grants were immediately vested on September 29, 2003, the date of exchange, had an exercise price of \$0.20 and a life of 10 years from the date of grant. All of the outstanding options issued under this exchange program had exercise prices in excess of the fair value of our Class A Common Stock as of the date of the exchange. As such, the option exchange was accounted for as a repricing in accordance with FIN 44. We are required to apply variable plan accounting to the replacement grant and measure compensation based on the change in fair value of the common stock at each reporting period. A total of \_\_\_\_\_ shares subject to such options exchanged under this program remain outstanding as of

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

March 31, 2006. We will continue to incur a non-cash charge or benefit each quarter based upon the increase or decrease in fair value of our common stock, until such options are exercised, forfeited or expire. Assuming a fair value of \$        per share for our common stock, the midpoint of the range of the estimated offering price in this offering, this non-cash charge would be \$        for the quarter ending March 31, 2006, provided that this amount could increase or decrease subject to the actual trading price of our common stock.

The fair value of common stock for options granted was estimated by the Compensation Committee of our Board of Directors, applying a number of commonly accepted valuation methodologies. The Board of Directors also considered valuations performed by an independent third-party valuation specialist.

We currently anticipate granting stock options to our officers, directors and employees subsequent to the consummation of this offering. The exercise price of the options will be equal to the price per share to the public at the time of the grant.

Effective January 1, 2006, we adopted Financial Accounting Standards No. 123R, *Share Based Payment* (SFAS No. 123R) using the modified prospective transition method. Under this transition method, our financial statements for periods prior to January 1, 2006 will not be restated. However, new awards and awards modified, repurchased or cancelled after January 1, 2006 will trigger compensation expense based on the fair value of the stock option as determined by an option pricing model. We will amortize stock-based compensation for such awards on a straight-line method over the related service period of the awards taking into account the effects of the employees' expected exercise and post-vesting employment termination behavior.

## Results of Operations

### Year Ended December 31, 2005 Compared to Year Ended December 31, 2004

#### *Revenues*

Total revenues decreased 27.2% to \$16.5 million for the year ended December 31, 2005 from \$22.6 million for the year ended December 31, 2004. The decrease was a result of the absence of license revenues relating to our arrangement with Baker Hughes. The satisfaction of our right to receive certain milestone payouts in connection with that arrangement and the sale of our interest in Luna Energy to Baker Hughes in December 2004 represents the completion of our licensing arrangement with Baker Hughes. The decrease in license revenues was offset in part by an increase in contract revenues during the year ended December 31, 2005 as compared with the same period in 2004. During 2005, consistent with our business plan, we did not receive significant license payments for our technologies, and we do not expect license revenues comparable to those in 2002, 2003 and 2004 in the near term. We do, however, expect that product revenues will increase in the near term as a result of our acquisition of Luna Technologies on September 30, 2005. The acquisition of Luna Technologies was consistent with our strategy to transition our revenues mix from contract research revenues to product sales and license revenues. We generated approximately \$1.1 million in product sales in 2005, virtually all of which were derived from operations of Luna Technologies subsequent to our acquisition.

Although total revenues decreased due to the cessation of revenues from the Luna Energy joint venture in December 2004, contract research revenues increased 11.2% to \$15.4 million for the year ended December 31, 2005 from \$13.8 million for the same period in 2004. This increase reflects our continued short-term commitment to steady and consistent growth of our contract research business while, at the same time, we seek to increase our product sales both in absolute terms and as a proportion of total revenues.

#### *Cost of Revenues*

Cost of revenues decreased 6.5% to \$13.0 million for the year ended December 31, 2005 from \$13.9 million for the year ended December 31, 2004. Consistent with our decrease in revenues, the decline was primarily driven by the lack of licensing revenues as our licensing arrangement with Baker Hughes was completed at the end of 2004.

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

Contract research cost of revenues increased 14.3% to \$12.6 million for the year ended December 31, 2005 from \$11.0 million in the same period in 2004. This increase was consistent with a corresponding increase in contract research revenues.

Cost of product sales and license cost decreased 85.8% to \$410 thousand for the year ended December 31, 2005 from \$2.9 million in the same period in 2004. This decrease was due to the cessation of license cost activity in 2005 with the completion of the Luna Energy joint venture in December 2004. Nearly all of the costs in this area incurred in 2005 were cost of product sales, which were driven by our increased product sales through our Luna Technologies Division beginning in the fourth quarter of 2005.

*Operating Expense*

Operating expense increased 43.3% to \$6.0 million for the year ended December 31, 2005 from \$4.2 million for the year ended December 31, 2004. The increase in operating expense was primarily attributable to our acquisition of Luna Technologies and the related indirect transaction and integration costs. Additionally, we incurred significant expenses in connection with our planned initial public offering that are not direct costs and are not otherwise capitalizable. These include hiring increased staff, professional fees and various other internal changes designed to supplement and enhance our existing infrastructure and human resources. The activity in 2005 is in line with our strategy of building a growing portfolio of businesses and products. We expect that our operating expenses will continue to increase in the coming months due to the indirect costs of our initial public offering and continued compliance with the various reporting requirements of being a publicly-traded company.

*Other Income (Expense)*

The decrease in other expense was a result of our acquiring the remaining outstanding equity of Luna Technologies as of September 30, 2005. As such, the operating activity of Luna Technologies was consolidated with our consolidated operating activity subsequent to September 30, 2005. Prior to the acquisition, our pro rata portion of the losses of Luna Technologies was reflected in operating income.

Interest expense remained consistent with our outstanding borrowings between 2004 and 2005. Our line of credit permits us to borrow up to \$2.5 million. As of the end of 2005, we had repaid the outstanding balance on our line of credit, and we do not anticipate a need to draw on that line of credit in the near term given the funds raised from our August and December 2005 financing rounds with Carilion Health System, as well as the generation of proceeds from this offering. We did not recognize substantial interest expense related to the senior convertible promissory notes issued to Carilion Health System on December 30, 2005 as such notes were only outstanding for one day during the period.

**Year Ended December 31, 2004 Compared to Year Ended December 31, 2003**

*Revenues*

Total revenues increased 28.4% to \$22.6 million in 2004 from \$17.6 million in 2003. This increase was largely driven by growth in our volume of research contracts. Contract research revenues increased 33.6% to \$13.8 million in 2004 as compared with \$10.4 million in 2003. During 2003, we undertook an initiative to improve our ability to obtain additional contracts by devoting increased resources to support our Contract Research Group. Much of the result from these efforts in 2003 is reflected in our 2004 revenues because of a lengthy bidding process and because our contract research may take several months and sometimes years to complete. The length of our contract research efforts under a typical contract ranges from six months to three years. In addition to the growth of our existing contract research, we also experienced an increase in research contract volume in connection with the creation of our Luna nanoWorks Division. Contracts under our Luna nanoWorks Division accounted for approximately \$337 thousand of the overall increase in our contract research revenues, while growth of our existing contract research business accounted for the remaining \$3.1 million of such increase.

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

Product sales and license revenues also contributed significantly to our total revenues growth during this period. Product sales and license revenues increased 21.0% to \$8.8 million in 2004 from \$7.2 million in 2003. Much of this increase is the result of achieving milestones under the Luna Energy license agreement. As a result of the sale of our remaining interest in Luna Energy to Baker Hughes in December 2004, we do not expect license revenues to be significant in the near term. Revenues related to product sales represent a small proportion of our total revenues in 2004 and 2003. During that period, we continued to remain focused on our contract research business.

*Cost of Revenues*

Cost of revenues increased 32.1% to \$13.9 million in 2004 from \$10.5 million in 2003, with most of the increase directly attributable to increased volume of research contracts. Cost of contract research revenues, however, increased at a slightly lower rate of 22.7%, from costs of \$8.9 million in 2003 to costs of \$11.0 million in 2004. As our contract research volume increased, the costs related to these contracts also increased. However, as the volume of contracts increase, we also benefit from economies of scale. Accordingly, our costs of contract research for this period increased at a lower rate than the corresponding revenue growth.

In addition to our increased contract research activity, we also incurred increased license costs due to certain bonuses accrued and paid in 2004 to contributors and providers of intellectual property related to the Luna Energy joint venture. In December 2004, we sold our remaining interest in Luna Energy to Baker Hughes. In connection with that sale and the receipt of payments for achievement of certain milestones in connection with that venture, we paid bonuses to the technology partners from whom we licensed part of the intellectual property for the venture. Accordingly, the cost of our product sales and license revenues increased 86.7% to \$2.9 million in 2004 as compared with \$1.5 million in 2003. Although this increase outpaced the percentage increase in license and royalty revenues between 2003 and 2004, it is consistent with the overall growth in license and royalty revenues between 2002 and 2004, during which period the Luna Energy joint venture took place.

*Operating Expense*

Operating expenses decreased 13.7% to \$4.2 million in 2004 from \$4.9 million in 2003 as we were able to increase revenues year-over-year with no significant changes in our operating infrastructure as well as incurring fewer costs related to outside transactions. In 2003, we sold our interest in Luna i-Monitoring. No similar transactions occurred in 2004. Additionally, as our operations have become more mature, we have been able to substantially reduce operating expenses due to the increased use of long-term contracts and leases as well as to our improved ability to predict the needs of our operations.

*Other Income (expense)*

Our share of losses from equity method investees increased approximately \$107 thousand as a result of advances made to such investees during the year which provided us basis to record such cases.

Interest expense remained consistent for the years ended December 31, 2004 and 2003.

**Liquidity and Capital Resources**

Prior to August 2005, our primary source of liquidity had been cash provided by operations and divestitures of certain assets and businesses. In August 2005, we completed our first outside equity financing and raised \$7.0 million through an equity investment by Carilion Health System. Carilion Health System invested an additional \$8.0 million in December 2005 in the form of \$5.0 million aggregate principal amount of senior convertible promissory notes and \$3.0 million in additional equity. Our principal uses of cash have been to fund our expansion, including facilities, personnel, working capital and other capital expenditures.

---

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

We have a \$2.5 million senior secured revolving credit facility with First National Bank that is collateralized by a security interest in substantially all of our assets. The interest rate on borrowings under our secured revolving credit facility is equal to the prime rate, limited to no less than 6.0% and no greater than 10.0% per annum, and the interest accrued is payable monthly. Under the terms of the senior secured revolving credit facility, the outstanding principal is payable in full on demand or at maturity on May 30, 2006. The senior secured revolving credit facility contains covenants which require us to maintain \$1.0 to \$2.0 million in liquidity depending on our outstanding balance. Additionally, without First National Bank's prior approval, we may not make a direct loan to an affiliate or subsidiary of ours exceeding \$500 thousand annually, guaranty the debt of our affiliate or subsidiary or incur debt in excess of \$200 thousand non-First National Bank debt annually. Finally, we are obligated to continue to provide First National Bank an assignment of life insurance in a minimum amount of \$1.0 million on the life of Kent A. Murphy, covering all of our indebtedness to First National Bank. As of December 31, 2005, we had repaid the outstanding balance on our secured revolving credit facility, and we do not anticipate a need to draw on that line of credit in the near term given the funds raised from our August and December 2005 financing rounds with Carilion Health System as well as the proceeds from this offering. With the exception of our obligations under our senior secured revolving credit facility and our capital lease, we have no other debt outstanding.

### **Discussion of Cash Flows**

For the year ended December 31, 2005, we used approximately \$88 thousand of cash in operations.

In March 2004, we received a grant of \$900 thousand from the city of Danville, Virginia under a Grant Agreement to support the expansion of economic and commercial growth within the city. Under the Grant Agreement, we agreed to locate a nanomaterials manufacturing and research facility and maintain its operations in Danville until March 25, 2009. We agreed under the Grant Agreement to invest by September 25, 2006 at least \$5.2 million in capital equipment expenditures and \$1.2 million in certain facilities and to maintain such investments in our Danville facility until March 25, 2009. We also agreed to create by September 25, 2006 at least 54 new full-time jobs at the Danville facility at an average annual wage of at least \$39 thousand plus benefits, and to maintain these jobs at such facility until March 25, 2009. If we fail to make these capital expenditures and create these jobs by September 25, 2006, we will be obligated to repay the city all or a portion of the funds based on a formula of the pro rata shortfall of such expenditures and jobs falling below such required levels. These contractual requirements will restrict the use of significant assets and could obligate us to an annual payroll obligation exceeding \$2.0 million until March 25, 2009. To the extent such hiring results in salaries in excess of the required minimum wages, our annual payroll obligation could be substantially greater than \$2.0 million.

In August 2005, we entered into a Class C Common Stock financing agreement with Carilion Health System, or Carilion, whereby Carilion committed to providing approximately \$15.0 million in equity financing in three tranches subject to certain conditions outlined in the agreement. In connection with this transaction, Carilion purchased shares of our Class C Common Stock for an aggregate purchase price of \$7.0 million. On December 30, 2005, we reached an agreement with Carilion to terminate the August 2005 financing agreement and enter into a new Class C Common Stock financing agreement. Under the new agreement, Carilion provided \$5.0 million in exchange for five \$1.0 million senior convertible promissory notes, and \$3.0 million in exchange for shares of Class C Common Stock. The notes are convertible into Class C Common Stock at a rate of \$2.65183 per share and bear interest at 6% per annum and mature on December 30, 2009. We received \$5.0 million in proceeds from the issuance of such notes at closing.

Cash used in investing activities for the year ended December 31, 2005 related primarily to the purchase of property and equipment and legal fees associated with securing patent rights to certain technology.

Cash flows from financing activities for the year ended December 31, 2005 were primarily from investments by Carilion. During the year ended December 31, 2005, we received proceeds of approximately \$10.0 million from two equity financing arrangements with Carilion as well as an additional \$5.0 million from the issuance of senior convertible promissory notes to Carilion.

[Table of Contents](#)

Management's discussion and analysis of financial condition and results of operations

Total cash and cash equivalents were approximately \$12.5 million at December 31, 2005. We believe that cash on hand, availability under our line of credit agreement and proceeds from our initial public offering will be sufficient to fund operations for the next 12 months.

### Summary of Contractual Obligations

We lease our facilities in Blacksburg, Charlottesville, Danville, Hampton, McLean and Roanoke, Virginia under operating leases that expire between February 2006 and August 2011 or under a month-to-month arrangement. Upon expiration of the leases, we may exercise certain renewal options as specified in the leases.

We also lease certain computer equipment and software under a capital lease agreement that expires in February 2008. The assets subject to these obligations are included in property and equipment on our consolidated balance sheet.

In March 2006, our Luna Technologies Division executed a non-cancellable, non-reschedulable \$1.2 million purchase order for multiple shipments of tunable lasers to be delivered over an 18-month period beginning in July 2006.

Set forth below is information concerning our known contractual obligations as of December 31, 2005 that are fixed and determinable. Except for facility leases, as of December 31, 2005, we did not have contractual obligations that extended beyond May 2009.

	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
Capital equipment and software lease	\$ 226,286	\$ 105,947	\$ 120,339	\$ —	\$ —
Operating facility leases	3,475,060	650,469	1,982,283	502,721	339,587
Purchase order obligation	1,230,000	1,230,000	—	—	—
Deferred Credits:					
City of Danville grant*	900,000	900,000	—	—	—
Total	\$5,831,346	\$2,886,416	\$2,102,622	\$ 502,721	\$ 339,587

\* In March 2004, we received a \$900 thousand grant from the City of Danville, Virginia to be used for the expansion of economic and commercial growth within the City. Specifically, \$450 thousand of the grant will be used to offset certain capital expenditures for leasehold improvements being made at our Danville facility, and the remaining \$450 thousand is to be used for our creation of new jobs.

The grant stipulates that we must make estimated capital expenditures of at least \$6,409,000 and create 54 new full time jobs at our Danville facility, at an average wage of at least \$39 thousand plus benefits within 30 months of the award, and then maintain such employment levels for an additional 30 months. We could be required to repay the grant funds on a pro-rata basis should we fail to satisfy the conditions stipulated in this agreement by September 25, 2006 at the earliest. As such, since we have not yet met the stipulations of the grant, we have included the \$900,000 in deferred credits in the accompanying consolidated balance sheets as of December 31, 2004 and 2005.

### Quantitative and Qualitative Disclosures about Market Risk

Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. We do not hold or issue financial instruments for trading purposes or have any derivative financial instruments. To date, all payments made under our research contracts are denominated in United States dollars. Our exposure to market risk is limited to interest rate fluctuations due to changes in the general level of United States interest rates, particularly because the interest rate on our line of credit is variable between 6.0% and 10.0% based on the current prime rate of interest. As of March 31, 2006, our cash reserves were maintained in money market investment accounts and were not exposed to material market risks.

# Business

## Overview

We research, develop and commercialize innovative technologies in two primary areas: molecular technology solutions and sensing solutions. We have a disciplined and integrated business model that is designed to accelerate the process of bringing new and innovative products to market. We identify technologies that can fulfill large and unmet market needs and then take these technologies from the applied research stage through commercialization in our two areas of focus:

- **Molecular Technology Solutions.** We develop molecular technology solutions, which are substances and materials with enhanced performance characteristics obtained by harnessing chemical, physical and biological properties of novel combinations of matter. We focus on substances and materials at the molecular level, including nanomaterials, which are materials whose size can be measured in nanometers, or one billionth of a meter. Examples of our solutions in this area include flame retardants, protective coatings, and materials that can help physicians identify diseased tissues using magnetic resonance imaging, or MRI.
- **Sensing Solutions.** We develop integrated sensing solutions, which are products that combine sensors, software and hardware to measure, monitor and control chemical, physical and biological properties. We have particular expertise in optical, acoustic and wireless technologies. Examples of our solutions in this area include medical monitoring products and industrial instrumentation for aerospace, energy generation and distribution, and defense applications.

We have a successful track record in executing our market-driven business model. Since our inception, we have developed more than a dozen products serving various industries including energy, telecommunications, life sciences and defense. We have created five companies in our areas of focus, sold two of them to industry leaders in their fields, raised private capital for two of our companies, formed one joint venture and entered into four licensing agreements.

Our aggregate revenues from January 1, 2003 through December 31, 2005 were \$56.6 million, and our aggregate cost of revenues during that same period were \$37.3 million. However, we had a net loss of \$2.0 million for the year ended December 31, 2005, and we expect to incur significant additional expenses as we expand our business. We also expect significantly greater losses for the foreseeable future primarily due to increased expenditures related to our nanomaterial and medical device product development efforts.

Our company is organized into three main groups: our Contract Research Group, our Commercialization Strategy Group and our Products Group. These groups work closely together to turn ideas into products.

**Contract Research Group.** Our Contract Research Group provides applied research to customers in our areas of focus. Our engineers and scientists collaborate with our network of government, academic and industry experts to identify technologies and ideas with promising market potential. After these promising technologies are identified, our Contract Research Group competes to win fee-for-service contracts from government agencies and industrial clients who seek innovative solutions to practical problems that require new technology. We focus primarily on contract research opportunities where we can retain partial or full rights to the intellectual property developed, and generally obtain full funding of the costs of contracts we undertake from our customers. This approach allows us to cover the costs of early-stage technology development with contract research revenues. Our contract research revenues grew from \$10.4 million in 2003 to \$15.4 million in 2005, representing 48.1% total growth over that period, while our contract research costs increased from \$8.9 million in 2003 to \$12.6 million in 2005, representing a total increase of 40.3% over that period. These revenues have in general been a growing part of our business from inception, and our Contract Research Group seeks to continually supply our product pipeline with new opportunities.

**Commercialization Strategy Group.** Our Commercialization Strategy Group works closely with our network of federal and industrial customers to identify new market opportunities for our technologies. After ideas are driven to proof of concept in the

## Business

Contract Research Group, our Commercialization Strategy Group develops detailed business plans for commercially viable products. It is at this stage that we first consider investing our own funds to finance the continued development of a product, which is then managed in our Products Group.

**Products Group.** Our Products Group currently consists of the following three divisions:

- **Luna Advanced Systems Division.** Most new product opportunities that are approved for further development by our management team are initially allocated to our Luna Advanced Systems Division. Products currently managed in this division include medical diagnostic instruments using our innovative ultrasound technologies, non-destructive industrial testing and homeland security devices, remote and secure wireless asset monitoring systems, flame retardants, multi-functional protective coating systems and blast and ballistic resistant materials. We transfer products to existing or new divisions within our Products Group with the resources needed for the successful commercialization of the technology if we determine that a product line is broad enough or that the market opportunity is sufficiently large.
- **Luna nanoWorks Division.** Our Luna nanoWorks Division develops and commercializes innovative products based on nanomaterials made from carbon, or carbon nanomaterials, that have broad potential applications. This division is developing MRI contrast agents, which are materials that can help physicians identify diseased tissues using MRI and that are designed to be potentially safer than, and technically superior to, contrast agents currently on the market. We currently supply nanomaterials to research laboratories and plan to supply proprietary high value-added carbon nanomaterials to customers who manufacture products such as solar cells, strong and light-weight composites and coatings to shield devices from electromagnetic interference.
- **Luna Technologies Division.** Our Luna Technologies Division manufactures and markets test and measurement equipment and integrated sensing solutions. This division's products are used for process and control monitoring in telecommunications, manufacturing, power generation and distribution, down-hole oil and gas production, aerospace, and defense applications. These products have won numerous awards and are sold and distributed throughout North America, Europe, the Middle East and Asia.

We expect that the capital raised in this offering will provide us greater flexibility in funding the commercialization of new technologies and will provide us the opportunity to increase the speed, quality and volume of products that we can develop.

We have knowledge and experience in molecular technology solutions and sensing solutions and, as of December 31, 2005, we owned or had exclusive rights to use 32 issued U.S. patents and 63 additional pending U.S., international and foreign patent applications. As of December 31, 2005, approximately 76 of our 143 employees are directly engaged in research, of whom 21 hold Ph.D.s and 27 hold advanced degrees.

## Industry Background and Market Opportunity

### *Molecular Technology Solutions*

Our molecular technology solutions generally utilize advanced materials with enhanced performance characteristics. These materials are produced by harnessing unique chemical, physical and biological properties through novel combinations of matter and include metals, ceramics, nanomaterials, composites and polymers, which are materials made up of smaller, linked building blocks. Nanotechnology, which focuses on manipulating materials at the atomic scale to create advanced materials with novel properties, is itself a broad field and many national governments have made a priority of supporting nanotechnology research and development. According to the National Nanotechnology Initiative, since the inception of the U.S. National Nanotechnology Initiative in 2001, the U.S. government has invested \$4 billion to support nanotechnology research and development activities.

## Business

In general, advanced materials enable significant improvements in the performance, cost and functionality of existing products and allow the development of products not previously possible. Such materials have potential applications in many industries, including semiconductors, electronics, biotechnology, textiles, alternative energy and defense. Some advanced material products that are currently being developed include: very high density and cost efficient digital memories; smart sensors; pharmaceuticals; drug delivery systems; cost efficient fuel cells, solar cells and light sources; stain resistant textiles; lightweight, high strength composites for civil and military applications; and wear resistant and anti-corrosion coatings for industrial applications.

In 2004, the market sizes of the following advanced material subsectors—coatings and flame retardants—were estimated to be approximately \$9.5 billion and \$1.6 billion, respectively, according to *Chemical Week*. In 2005, the market sizes of the following advanced material subsectors—ceramics and composites—were estimated to be approximately \$2.0 billion and \$4.8 billion, respectively, according to Electronics.ca Publications and the *Market Leaders- Cook Composites and Polymers* report .

### *Sensing Solutions*

Our sensing solutions involve the integration of multiple technologies to design, manufacture and commercialize new products. Such products require a broad range of expertise and technical competencies, including research and development, engineering design, software programming and product testing. Our optical, ultrasound and wireless sensing solutions address a wide variety of end markets including defense and military, healthcare, telecommunications, industrial measurement, security applications and consumer electronics. We believe that Homeland Security-related applications are one of the most attractive sensing solutions markets given recent increases in government investment in this area. For example, the research and development budget of the U.S. Department of Defense was expected to reach \$70.0 billion in 2005 according to the American Association for the Advancement of Science.

Examples of sensing solutions products include industrial and military sensors to increase equipment operating efficiency, perimeter and impact detection systems, diagnostic systems for telecommunications networks, devices to measure physical properties of materials for medical and industrial applications and secure wireless communication systems.

Many of these end markets represent very large opportunities. For example, in 2004, the market sizes of the following sensing solutions sub-sectors—industrial sensors and electromechanical actuator systems—were estimated to be approximately \$4.2 billion and \$7.1 billion, respectively, according to *Electronic Business*.

### *Opportunity to Accelerate the Commercialization of Technology*

Technology innovation is a key engine for growth in an increasingly global and competitive marketplace. According to the National Science Foundation, over \$312.0 billion was spent in research and development in the United States in 2004 as follows: \$93.4 billion by federal agencies, \$199.0 billion by the private sector, \$11.1 billion by academic institutions and \$8.6 billion by not-for-profit organizations.

However, the transition from technology discovery to commercialization is challenging, and government agencies, academic institutions and corporations frequently lack formal processes to enable timely commercialization of technologies in response to marketplace demands. One problem is that research and development is often done in isolation, without input or feedback from the marketplace. In addition, due to the inherent complexity of new technologies, cross-disciplinary and integration issues are often not addressed because researchers, engineers and product developers have very specialized areas of expertise. Moreover, research organizations may be unable to commercialize technologies because their networks may not be broad or deep enough to connect them expeditiously with partners, investors and customers. Development efforts can also fail for a host of other reasons, such as inability to manufacture at commercial scale, unanticipated competition or poorly understood customer needs.

## Business

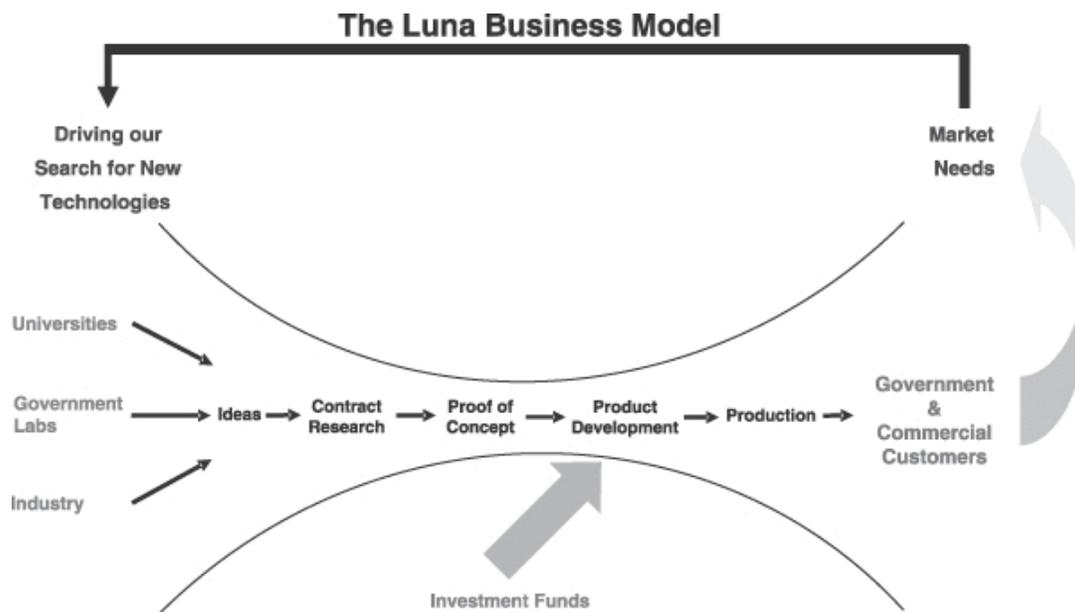
Technology innovation in areas such as molecular technology solutions and sensing solutions is particularly susceptible to these challenges because it requires expertise across a number of technical disciplines, which are often isolated from each other. We have developed a model for technology innovation that addresses these issues and that we believe has the potential to significantly accelerate the creation and commercialization of new technologies.

### Our Business Model

We have developed a disciplined and integrated process to accelerate the development and commercialization of innovative technologies. Our business model employs a market-driven approach and provides the infrastructure, resources and know-how throughout the process of developing and commercializing new products. To manage a diverse set of products effectively across a range of development stages, we are organized into three main groups: our Contract Research Group, our Commercialization Strategy Group and our Products Group. These groups work together through all product development stages, including:

- Searching for emerging technologies based on market needs;
- Conducting applied research;
- Developing and commercializing innovative products; and
- Applying proven technologies and products to new market opportunities.

The graphic below illustrates our business model:



The strength of our business model is exemplified by our track record in taking innovative technologies from the applied research stage through product development and ultimately to the creation of independent businesses. For example, we have created five companies in our areas of focus, sold two of them to industry leaders in their fields, raised private capital for two of our companies and formed one joint venture. In addition, we have developed more than a dozen products serving several

## Business

industries including energy, telecommunications, life sciences and defense. We describe below three examples of independent businesses that we have created:

- **Luna Analytics, Inc.** In June 1999, we created Luna Analytics to commercialize analytical instruments that improve the assessment of protein interactions. Luna Analytics' devices are being developed to provide advanced disease diagnostics, treatment and drug discovery. We currently own approximately 39% of Luna Analytics.
- **Luna Energy, LLC.** In February 2002, we created Luna Energy to commercialize real-time, state-of-health pipeline monitoring sensors for the oil and gas industry. Luna Energy was acquired in December 2004 by Baker Hughes Oilfield Operations Inc., a leader in oil field services. We no longer have an ownership interest in Luna Energy, but our Luna Technologies Division is entitled to receive payments from Luna Energy in connection with future product sales beginning in 2007.
- **Luna i-Monitoring, Inc. (now IHS i-Monitoring).** In May 2002, we created Luna i-Monitoring to commercialize a suite of highly integrated wireless sensors called iNodes for cost-effective remote monitoring and Internet accessibility for the oil and gas marketplace. Luna i-Monitoring was acquired by IHS Energy, Inc. in October 2003, and therefore we no longer have any ownership interest in Luna i-Monitoring. However, we are entitled to receive payments in connection with future product sales through November 2008. We have not received any payments to date and do not anticipate that the amounts, if any, we may receive in the future from Luna i-Monitoring will be material to our business.

## Our Growth Strategy

We have the following key strategies to achieve our goal of accelerating the development and commercialization of innovative technologies and to create successful products in our areas of focus:

- **Focus on developing and commercializing a growing portfolio of innovative products.** We intend to build and commercialize a growing portfolio of high value-added products using innovative technologies and utilize our existing relationships to identify, prioritize and allocate resources to respond rapidly to market needs and shorten the time to market for new products.
- **Transition our mix of revenues to a higher percentage of product and license revenues.** We plan to commercialize a growing number of products in order to increase the amount of revenues that we generate from product sales and license payments. To this end, we will seek to expand our distribution network and our ability to service our customers. We will also seek to allocate resources to improve our ability to manufacture and shorten the cycle time from idea to market and to monetize our intellectual property portfolio by licensing our technologies. As a result, we believe that product sales and license revenues will comprise a greater portion of our total revenues in the future.
- **Continue to strengthen our Contract Research Group.** We will seek to strengthen our Contract Research Group through increased resource allocation and hiring and by expanding our network of relationships with federal laboratories, major research universities and industry leaders. These steps will provide us the opportunity to grow our applied research business, remain informed of the latest technological advances and increase the quality and volume of high potential technologies that will support our product pipeline.
- **Expand our intellectual property portfolio in our areas of focus.** We will seek to expand our intellectual property portfolio by applying our disciplined processes to generate know-how and intellectual property through our network of relationships and our own research and development efforts. By continuing to expand our intellectual property, we will seek to enhance our competitive position and develop additional products in these areas.

## Business

**Contract Research Group**

Our Contract Research Group provides applied research to customers in our areas of focus – molecular technology solutions and sensing solutions. Our Contract Research Group competes to win contracts in these areas on a fee-for-service basis. This group has a successful track record of evaluating innovative technologies to address the needs of our customers. We identify these needs by utilizing our knowledge of the markets in our areas of focus and by consulting with major government entities, leading research universities and large corporations. We also use this network to obtain favorable technology transfer agreements, contract research revenues and strategic partnerships for the products that we develop based on our applied research.

We are working or have worked with over 60 corporate, academic and government collaborators, including:

- **Universities.** The College of William and Mary, Duke University, Georgia Institute of Technology, North Dakota State University, The Ohio State University, The Pennsylvania State University, University of California, San Diego, University of Pittsburgh, University of Virginia, Washington University in St. Louis, University of Wyoming, and Virginia Polytechnic Institute and State University, or Virginia Tech;
- **Government entities.** Defense Advanced Research Projects Agency, Defense Threat Reduction Agency, Environmental Protection Agency, National Aeronautics and Space Administration, National Institutes of Health, National Institute of Standards and Technology, National Science Foundation, United States Air Force, United States Army, United States Department of Agriculture, United States Department of Commerce, United States Department of Defense, United States Department of Energy, United States Department of Transportation and United States Navy; and
- **Corporations.** Anteon International Corporation, Applied Research Associates, Inc., Dana Corporation and Northrop Grumman Corporation.

We seek to continue to maximize the benefits we derive from our contract research business, including revenues generation and identification of promising technologies for further development. For example, we proactively target selected projects with the highest commercialization potential. Also, we take a disciplined approach to contract research to ensure that in general the costs of any contract we undertake are fully covered. This approach enables us to cover the costs of riskier stage technology development with outside funding. We believe that this model is cost efficient and reduces our risk significantly.

As of December 31, 2005, our Contract Research Group was engaged in 68 separate active contracts that typically last from six months to three years. These projects span a wide range of applications across our areas of focus. The table below illustrates the type of research that these contracts encompass:

<b>Competency/Platform Technology</b>	<b>Number of Contracts</b>	<b>Examples of Potential Products</b>
<b>Molecular Technology Solutions</b>	26	Disease-targeting MRI contrast agents; flame retardants; coatings to shield devices from electromagnetic interference; multi-functional protective coating systems; and blast and ballistic resistant materials
<b>Sensing Solutions</b>	42	Medical diagnostic and monitoring instruments for heart and lung bypass operations, compartment syndrome and bone strength measurement; non-destructive industrial testing systems; and wireless remote and secure asset monitoring
<b>Total</b>	68	

## Business

Although we conduct our applied research on a fee-for-service basis for third parties, we seek to retain full or partial rights to the technologies and patents developed under those contracts and to continuously enlarge and strengthen our intellectual property portfolio. Often, a new technology that we develop complements existing technologies and enables us to develop applications and products that were not previously possible. In addition, the technologies we develop are often applicable to commercial markets beyond what was originally contemplated in the contract research of such technologies and we endeavor to capture the value of those opportunities.

As of December 31, 2005, our Contract Research Group team consisted of 76 people, 21 with Ph.D.s and 27 with advanced degrees. Our Contract Research Group also utilizes the knowledge and experience of researchers employed through the academic institutions, corporations and government agencies with which we subcontract. The Contract Research Group is organized into subgroups according to the area of technology, with each subgroup managed by its own director responsible for its financial performance. In addition, our Contract Research Group has in place disciplined processes designed to ensure quality control of proposal preparation, program reviews, pipeline reviews, revenues tracking and financial reporting.

Our Contract Research Group has a high historical success rate in winning bids for SBIR contracts, and we have won two National TIBBETT'S Awards from the Small Business Administration for outstanding SBIR performance. SBIR contracts include Phase I feasibility contracts of up to \$100 thousand and Phase II proof-of-concept contracts, which can be as high as \$750 thousand. We also have been successful at winning contracts outside the SBIR program from corporations and government entities. Such contracts have no financial limit and typically have a longer duration, ranging from 12 to 24 months. As we continue to grow, one of our goals is to derive a larger portion of our contract research revenues from contracts outside the SBIR program.

### **Commercialization Strategy Group**

Our Commercialization Strategy Group works with our Contract Research Group to identify technologies that have demonstrated proof of concept and that are ready for further development. After a detailed review, it is at this stage that we first consider investing our own funds to finance continued development. To this end, we have rigorous processes to evaluate the merits of further developing any given technology.

Initially, the Commercialization Strategy Group prepares proposals for selected high-potential proof-of-concept technologies for consideration by our internal investment committee. These proposals have the basic elements of a business plan, including detailed market, competitive, sales, marketing, distribution, financing and intellectual property analyses. Our internal investment committee, which is composed of key members of our management team and experts in the fields relevant to each opportunity, evaluates the merits of each proposal and makes recommendations to our management. Once qualified opportunities are approved by management, resources are allocated and the prototyping and development of a commercial product begins. During the product development process, the Commercialization Strategy Group and our internal investment committee regularly review progress and evaluate whether or not to allocate additional resources to, and to continue funding, development.

Our Commercialization Strategy Group includes personnel with a mix of intellectual property, technical and business backgrounds, including individuals who have experience with venture capital-backed companies and others who have successfully run major divisions of large corporations. In addition, we plan to consult with members of our advisory board with respect to product development matters from time to time. We believe that this combination of skills and experience is critical to the success of the product development process.

We have a successful track record, having developed more than a dozen products serving industries including energy, telecommunications, life sciences and defense. We believe our Commercialization Strategy Group is positioned to continue that success.

## Business

### Products Group

#### *Overview*

Our Products Group currently consists of the Luna Advanced Systems Division, the Luna nanoWorks Division and the Luna Technologies Division. We provide a description of these divisions below.

#### *Luna Advanced Systems Division*

The Luna Advanced Systems Division provides product development resources to a number of technologies and product candidates in transition from the Contract Research Group to a division within our Products Group. Although this division is currently offering some of our legacy products for commercial sale, we intend to build our capability to commercialize our existing innovative technologies. For example, to support our commercialization efforts, we have recently assembled a team of dedicated sales and marketing personnel with experience in industries related to our product candidates. Below we describe some of the products in our development pipeline.

#### *Ultrasonic Technologies*

We are developing a number of new devices that use high frequency sound, or ultrasonic, waves to evaluate the physical properties of materials. Application of ultrasonic technology in the medical field is commonly known as ultrasound. Our devices can determine the physical condition of an object by analyzing numerical measurements taken from ultrasonic waves that interact with the object. Our quantitative ultrasonic signal processing technology is designed to be extremely sensitive, detecting changes in the physical properties of the object studied. Our instruments report a numerical signature, not an image that is subject to interpretation and sometimes requires an expert consultant. Our technology thus provides information that cannot be obtained by traditional non-quantitative ultrasonic methodologies. Our quantitative ultrasonic technology has applications in medical diagnosis, non-destructive industrial testing and homeland security. All of our ultrasonic devices discussed below are currently in development stage and are not yet available for commercial sale.

#### *Medical Monitoring and Diagnostic Devices*

Ultrasound is an important, non-invasive tool for diagnosing disease inside the body. Roughly 700 thousand procedures utilizing ultrasound devices are performed each day worldwide. Our quantitative ultrasound supplements other diagnostic tools, providing a numerical readout of certain physical properties of the body part being analyzed, such as pressure or strain, which helps physicians diagnose certain disease conditions. We are developing medical device products with our ultrasound platform technology for the diagnosis of the following:

- **Compartment syndrome.** Compartment syndrome is a buildup of pressure within muscles or other body parts following a severe traumatic blow. Such pressure buildup is often undetectable without surgery or other invasive procedures and the reduced blood flow from the disease can lead to debilitating injuries. QUS-1000CS is our compartment syndrome diagnostic device that is currently under development and is being designed to enable the doctors' office or emergency room nursing staff to easily and consistently monitor this condition using a non-invasive method.
- **Bone strength.** Bone loss due to osteoporosis is presently determined using x-ray techniques that measure the density of calcium in the bone. Our ultrasound technology measures the stiffness of the bone and can detect the difference between a bone bearing weight and one that is not. This measurement reflects the load bearing capacity, which is data that current devices in the market do not provide. QUS-1000BQ is our bone strength measurement device that is currently under development and is being designed to allow the monitoring of bone integrity and provide diagnostic information to improve the care of patients with osteoporosis.

## Business

- **Intracranial pressure buildup.** A heavy blow to the head can cause internal pressure that builds up rapidly and can cause morbidity and death if not treated. This condition is typically diagnosed by evaluating a patient's response to external stimuli, which is not possible if the patient is unconscious. Our ultrasound technology can detect such pressure buildup rapidly in non-responsive patients by using a non-invasive device that reports a numerical readout and that does not require expert interpretation. QUS-1000ICP is our intracranial pressure measurement device that is currently under development and is being designed to enable trauma personnel to diagnose and monitor such a condition.

All three products, the QUS-1000CS, the QUS-1000BQ and the QUS-1000ICP, share common components, but also have customized interfaces specific to each application. The pathway to market for medical diagnostic devices requires approval by government agencies. For example, we are required to obtain certification for safety through international standards as well as approval from the FDA through a 510(k) registration which we do not anticipate before the end of 2007. We are currently developing our marketing and distribution strategy for these products.

### *Non-Destructive Industrial Testing and Homeland Security Applications*

We are developing a multi-purpose diagnostic instrument for the United States Army's initiative to improve field service for deployed vehicles. Our multi-purpose diagnostic device measures the physical integrity of parts in the field based on their responses to an ultrasonic probe. Each part has its own distinct acoustic response to an ultrasonic probe which our device can read. A response falling outside a specified range indicates the part will not perform as required. Our device can test the integrity of a large number of replaceable vehicle parts having various uses and made of various materials. Other potential markets for this product include materials laboratories and manufacturing quality assurance departments.

We are also developing homeland security products based on our ultrasonic platform technology, such as an ultrasonic wand to detect weapons concealed beneath clothing and a product that identifies vehicles on the highway system that might be transporting weapons of mass destruction. We plan to continue to develop these homeland security products through our Contract Research Division until we have completed prototype testing, which we anticipate will take at least one year. We intend to market these products, should they prove viable, to government entities and corporations.

### *Remote and Secure Asset Monitoring*

We are developing innovative applications integrating sensors, software and hardware components to provide remote and secure asset monitoring solutions and products. These products, which are currently in development and are not yet available for commercial sale, integrate several technologies such as:

- Sensors utilizing light-transmitting optical fibers, or fiber optic sensors, that collect vital information, such as temperature, pressure, strain, movement, moisture, sound or other changes where they are deployed. We have particular experience developing sensors that operate in harsh environments.
- Encryption technology that scrambles wireless communications to provide security for military or industrial uses. We are designing a card that plugs into the network slot of a laptop or other portable wireless device and serves as a receptacle for any standard network card, converting the wireless communication into a secure, encrypted transmission that can only be unscrambled by a receiver with a similar card.
- Wireless transmission technology to send the data from remote sensors to a central monitoring station, enabling a customer to maintain real time, sensitive contact information about the health of machinery, or other equipment without the expense and inconvenience of installing cable-connected sensors.
- Secure wireless technology that encrypts the data from wireless sensors prior to transmission for settings where the customer needs security.

---

[Table of Contents](#)

## Business

We are developing cost-effective remote and secure asset monitoring products that are simple to install and that offer industrial customers the ability to gather data critical to the performance of their equipment and to increase the reliability and performance of their machinery. These sensors are designed to work in harsh environments or in difficult to reach sites to monitor critical data, such as temperature, pressure and a number of other variables.

We also are developing products for military secure wireless communication applications. For example, we are working with the U.S. Navy to enable handheld wireless devices to communicate securely with a ship or submarine network. In addition, we are developing a sophisticated system that is designed to detect security breaches.

### *Flame Retardants*

We are developing a proprietary flame retardants that can be mixed with other components into fire resistant composites or spray-on coatings for textiles. Originally developed to provide the U.S. Navy with fire resistant ammunition packages, our flame retardant produces a non-combustible surface under fire condition and slows heat transfer through the material. Unlike many flame retardants used today, we believe that our product is environmentally sound in both its manufacture and disposal and that it does not produce toxic fumes if it eventually burns. We plan to collaborate with a leading manufacturer and marketer of textile products to continue development of our flame retardant coating technology.

### *Multi-Functional Protective Coating Systems*

We are developing a family of multi-functional protective coating products to meet numerous market opportunities. Our approach involves the combination of innovative resin systems with commercially available and proprietary additives to create high performance primers and topcoats. Our engineered coating systems are designed to have a variety of key performance attributes, including anti-corrosion, self-healing, rapid cure, non-skid, and tailored dielectric properties. In addition to coatings, we are also developing other complementary products, such as surface cleaners and pretreatments that will improve the performance of the entire coating system. We plan to engage with large coatings manufacturers for the eventual production and distribution of our coating systems through established channels.

### *Blast and Ballistic Resistant Materials*

We are developing a variety of blast and ballistic resistant coatings, materials and composites for critical defense and homeland security applications. We combine resins, polymers, fibers, fabrics and composites that we have developed with commercially-available components to create high strength, lightweight and flexible materials that range in application from soldiers to ships. Specific examples of potential applications include a new ammunition packaging system to protect both ordnance and soldiers; a flexible blast resistant polymer to improve the integrity of ship deck coating systems and to prevent interior shrapnel in the event of an explosive blast; and lightweight, transparent, ballistic resistant polymers for use in next generation military visors.

## *Luna nanoWorks Division*

### *Overview*

Our Luna nanoWorks Division is developing advanced carbon nanomaterials, which are molecular structures consisting of carbon atoms in distinctive geometric shapes. Advanced carbon nanomaterials include: Trimetasphere™ nanomaterials, a new class of materials that we describe in more detail below; fullerenes, which are carbon spheres that resemble a soccer ball; and carbon nanotubes, which are carbon rings shaped like a cylinder.

A Trimetasphere™ nanomaterial is a carbon sphere with three metal atoms enclosed inside. Using different combinations of a group of 17 rare earth metals, we can develop thousands of different types of Trimetasphere™ nanomaterials, each with distinctive properties and performance characteristics and each potentially marketable as a separate product. Through our

## Business

collaborative relationship with Virginia Tech, we have obtained an exclusive license to commercialize Trimetasphere™ nanomaterials under an issued U.S. patent and pending U.S. and foreign applications. We recently were awarded the Nano 50 Products Award by NASA's Tech Briefs publication for our Trimetasphere™ nanomaterials.

Each type of Trimetasphere™ nanomaterial has distinctive chemical, physical or biological properties due to the properties of the metals enclosed in its carbon cage. We can further customize Trimetasphere™ nanomaterials for specific applications by attaching different atoms or molecules to the surface of their carbon spheres. In some cases, this modification process may also provide us with new intellectual property covering carbon nanomaterials other than Trimetasphere™ nanomaterials, further expanding our inventory of potential new products.

We have won a number of government contracts funding new applications of nanotechnology totaling approximately \$11.0 million. These contracts are partially funding our development of manufacturing processes to produce nanomaterials in large quantities. Furthermore, we are researching and developing new applications exploring the physical properties of nanomaterials. As of December 31, 2005, we had invested nearly \$3.0 million of our own funds in these activities and we plan to continue to compete for additional research contracts to support our Luna nanoWorks Division.

Our Luna nanoWorks Division will focus on business opportunities in which we are well-positioned to have a strong intellectual property position in the United States and for which our products are likely to command premium pricing. We believe these opportunities exist in materials supply and medical applications. Our Luna nanoWorks Division plans to supply advanced carbon nanomaterials to customers in different industries where our nanomaterials will enable and become components of our customers' products. Our Luna nanoWorks Division is also identifying medical application products utilizing Trimetasphere™ nanomaterials.

### *Medical Imaging*

Magnetic resonance imaging, or MRI, has been established as the imaging technology of choice for a broad range of applications, including the identification and diagnosis of a variety of medical disorders. MRI provides three-dimensional images that enable physicians to diagnose and manage disease in a minimally invasive manner. MRI contrast agents, used in about 30% of MRI procedures, improve the resolution of MRI images by enhancing the contrast in the organ or tissue in the body where the contrast agent circulates. Most of the contrast agents approved by the FDA use gadolinium, a toxic metal. To neutralize gadolinium's toxicity, contrast agents use organic compounds called chelates that wrap around the gadolinium, shielding the patient from its toxicity. However, chelates cannot neutralize the gadolinium if it escapes into the bloodstream. Hence, the longer the agent circulates, the greater the risk of toxicity. As a result, the contrast agents currently in use need to be eliminated from the body quickly, making it difficult to produce high quality images.

Our Luna nanoWorks Division is developing a Trimetasphere™ nanomaterial-based MRI contrast agent. We believe our Trimetasphere™ nanomaterial-based contrast agent offers two potential advantages: lower risk of toxicity and higher image contrast. Due to the strength of the Trimetasphere™ nanomaterial's carbon cage enclosing the gadolinium, our Trimetasphere™ nanomaterial-based contrast agent can neutralize gadolinium for a longer period of time, and therefore allow the contrast agent to remain safely in the body longer. Experiments have also shown that Trimetasphere™ nanomaterials provide a stronger contrast effect than the other contrast agents currently on the market. The first compound in this program is in preclinical development, with an investigational new drug application, or IND, planned for the end of 2006.

In addition, we are developing various modifications to the Trimetasphere™ nanomaterials to target them for specific tissues or physiological conditions. We believe that, using the Trimetasphere™ nanomaterials, a complete family of disease-targeting diagnostic agents can be created to enhance the capabilities of MRI imaging and significantly expand its applications.

Medical contrast agents for human use must be approved by the FDA or similar foreign regulatory agencies before they can be marketed, which we do not expect before 2009. We are in the early stages of developing a marketing strategy for our MRI contrast agent.

## Business

### *Materials Supply Business*

Our Luna nanoWorks Division has two goals for its materials supply business: to identify new product opportunities by supplying carbon nanomaterials to research laboratories in academia, government and industry; and to develop customized products with specialized performance characteristics for use in industrial applications.

Luna nanoWorks sells carbon nanomaterial kits to academic, federal and private laboratories. These kits are sold to dedicated researchers with the objective of encouraging the discovery of new applications such as nano-scale circuit components, memory storage devices and biological tracers. Should these researchers discover an important new use, we expect that our proprietary position surrounding the relevant material will position us to negotiate favorable terms with the inventors of such new use.

We also have active research programs investigating the enhancement of various industrial materials, including:

- **High performance solar panels.** Solar panels are designed to capture light and convert its energy into electrical power. Solar panels currently on the market face limitations in efficiently converting solar energy into electrical power. We are in the early stages of developing a product that uses the electrical properties of Trimetasphere™ nanomaterials to increase the overall efficiency of solar panels.
- **Stronger and lighter composites.** Composite structures utilizing polymers, which are materials made up of smaller, linked building blocks, have replaced many metal structures for use in military body and vehicle armor due to their greater strength and lighter weight. We are investigating the use of enhanced carbon nanotubes to further reduce the weight and enhance the strength of these composites.
- **Coatings to shield devices from electromagnetic interference .** Carbon nanomaterials provide the strength of carbon fibers and are lightweight and highly conductive, making them suitable for use in coatings designed to shield electronics and electrical equipment from radio waves.

### *Luna Technologies Division*

We reacquired Luna Technologies, Inc. in September 2005, and currently operate it as our Luna Technologies Division. We established Luna Technologies, Inc. in July 1998 and funded its growth by raising venture capital. Such financing activities diluted our equity ownership to as little as approximately 7% during our holding period and to approximately 10% prior to September 2005. In line with our strategy of building a growing portfolio of products, we purchased all of the stock of Luna Technologies, Inc. that we did not own in exchange for shares of our common stock in September 2005. Our acquisition of Luna Technologies is expected to enhance our development and production of fiber-optic technology.

### *Test and Measurement Equipment*

Our test and measurement products monitor the integrity of fiber optic network components and subassemblies. Luna Technologies Division's products are targeted at manufacturers and suppliers of optical components and sub-assemblies and allow them to reduce costs and improve the quality of their products. Most manufacturers and suppliers of optical components and modules currently use a combination of different types of optical test equipment to identify and measure failures in optical networks, such as bad splices, bends, crimps and other reflective and non-reflective events. Our optical test equipment products replace the need for these multiple test products and address all stages of the end user's product development life cycle including: design verification, component qualification, assembly process verification and failure analysis.

Our Luna Technologies Division has two flagship product lines—our Optical Vector Analyzer, or OVA, and our Optical Backscattering Reflectometer, or OBR. Our award winning OVA platform allows manufacturers and suppliers of optical components and sub-assemblies to reduce costs and time-to-market by replacing multiple, time consuming and expensive measurement platforms with a single, integrated and easy-to-use instrument. Our most recent version of OVA operating

## Business

software provides customers with faster testing times, advanced data analysis options and an extended dynamic range relative to previous versions.

Our OBR is a highly sensitive diagnostic device that allows data and telecommunications companies and the service providers who maintain their own fiber optic networks to reduce test time and improve product quality. Our OBR introduces the ability to inspect metropolitan fiber networks with higher resolution and better sensitivity than previously possible. Its user-friendly graphical user interface also makes the OBR product suitable for both research and manufacturing applications.

We expect to increase sales of our optical test equipment products by expanding our customer base beyond the telecommunications industry into avionics, defense and academic research laboratories.

In 2005, Luna Technologies Division received the Frost & Sullivan "Award for Product Line Strategy" for its OVA product and the Frost & Sullivan "Optical Product of the Year Award" for its OBR product.

In June 2005, Luna Technologies entered into a Joint Cooperation Agreement with Luna Energy. Under this agreement, both parties have agreed to cooperate to develop a fiber optic sensing system product and have agreed to contribute materials, intellectual property, personnel and other resources to the development effort. Upon successful completion of product development, Luna Energy will receive a license to certain of Luna Technologies' intellectual property and will be required beginning in 2007 and continuing through December 31, 2017 to make payments to Luna Technologies with respect to revenues derived from products sold that utilize this intellectual property. Although as of December 31, 2005, Luna Energy had not yet sold products that would entitle Luna Technologies to royalty payments under this joint cooperation agreement, Luna Technologies had received aggregate development milestone payments of \$305 thousand as of that date under this agreement and is entitled to receive additional development milestone payments of \$120 thousand in the aggregate, subject to the satisfaction of certain conditions. Luna Technologies also has the right to receive royalty payments from sales of products in the future. The license of certain of the intellectual property from Luna Technologies to Luna Energy shall be an exclusive license if Luna Energy makes certain minimum royalty payments of \$420 thousand in the aggregate between 2007 and 2017, and shall be a non-exclusive license if Luna Energy fails to make these minimum royalty payments. Since December 2004, we have not held an ownership interest in Luna Energy. Luna Technologies continues to operate as our Luna Technologies Division after we acquired that entity in September 2005.

### *Integrated Sensing Solutions*

We have significant knowledge and experience in Distributed Sensing Systems, or DSS, which are products comprised of multiple sensors whose input is integrated through a fiber optic network and software. Our DSS products use fiber optic sensing technology with an innovative monitoring system that allows several thousand sensors to be networked along a single optical fiber. Some key applications, markets and technical advantages of our DSS are described below.

- **Distributed Strain.** Potential markets for our DSS products include the airframe industry, integrated structural monitoring on civil structures and space applications. For example, a major air frame manufacturer deployed our DSS products during fatigue tests to measure strain through a network of sensors distributed throughout an aircraft. Our distributed strain measurement technology can also provide three-dimensional shape measurement. We are developing this technology for use in robotic tethers and for wing structures. We have sold our shape-sensing probes to a major aircraft manufacturer for measuring shape on an aerodynamic surface.
- **Distributed Temperature.** We sell a network of distributed temperature sensors to a major manufacturer of electrical generators. This DSS product enables the direct monitoring of temperature, which helps to prolong generator life and to increase operational efficiency. We have also sold our DSS temperature sensors to NASA for both ultra-cold and extremely high-temperature measurements. Potential markets include industrial process control and electrical system monitoring.

## Business

### Competition

We compete for government, university and corporate research contracts relating to a broad range of technologies. We also compete in the materials supply sensing and fiber optic network testing markets. In addition, we plan to develop and commercialize multiple molecular technology and sensing solutions products across many industries, technologies and markets. As a result, we compete, or will compete, with a variety of companies in several different markets.

Competition for contract research is intense and the industry has few barriers to entry. We compete against a number of in-house research and development departments of major corporations, as well as a number of small, limited-service contract research providers. The contract research industry continues to experience consolidation, which has resulted in greater competition for clients. Increased competition might lead to price and other forms of competition that could harm our operating results.

We compete for contract research on the basis of a number of factors, including reliability, past performance, expertise and experience in specific areas, scope of service offerings, technological capabilities and price. Although there can be no assurance that we will continue to do so, we believe that we compete favorably in these areas. If in the future we are unable to effectively compete in these areas, we could lose business to our competitors, which could harm our operating results. Our competitors in contract research include, but are not limited to, companies such as General Dynamics Corporation, Lockheed Martin Corporation, SAIC, Inc. and SRA International, Inc.

In the molecular technology solutions products market, our competitors include, but are not limited to, large public manufacturers such as The Dow Chemical Company, E.I. du Pont de Nemours and Company, Rohm and Haas Company and 3M Company, as well as emerging advanced materials companies.

In addition, in the MRI contrast agent market, our competitors include Amersham plc, Berlex Laboratories, Inc., Bracco Diagnostics, Inc. and Mallinckrodt Inc.

In the sensor solutions products market, our competitors include, but are not limited to, large companies such as Agilent Technologies, Inc., Analog Devices, Inc., Freescale Semiconductor, Inc., JDS Uniphase Corp., Robert Bosch GmbH and Silicon Sensing, as well as emerging companies developing innovative sensing technologies.

The products that we have developed or are currently developing will compete with other technologically innovative products, as well as products incorporating conventional materials and technologies. We expect that our products will compete with companies in a wide range of industries, including semiconductors, electronics, biotechnology, textiles, alternative energy, military, defense, healthcare, telecommunications, industrial measurement, security applications and consumer electronics.

### Intellectual Property

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

Our success depends in part on our ability to develop patentable products and obtain, maintain and enforce patent and trade secret protection for our products, as well as successfully defend these patents against third party challenges both in the United States and in other countries. We will only be able to protect our technologies from unauthorized use by third parties to the extent that we own or have licensed valid and enforceable patents or trade secrets that cover them. Furthermore, the degree of future protection of our proprietary rights is uncertain because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage.

## Business

Currently, we own or license numerous U.S. patents and patent applications, and we intend to file, or request that our licensors file, additional patent applications for patents covering our products. However, patents may not be issued for any pending or future pending patent applications owned by or licensed to us. Claims allowed under any issued patent or future issued patent owned or licensed by us may not be valid or sufficiently broad to protect our technologies. Any issued patents owned by or licensed to us now or in the future may be challenged, invalidated or circumvented, and, in addition, the rights under such patents may not provide us with competitive advantages. In addition, competitors may design around our technology or develop competing technologies. Intellectual property rights may also be unavailable or limited in some foreign countries, which could make it easier for competitors to capture or increase their market share with respect to related technologies. Although we are not currently involved in any legal proceedings related to intellectual property, we could incur substantial costs to defend ourselves in suits brought against us or in suits in which we may assert our patent rights against others. An unfavorable outcome of any such litigation could have a material adverse effect on our business and results of operations.

As of December 31, 2005, we owned or had exclusive rights to use at least 32 issued U.S. patents and at least 62 additional pending U.S., international and foreign patent applications. As of December 31, 2005, we did not have any issued or granted foreign patents. In particular, as of December 31, 2005, we owned or had exclusive license to the following issued patents and applications as they relate to specific products:

- two issued U.S. patents with expiration dates ranging from December 2021 to April 2024, three pending U.S. patent applications, and one pending foreign patent applications relating to our OVA and OBR products;
- three issued U.S. patents with expiration dates ranging from December 2019 to August 2021, six pending U.S. patent applications, and 11 pending foreign patent applications relating to our carbon nanomaterials, including Trimetasphere™ nanomaterials;
- three pending U.S. patent applications and one pending foreign patent application relating to our DSS technology;
- 10 issued U.S. patents with expiration dates ranging from June 2011 to September 2022, three pending U.S. patent applications and one pending foreign patent application relating to our ultrasound technologies for medical applications;
- three pending U.S. patent applications and two pending foreign applications relating to our ultrasonic technologies for weapons detection and non-destructive industrial testing technologies;
- five issued U.S. patents with expiration dates ranging from February 2012 to April 2020, and two pending U.S. patent application relating to our remote and secure asset monitoring technologies;
- six pending U.S. patent applications and seven pending foreign patent applications relating to our flame retardant, impact indicator coatings and multifunctional protective coatings; and
- 12 issued U.S. patents with expiration dates ranging from February 2016 to March 2024, and 13 pending U.S. and foreign patent applications relating to our various other technologies.

We own 20 of the issued U.S. patents, 25 of the U.S. patent applications and 23 of the foreign patent applications identified above. The remaining 12 issued U.S. patents, seven U.S. patent applications and seven foreign patent applications are owned by and licensed exclusively from third parties, which include educational institutions, government agencies and for-profit companies. We consider the following exclusive license agreements to be material to our business:

- **Virginia Tech nanomaterials license.** Our Amended and Restated License Agreement with Virginia Tech Intellectual Properties, Inc., or VTIP, dated March 19, 2004, relating to Trimetasphere™ nanomaterials, which provides us with rights to one issued U.S. patent, one U.S. patent application and one foreign patent application. Under this license agreement, VTIP granted us an exclusive worldwide license, in all fields of use,

## Business

under the foregoing patent rights, to make, have made, use and sell licensed products, with a reservation of rights by VTIP for educational and research purposes. We are required to diligently pursue development, manufacture and sale of licensed products, and are also required to, among other things, raise financing before March 19, 2009, make annual expenditures toward development of the licensed products, use reasonable efforts to market the licensed products and meet market demand, and distribute research samples of the licensed products. If we fail to do so, VTIP has the right to terminate the license or to change the exclusive license to a non-exclusive license. We paid up-front fees for this license agreement and are required to pay to VTIP royalties on product sales, including royalties on product sales by companies to which we have granted a sublicense. We have the right to terminate the license agreement for convenience, and VTIP has the right to terminate the agreement upon a material breach by us or our failure to make a payment. We agreed to indemnify VTIP against any claims arising out of our exercise of the license granted or any sublicense, including for products liability claims. VTIP is responsible for diligently pursuing the prosecution and maintenance of the patents at issue, and must consult with us and provide us with a reasonable opportunity to review and comment on all proposed submissions to any patent office. VTIP has the first right to institute an action for infringement of the licensed intellectual property; we can bring an infringement claim against third parties only if VTIP elects not to. Recoveries from any such action belong to the party bringing suit. If legal actions are brought jointly by VTIP and us where we each fully participate in such action, the recoveries are shared in jointly in proportion to the share of expense paid by each party.

- **NASA ultrasound technologies license.** Our License Agreement No. DE-384 with NASA dated October 28, 2004, relating to ultrasound technologies, which provides us with rights to 10 issued U.S. patents, two U.S. patent applications and one foreign patent application. Under this license agreement, NASA granted us a terminable, exclusive license to make, have made, use and sell licensed inventions, in the United States (including its territories and possessions) and other jurisdictions that are covered by a patent or patent application, in the field of medical applications for assessing and measuring intracranial pressure and compartment syndrome. We are required to achieve practical application, which is generally defined as a commercial application or use for which a market exists, of the licensed application before September 7, 2006, and achieve certain milestones along the way. We paid up-front fees for this license agreement and are required to pay to NASA and to the University of California, a joint owner with NASA of one of the patent applications covered by the license agreement, royalties on product sales, including minimum annual royalties from 2004 through the term of the license agreement as well as royalties on product sales by companies to which we have granted a sublicense. We may terminate the license agreement with advance notice or immediately upon a material breach by NASA. NASA may terminate the license upon a material breach by us or if NASA determines, among other things, that (i) we have failed to achieve or maintain practical application of the licensed invention before September 7, 2006, (ii) we have not substantially manufactured the licensed invention in the United States, or (iii) we have failed to meet market demand, to pay royalties or to submit required reports. In addition, until September 7, 2009, NASA is permitted to unilaterally modify or revoke the license as to any licensed invention for which we have not achieved a practical application. We agreed to indemnify NASA and the University of California against claims arising out of our use of the licensed invention or our sale, use or disposition of products or processes made by use of such inventions. We have the right to enforce the licensed patents, subject to the U.S. government's right to bring suit or intervene, and any recoveries must be shared with NASA and the University of California on terms to be negotiated with them.

In addition to the exclusive license agreements described above, we consider the following non-exclusive license agreements to be material to our business because they relate to certain of our key products:

- **NASA OVA and OBR products and DSS technology licenses.** Our License Agreement with NASA No. DN-982 dated June 10, 2002, as modified on dated January 23, 2006, and our License Agreement with NASA No. DN-951 dated December 20, 2000, relating to our OVA and OBR products and DSS technology, which provide us with rights to four issued U.S. patents and two foreign patent applications. Under these license

## Business

agreements, NASA granted us a terminable, non-exclusive license to make, have made, use and sell licensed inventions, in the United States (including its territories and possessions), in all fields of use. We paid up-front fees for this license agreement and are required to pay royalties on product sales, including minimum annual royalties from 2003 through the term of the license agreement as well as royalties on product sales by, and other payments we receive from, companies to which we have granted a sublicense. We may terminate the license agreement with advance notice or immediately upon a material breach by NASA. NASA may terminate the license upon a material breach by us or if NASA determines, among other things, that (i) we failed to achieve or maintain practical application of the licensed invention before June 10, 2004, (ii) we have not substantially manufactured the licensed invention in the United States, or (iii) we have failed to meet market demand, to pay royalties or to submit required reports. In addition, NASA is permitted to unilaterally modify or terminate the agreement in event of a breach by us by providing notice to us and allowing us to challenge or protest its decision. We agreed to indemnify NASA against claims arising out of our use of the licensed invention or information provided by NASA, or our sale, use or disposition of products or processes made by use of such inventions or such information. We have the right to enforce the licensed patents, subject to the U.S. government's right to bring suit or intervene, and any recoveries must be shared with NASA on terms to be negotiated with them.

- **United Technologies Corporation DSS technology license.** Our Fiber Optic Patent License with United Technologies Corporation, or UTC, dated September 22, 2003, relating to DSS technology, which provides us with rights to two issued U.S. patents. Under this license agreement, UTC granted us a non-exclusive, non-transferable, worldwide license, under the foregoing patent rights, to make, have made, use and sell licensed products, without the right to grant sublicenses. We paid non-refundable up-front fees for this license agreement and are required to pay royalties on product sales. We do not have the right to terminate the license agreement without the agreement of UTC, but UTC has the right to terminate upon, among other things, a material breach by us or our failure to make a payment. We agreed to indemnify UTC against any claims relating to (i) use of the licensed patents by us, our customers, subcontractors, agents or employees, and (ii) our manufacture, use and sale of the licensed products. UTC may decide in its sole discretion whether to enforce its rights under the licensed patents or to defend any action with respect to such patents. Any such action would be under UTC's sole control and at its expense, and UTC would retain all damages and recoveries from any such action.

We may not be able to prevent third parties from obtaining rights from our licensor that are identical to ours. For example, because our licenses from NASA and UTC described above that relate to fiber Bragg grating and fiber optic strain sensing are non-exclusive, others, including our competitors, may obtain rights from our licensor that are identical to ours.

The development of some of our intellectual property, including software, may have been funded by the U.S. government including under, or in connection with, U.S. government contracts and other federal agreements. Similarly, some of our patents may cover inventions that were conceived or first reduced to actual practice under, or in connection with, U.S. government contracts or other federal funding agreements. The U.S. government may constrain the use of intellectual property, including patents and software that was developed through or under U.S. government contracts, federal funding agreements or other federal agreements. In addition, in instances where the U.S. government has provided funding of, or for, the development of intellectual property, the U.S. government typically retains a non-exclusive, royalty-free, worldwide license to use the intellectual property in any manner it deems appropriate including, in some specific circumstances, providing it to our competitors. When we work on U.S. government contracts, federal funding agreements and other federal instruments, we seek to protect our proprietary technologies and intellectual property developed at private expense by taking steps to maintain ownership of such intellectual property, as well as steps intended to limit the U.S. government's rights in such intellectual property to the extent permitted by applicable statutes, rules and regulations. We may not have succeeded in our efforts to maintain title in patents or ownership or in limiting the U.S. government's rights in our proprietary technologies and the intellectual property whether developed in the performance of a federal funding agreement or developed at private expense.

## Business

In addition to patent and trade secret protection, we also rely on several registered and unregistered trademarks to protect our brand. LUNA INNOVATIONS is a registered trademark in the United States. Our unregistered trademarks include: our logo (a black and white image of a moth design); TRIMETASPHERES; EDAC; and ACCELERATING THE INNOVATION PROCESS.

Our intellectual property policy is to protect our products, technology and processes by asserting our intellectual property rights where appropriate and prudent. However, we currently have no foreign issued patents and only three pending foreign applications in the field of endohedral metallofullerenes, and any pending or future pending patent applications owned by or licensed to us (in the United States or abroad) may not be allowed or may in the future be challenged, invalidated or circumvented, and the rights under such patents may not provide us with competitive advantages. Any significant impairment of our intellectual property rights could harm our business or our ability to compete. Protecting our intellectual property rights is costly and time consuming. Any increase in the unauthorized use of our intellectual property could make it more expensive to do business and harm our operating results.

There is always the risk that third parties may claim that we are infringing upon their intellectual property rights and, if successful in proving such claims, we could be prevented from selling our products or services. For example, we are aware of competitors with patents in technology areas applicable to our optical test equipment products. Such competitors may allege that we infringe these patents. In addition, we acquired a business that had received a letter in 2002 from a competitor alleging infringement of certain patents. The competitor sent an additional letter on January 14, 2004 to the business that we acquired, again alleging infringement of the competitor's patents. Neither we nor the business that we acquired have received any further communications from this third party. We cannot currently predict whether this third party, or any other third party, will assert a claim against us, or whether any third parties that have asserted such claims against businesses that we have acquired will assert claims or pursue infringement litigation against us; nor can we predict the ultimate outcome of any such potential claims or litigation.

Even if such claims are unfounded, we could suffer significant litigation or licensing expenses as a result of such claims. Companies in the molecular technology solutions, advanced materials, nanotechnology, systems integration, sensing and fiber optics industries own numerous patents, copyrights and trademarks and frequently enter into litigation based on allegations of infringement or other violations of intellectual property rights. As we face increasing competition, the possibility of intellectual property claims against us grows. Our technologies may not be able to withstand any third-party claims or rights against their use.

In recent years, numerous patent applications have been filed by others with the United States Patent and Trademark Office that refer to molecular technology solutions, advanced materials, nanotechnology, systems integration, sensing, fiber optics and our other core technologies. Information contained in patent applications is generally not publicly available. Consequently, we are unable to evaluate the underlying intellectual property until these patent applications become issued or published. The process to issue patents is long and certain innovations that have not yet resulted in issued patents could have been developed prior to our intellectual property. These patents, if and when issued, may predate our patents and may have superior claims or superior rights or otherwise be in conflict with our technology or business processes.

For additional, important information related to our intellectual property, please review the information set forth in "Risk factors—Risks Related to Our Business and Technologies."

Business

**Government Regulation**

*Small Business Innovation Research Qualifications*

We presently benefit from our status as qualifying for the U.S. Government's Small Business Innovation Research, or SBIR, program administered by the U.S. Small Business Administration, or SBA. SBIR is a highly competitive program that encourages small businesses to explore their technological potential and provides them incentive to profit from the commercialization of technologies. Each year, ten federal agencies and departments, including NASA, the Department of Defense and the National Institutes of Health, are required to set aside a portion of their grant awards for SBIR-qualified organizations. SBIR contracts include Phase I feasibility contracts of up to \$100 thousand and Phase II proof-of-concept contracts, which can be as high as \$750 thousand. Several of our research contracts have used this program as a key source of project funding to develop new technologies.

We must continue to qualify for the SBIR program in order to be eligible to receive future SBIR awards. The eligibility requirements are:

- **Ownership.** The company must be at least 51 percent owned and controlled by U.S. citizens or permanent resident aliens, or owned by an entity that is itself at least 51 percent owned and controlled by U.S. citizens or permanent resident aliens; and
- **Size.** The company, including its affiliates, cannot have more than 500 employees.

These requirements are set forth in the SBA's regulations and are interpreted by the SBA's Office of Hearings and Appeals. In determining whether we satisfy the 51% equity ownership requirement, agreements to merge, stock options, convertible debt and other similar instruments are given "present effect" by the SBA as though the underlying security were actually issued unless the exercisability or conversion of such securities is speculative, remote or beyond the control of the security holder. We therefore believe our outstanding options and warrants held by eligible individuals may be counted as outstanding equity for purposes of meeting the 51% equity ownership requirement. As of December 31, 2005, giving present effect to our outstanding options, at least approximately 73% of our equity was owned by U.S. citizens or permanent residents. Upon the completion of this offering, approximately % of our equity will be owned by U.S. citizens or permanent residents (and approximately % assuming exercise of the underwriters' over-allotment option). In addition, to be eligible for SBIR contracts, the number of our employees, including those of any entities that are considered to be affiliated with us, cannot exceed 500. As of December 31, 2005, we, including all of our divisions, had 131 full-time and 12 part-time employees. In determining whether we have 500 or fewer employees, the SBA may count the number of employees of entities that are large stockholders who are "affiliated", or have the power to control us. In determining whether two or more firms are affiliated, the SBA will look at indicia such as stock ownership or common management, but ultimately will make its determination based on the "totality of the circumstances." The SBA presumes that a large stockholder of ours has the power to control us absent evidence rebutting that presumption. With respect to Carilion Health System, our only large institutional stockholder, we believe we would not be required to count the employees of Carilion Health System. We believe the relative beneficial ownership of our individual stockholders rebuts the presumption of control by Carilion Health System because the shares held by our executive officers and directors constitute the controlling voting interest in us. Eligibility protests can be raised to the SBA by a competitor or by the awarding contracting agency. Accordingly, a company can be declared ineligible for a contract award as a result of a competitor's protest to the SBA or as a result of questioning by the awarding contracting agency. We believe that we are currently in compliance with the SBIR eligibility criteria, but we cannot provide assurance that the SBA will interpret its regulations in our favor. As we grow larger, and as our ownership becomes more diversified, we may no longer qualify for the SBIR program, and we may be required to seek alternative sources and partnerships to fund some of our research and development costs. See "Risk factors—Risks Related to Our Business and Technologies."

## Business

### *Environmental*

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

The European Union Directive 2002/96/EC on Waste Electrical and Electronic Equipment, known as the "WEEE Directive," requires producers of certain electrical and electronic equipment, including monitoring instruments, to be financially responsible for specified collection, recycling, treatment and disposal of past and present covered products placed on the market in the European Union. As a manufacturer of covered products, we may be required to register as a producer in some European Union countries, and we may incur some financial responsibility for the collection, recycling, treatment and disposal of both new products sold, and products already sold prior to the WEEE Directive's enforcement date, including the products of other manufacturers where these are replaced by our own products. European Union Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in electrical and electronic equipment, known as the "RoHS Directive," restricts the use of certain hazardous substances, including mercury, lead and cadmium in specified covered products; however, the RoHS Directive currently exempts monitoring instruments from its requirements. If the European Commission were to remove this exemption in the future, we would be required to change our manufacturing processes, and redesign products regulated under the RoHS Directive in order to be able to continue to offer them for sale within the European Union. For some products, substituting certain components containing regulated hazardous substances may be difficult or costly, or result in production delays. We will continue to review the applicability and impact of both directives on the sale of our products within the European Union. Although we cannot currently estimate the extent of such impact, they are likely to result in additional costs, and could require us to redesign or change how we manufacture our products, any of which could adversely affect our operating results. Failure to comply with the directives could result in the imposition of fines and penalties, inability to sell covered products in the European Union and loss of revenues.

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

### *FDA Regulation of Products*

Some of the products that we are developing are subject to regulation under the FDC Act. In particular, our Trimetasphere™ nanomaterial-based MRI contrast agent and our ultrasound diagnostic devices for measuring certain medical conditions will be considered a drug and medical devices, respectively, under the FDC Act. Both the statutes and regulations promulgated under the FDA Act govern, among other things, the testing, manufacturing, safety efficacy, labeling, storage, recordkeeping, advertising and other promotional practices involving the regulation of drug and devices.

## Business

### *New Drugs*

Obtaining FDA approval for a new drug has historically been a costly and time consuming process. Generally, in order to gain FDA premarket approval, a developer first must conduct preclinical studies in the laboratory and in animal model systems to gain preliminary information on an agent's efficacy and to identify any safety problems. The results of these studies are submitted as a part of an investigational new drug, or IND, application which the FDA must review before human clinical trials of an investigational drug can start. The IND application includes a detailed description of the clinical investigations to be undertaken. In order to commercialize any drug, we must sponsor and file an IND application and be responsible for initiating and overseeing the clinical studies to demonstrate the safety, efficacy and potency that are necessary to obtain FDA approval of any of the products. We will be required to select qualified investigators to supervise the administration of the products and ensure that the investigations are conducted and monitored in accordance with FDA regulations. Clinical trials are normally done in three phases, although the phases may overlap. Phase I trials are concerned primarily with the safety and preliminary effectiveness of the drug, involve fewer than 100 subjects and may take from six months to over one year. Phase II trials typically involve a few hundred patients and are designed primarily to demonstrate effectiveness in treating or diagnosing the disease or condition for which the drug is intended, although short-term side effects and risks in people whose health is impaired may also be examined. Phase III trials are expanded clinical trials with larger numbers of patients which are intended to evaluate the overall benefit-risk relationship of the drug and to gather additional information for proper dosage and labeling of the drug. The process of clinical trials generally takes two to five years to complete, but may take longer. The FDA receives reports on the progress of each phase of clinical testing, and it may require the modification, suspension or termination of clinical trials if it concludes that an unwarranted risk is presented to patients.

If clinical trials of a new product are completed successfully, the sponsor of the product may seek FDA marketing approval. If the product is regulated as a drug, the FDA will require the submission and approval of a new drug application, or NDA, before commercial marketing of the drug. The NDA must include detailed information about the drug and its manufacture and the results of product development, preclinical studies and clinical trials. The testing and approval processes require substantial time and effort, and we cannot guarantee that any approval will be granted on a timely basis, if at all. If questions arise during the FDA review process, approval can take more than five years. Even with the submissions of relevant data, the FDA may ultimately decide that the NDA does not satisfy its regulatory criteria for approval and deny approval or require additional clinical studies. In addition, the FDA may condition marketing approval on the conduct of specific post-marketing studies to further evaluate safety and effectiveness. Even if FDA regulatory clearances are obtained, a marketed product is subject to continual review. Later discovery of previously unknown problems or failure to comply with the applicable regulatory requirements may result in restrictions on the marketing of a product or withdrawal of the product from the market as well as possible civil or criminal sanctions.

### *Medical Devices*

Any device products that we may develop are likely to be regulated by the FDA as medical devices rather than drugs. The nature of the FDA requirements applicable to devices depends on their classification by the FDA. A device developed by us would be automatically classified as a Class III device, requiring pre-market approval, unless the device was substantially equivalent to an existing device that has been classified in Class I or Class II or to a pre-1976 device that has not yet been classified or we convince the FDA to reclassify the device as Class I or Class II. Class I or Class II devices require registration through the 510(k) exemption. If we were unable to demonstrate such substantial equivalence and unable to obtain reclassification, we would be required to undertake the costly and time-consuming process, comparable to that for new drugs, of conducting preclinical studies, obtaining an investigational device exemption to conduct clinical tests, filing a pre-market approval application, and obtaining FDA approval.

If the device were a Class I product, the general controls of the Federal Food, Drug, and Cosmetic Act, chiefly adulteration, misbranding and good manufacturing practice requirements, would nevertheless apply. If substantial equivalence to a Class II device could be shown, the general controls plus special controls, such as performance standards, guidelines for safety and effectiveness, and post-market surveillance, would apply. While demonstrating substantial equivalence to a Class I or Class II

## Business

product is not as costly or time-consuming as the pre-market approval process for Class III devices, it can in some cases also involve conducting clinical tests to demonstrate that any differences between the new device and devices already on the market do not affect safety or effectiveness. If substantial equivalence to a pre-1976 device that has not yet been classified has been shown, it is possible that the FDA would subsequently classify the device as a Class III device and call for the filing of pre-market approval applications at that time. If the FDA took that step, then filing an application acceptable to the FDA would be a prerequisite to remaining on the market.

## Employees

As of December 31, 2005, we employed 143 people, including 131 people on a full-time basis, 129 in the United States and two internationally. Of these, 28 employees hold Ph.D.s and 38 hold advanced degrees. We have experienced no work stoppages and believe that our employee relations are good.

## Facilities

Our corporate headquarters are located in Roanoke, Virginia, and, in late 2006, we will move into 20,000 square feet of leased office space currently under construction at the Riverside Center in Roanoke, Virginia. Additional administrative functions currently located in 14,700 square feet of space in Blacksburg, Virginia, under a lease expiring June 30, 2006 will be moved to the corporate headquarters when construction is complete.

We lease an additional 15,000 square feet of space in Blacksburg, Virginia for research, development, manufacturing and administrative functions. Our Luna Technologies Division occupies an additional 6,310 square foot facility space in Blacksburg, Virginia, also for research, development, manufacturing and administrative functions. In the third quarter of 2006, all of our Blacksburg, Virginia, research, development and manufacturing functions will be consolidated into 32,000 square feet of newly leased space in Blacksburg.

Our Luna nanoWorks Division occupies a 24,000 square foot facility in Danville, Virginia for nanomaterials manufacturing and research and development.

Our facility in Charlottesville, Virginia currently occupies approximately 8,000 square feet for research and development of molecular technology solutions. Our facility in Hampton, Virginia, which is located near the NASA Langley Research Center, occupies approximately 10,000 square feet for research and development of non-destructive evaluation and certain ultrasonic technologies. We also maintain additional office space in McLean, Virginia.

We believe that our existing facilities are adequate for our current needs and suitable additional or substitute space will be available as needed to accommodate expansion of our operations.

## Legal Proceedings

We are not party to any material legal proceedings, nor are we currently aware of any threatened material proceedings. From time to time, we may become involved in litigation in relation to claims arising out of our operations in the normal course of business. While management currently believes the amount of ultimate liability, if any, with respect to these actions will not materially affect our financial position, results of operations, or liquidity, the ultimate outcome of any litigation is uncertain. Were an unfavorable outcome to occur, or if protracted litigation were to ensue, the impact could be material to us.

In March 2003, the Office of Inspector General of the Department of Commerce advised us that the government was investigating anonymous allegations of contract improprieties. We have cooperated fully and extensively with that investigation through interviews and document production. In April 2003, the government advised our regulatory counsel that to date no wrongdoing had been identified, although the government indicated that we may not have fully complied with

## Business

contractual reporting requirements in one or two instances, which the government did not specify. We believe that the investigation has been resolved favorably, based on statements by the government investigator to company employees in June 2003, and that this matter effectively is at an end absent any advice or communication from the government to the contrary. However, if the government pursues this investigation further, there can be no assurance as to how or whether our relationships, business, financial condition or results of operations will ultimately be affected.

On November 9, 2004, we received a subpoena from the Department of Defense's Office of the Inspector General covering certain government research contracts awarded to us between January 1, 1998 and November 9, 2004 to determine if we had duplicated work in our submission of project reports to the government. In connection with the investigation, the government alleged that duplication occurred in three research reports that we prepared under the contracts. We submitted a response to the Inspector General in September 2005 challenging the government's findings. On November 15, 2005, we entered into a settlement agreement with the government and received a general release with respect to the civil and administrative claims in this matter in return for a payment of \$165,333.

In July 2005, we received a letter from legal counsel retained by a former employee that such law firm is investigating whether such former employee has any claims against us, including breaches of contract, fiduciary duty, implied covenants of good faith and fair dealing as well as potential violations of minority stockholder rights that such former employee may have as a stockholder in one of our subsidiaries. In 2006, we responded to additional inquiries from counsel for such former employee seeking information about the relationship between us and the subsidiary in which the employee holds stock. Although we believe none of these potential claims has merit, we cannot currently predict whether such former employee will file litigation against us or the ultimate outcome of any such potential litigation.

## Advisory Board

We have assembled a twelve member advisory board of leaders with backgrounds in government, academia and industry with which we consult on a formal basis regarding strategic and technical matters. In general, they serve on an exclusive basis within a defined field of collaboration. In connection with their appointment to and as consideration for their service on the advisory board, each advisor receives a stock option grant to purchase 5,000 shares of our common stock.

Our advisory board members include:

**Frank Bonsal, Jr.** is co-founder of the venture capital firm New Enterprise Associates, or NEA, where he has focused on the development of its early stage companies. He is also a co-founder of Red Abbey Venture Partners in Lutherville, Maryland and he is a special limited partner of Amadeus Capital Partners, Boulder Ventures, Novak Biddle Venture Partners, Trellis Ventures and Windward Ventures. Mr. Bonsal's current board memberships include Advertising.com, Inc., CeraTech and Cibernet Corporation. Mr. Bonsal is also a member on the Johns Hopkins Hospital Endowment Board. Prior to founding NEA, Mr. Bonsal was a general partner of Alex. Brown & Sons Inc.

**Terry Brady** was most recently employed by Oridion Systems Ltd. to launch a new division in the United States. Prior to joining Oridion Systems Ltd., Mr. Brady founded Array Medical, Inc., where he served as President and Chief Executive Officer. Before founding Array Medical, Inc., Mr. Brady was President of International Technidyne Corporation Commercial Group.

**Ronald E. Carrier, Ph.D.** is currently president emeritus of James Madison University, where he served previously as President for 27 years. During his presidency, James Madison University changed from a teachers' college to a major comprehensive university. Dr. Carrier has been active on a number of national and state commissions and has been a board member of several companies that have been acquired by Fortune 200 companies.

**John F. Hay** is currently a principal with P3 Consulting, LLC in Washington, D.C. Mr. Hay has over 40 years of experience in the national security arena having served twelve years as an industry executive and thirty one years in uniform with the

Business

Department of the Navy. In 2000, Mr. Hay was appointed to the Bush-Cheney Transition Advisory Committee and subsequently served as an advisor to the Secretary of Defense and the NASA Administrator. He currently serves as an advisor to the Secretary of the Army and is a member of the Army Science Board. During his time in industry, Mr. Hay was Senior Vice President, Corporate and International Affairs for Westinghouse Electric and CBS Corporation. Before joining Westinghouse, Mr. Hay spent five years as a Congressional Affairs Officer in the Office of the Secretary of the Army. During the previous twenty-six years, his military service included serving in the Chief of Staff of the Army's Office and a series of command and staff assignments in Infantry, Special Operations, Intelligence and Military Police units. Mr. Hay received his bachelors degree from the University of Nebraska, his masters degree from Wichita State University and is a graduate of the U.S. Army Command and Staff College and the FBI National Academy.

**Charles Edward Hamner, Jr. DVM, Ph.D.** is currently the President and CEO of Hamner Advisory Service; he specializes in management in the pharmaceutical and health care industries and academic administration. From 1988-2002 Dr. Hamner served as President and CEO of the North Carolina Biotechnology Center, and was a Research Professor in the OB/GYN Department at the University of North Carolina at Chapel Hill. He has also worked as Associate Vice President for Health Affairs at the University of Virginia Medical Center (1978-1988), and served as Interim Executive Director for the Center in 1981. Dr. Hamner received his bachelors degree in Animal Science from Virginia Tech and his masters degree in Chemistry, DVM in Veterinary Medicine and Ph.D. in Bio-Chemistry from the University of Georgia.

**Sir Harold W. Kroto** is one of the co-recipients of the 1996 Nobel Prize in Chemistry. Dr. Kroto's Nobel Prize was based on his co-discovery of buckminsterfullerene, a form of pure carbon better known as "buckyballs." Dr. Kroto earned his Doctorate in chemistry from the University of Sheffield. He started his academic career at the University of Sussex at Brighton in 1967, where he became a professor in 1985 and, in 1991 was made a Royal Society Research Professor.

**The Honorable John O. Marsh Jr.** is currently a Senior Fellow at the National Center for Technology and Law and a Distinguished Adjunct Professor at the George Mason University School of Law. Prior to that, Mr. Marsh served in the U.S. House of Representatives for Virginia, as Secretary of the Army for eight years, and as National Security Advisor to Vice President and, later, President Gerald R. Ford. Mr. Marsh is also the former Chairman and interim Chief Executive Officer of Novavax, Inc., a specialty biopharmaceutical company. Mr. Marsh received his law degree from Washington and Lee University.

**John B. Noftsinger, Jr., Ph.D.** is currently the Associate Vice President of Academic Affairs for Research and Program Innovation, the Executive Director of the Institute for Infrastructure and Information Assurance, and an Associate Professor of Integrated Science and Technology and Education at James Madison University, where he specializes in interdisciplinary program and grant development. Dr. Noftsinger is also the Co-Chair of the Virginia Research and Technology Advisory Committee and the Chair of the Virginia Technology Alliance.

**Jay Sculley, Ph.D.** is the Chairman Emeritus and former Chairman, President and Chief Executive Officer of The Allied Defense Group, Inc. Dr. Sculley was previously the Director of Advanced Studies and Technologies at Grumman Corporation. Dr. Sculley served as the Assistant Secretary for Research and Development for the U.S. Army during President Ronald Reagan's administration. In addition, Dr. Sculley was a professor and Dean of the Department of Civil Engineering at the Virginia Military Institute, where he also served as a member of the Board of Visitors.

**Jerre Stead** is currently Chairman of IHS, Inc. and is the former Chairman and Chief Executive Officer of Ingram Micro Inc. He previously served as Chief Executive Officer of Legent Corporation, Chairman and Chief Executive Officer of AT&T Global Information Solutions, and Chairman, President, and Chief Executive Officer of Square D Company. Mr. Stead also serves on the board of directors of TBG, Armstrong World Industries, Inc., Brightpoint, Inc., Conexant Systems, Inc., Mindspeed Technologies, Inc., and Mobility Electronics, Inc.

**G. Kim Wincup** is senior vice president of Science Applications International Corporation. Mr. Wincup previously served as counsel to the U.S. House of Representatives Armed Services Committee and U.S. House of Representatives Veterans

---

[Table of Contents](#)

Business

Affairs Committee, as staff director of the U.S. House of Representatives Armed Services Committee and the Joint Committee on the Organization of Congress, and as Assistant Secretary of both the Air Force and the Army. Mr. Wincup has a bachelors degree in Political Science from DePauw University, and received a law degree from the University of Illinois School of Law.

**General Larry D. Welch** was formally the U.S. Air Force Chief of Staff. As Chief, he served as the senior uniformed Air Force Officer responsible for the organization, training and equipage of a combined active duty, Guard, Reserve and civilian force serving at locations in the United States and overseas. As a member of the Joint Chiefs of Staff, he and the other service chiefs functioned as the principal military advisers to the secretary of defense, National Security Council and the President. General Welch received a bachelor's degree in Business Administration from the University of Maryland and a Masters Degree in International Relations from the George Washington University. General Welch completed Armed Forces Staff College at Norfolk, Va., in 1967, and National War College at Fort Lesley J. McNair, Washington, D.C., in 1972.

# Management

## Executive Officers and Directors

The following table sets forth certain information concerning our current executive officers and directors:

Name	Age	Position	Director or Executive Officer Since
Kent A. Murphy, Ph.D.	47	President, Chief Executive Officer, Secretary, Treasurer and Chairman of the Board of Directors	1990
Scott A. Graeff	39	Chief Financial Officer and Executive Vice President, Corporate Development	2005
John T. Goehrke	48	Chief Operating Officer	2005
Scott A. Meller	39	President, Contract Research Group	2000
Kenneth D. Ferris	58	President, Luna Advanced Systems Division	2005
Robert P. Lenk, Ph.D.	58	President, Luna nanoWorks Division	2005
N. Leigh Anderson, Ph.D.	56	Director	2006
John C. Backus, Jr.(1)(2)	47	Director	2005
Bobbie Kilberg	61	Director	2006
Edward G. Murphy, M.D.(1)(3)	50	Director	2005
Richard W. Roedel(1)(2)(3)	56	Director	2005
Paul E. Torgersen, Ph.D.(2)(3)	74	Director	2000

(1) Member of our nominating and corporate governance committee.

(2) Member of our audit committee.

(3) Member of our compensation committee.

**Kent A. Murphy, Ph.D.**, our founder, has served as our President, Chief Executive Officer, Secretary, Treasurer and Chairman of the Board since 1992. Dr. Murphy received his Ph.D. in Electrical Engineering from Virginia Polytechnic Institute and State University and is formerly a tenured professor in Virginia Tech's Bradley Department of Engineering, where he filed for over 35 patents. In 2001, he was named SBIR Entrepreneur of the Year and in 2004 was named Outstanding Industrialist of the Year by Virginia's Governor Warner. Dr. Murphy is the founding member of The Accelerating Innovation Foundation, a non-profit organization whose goal is to promote and facilitate development of a technology innovation cluster in the Mid-Atlantic region. Dr. Murphy is not related to Edward G. Murphy, M.D., a member of our board of directors.

**Scott A. Graeff** has served as our Chief Financial Officer since July 2005 and was a member of our Board of Directors from August 2005 until March 2006. In addition, he currently serves as our Executive Vice President, Corporate Development. From December 1999 to June 2001, Mr. Graeff served as Chief Financial Officer of Liquidity Link, a software development company. From June 2001 to August 2002, Mr. Graeff served as President and Chief Financial Officer of Autumn Investments. From August 2002 until July 2005, Mr. Graeff served as a Managing Director for Gryphon Capital Partners, a venture capital investment group. From August 2003 until July 2005, Mr. Graeff also served as the Acting Chief Financial Officer of Luna Technologies, Inc. Mr. Graeff is presently a member of the Board of Directors of Provox Technologies Corporation, a provider of speech recognition-based medical documentation and workflow management systems, a position he has held since June 2004. Mr. Graeff holds a B.S. in Commerce from the University of Virginia.

**John T. Goehrke** has served as our Chief Operating Officer since September 2005. From August 2003 to September 2005, Mr. Goehrke served as President and Chief Executive Officer of Luna Technologies, Inc. From April 2000 to April 2003, Mr. Goehrke served as General Manager of the Access Division of Acterna, LLC, a provider of communications test solutions

---

[Table of Contents](#)

Management

for telecommunications and cable network operators. Mr. Goehrke holds a B.S. in Electrical Engineering from the University of Connecticut and a M.B.A. from the University of Pittsburgh.

**Scott A. Meller** has served as our President, Contract Research Group, since September 2005. From May 2004 to September 2005, Mr. Meller served as our Chief Operating Officer. From October 2002 to May 2004, Mr. Meller served as our Vice President of Research and Development and previously served as Director of Engineering from September 2000 to October 2002. Mr. Meller joined Luna Innovations in 1996 and was a major contributor to early research that led to spin-offs and new products, including Luna Technologies, Inc. Mr. Meller holds a B.S. in Electrical Engineering from Clemson University, a M.S. in Electrical Engineering from Virginia Tech, and is a licensed Professional Engineer. He also holds three patents in optical fiber sensors and devices.

**Kenneth D. Ferris** has served as President of our Luna Advanced Systems Division since December 2005. Prior to joining Luna iMonitoring as Director in 2002, Ken was with Carrier Access, where as VP and General Manager of Broadband Terminal Products, he was responsible for Product Development and Product Management activities. Ken joined Carrier Access in August of 2000 when Carrier acquired Millennia Systems, a company he co-founded with Dr. Phil Couch. Prior to starting Millennia in 1998, Ken was a Vice President for FiberCom, as part of the team who developed the company from infancy to maturity. Prior to joining FiberCom he was with ITT -EOPD in Roanoke for three years. Ken spent the first 10 years of his career in the U.S. Department of Defense performing systems engineering and program management for a variety of projects. Ken led the partnership of Luna iMonitoring with IHS in 2003. Mr. Ferris holds a B.S. in Electrical Engineering from Virginia Tech.

**Robert P. Lenk, Ph.D.** has served as President of our Luna nanoWorks Division since August 2005. Since December 2003, Dr. Lenk has served as President of Oncovector Inc., a biopharmaceutical company. Dr. Lenk has also served as a member of Oncovector's Board of Directors since May 2003. From July 1999 to September 2003, Dr. Lenk was President and Chief Executive Officer of Therapeutics 2000, an inhalation pharmaceutical research company. Dr. Lenk holds a Ph.D. in Cell Biology from the Massachusetts Institute of Technology.

**N. Leigh Anderson, Ph.D.** has served as a member of our board of directors since March 2006. Since 2002, Dr. Anderson has served as the Chief Executive Officer of the Plasma Proteome Institute, a scientific research institute in Washington, D.C., of which he is also a founder. Dr. Anderson is currently a member of the Board of Directors and a member of the Audit Committee of Dade Behring Holdings, Inc. (DADE), a Nasdaq-traded company. Dr. Anderson also consults through Anderson Forschung Group, of which he has been a Principal since 2002. From 2001 to 2002, Dr. Anderson served as the Chief Scientific Officer and a member of the board of directors of Large Scale Biology Corporation, a biotechnology corporation that previously traded on Nasdaq under the symbol "LSBC" and ceased operations in December 2005. Dr. Anderson earned a B.A. in Physics from Yale University and a Ph.D. in Molecular Biology from Cambridge University.

**John C. Backus, Jr.** has served as a member of our board of directors since September 2005. Mr. Backus is a member of our audit committee and chairman of our nominating and corporate governance committee. Since 1999, Mr. Backus has served as a Managing Director and Partner at Draper Atlantic, an early stage information technology venture capital firm based in Northern Virginia which he co-founded. Prior to founding Draper Atlantic, Mr. Backus was a founder and the President and Chief Executive Officer of IntelliData Technologies Corporation, a developer of software products and services for the financial services industry. Mr. Backus earned a B.A. in Economics and an M.B.A. from Stanford University.

**Bobbie Kilberg** has served as a member of our board of directors since March 2006. She is the President and CEO of the Northern Virginia Technology Council, or NVTC, the largest technology council in the United States. In addition, she was appointed by President George W. Bush to serve on the President's Council of Advisors on Science and Technology, or PCAST, and also serves on the Board of Trustees/Board of Directors of George Washington University, Washington D.C. public television station WETA, the Wolf Trap Foundation for the Performing Arts, United Bank - Virginia, and the Advisory Board of George Mason University's School of IT & Engineering. Ms. Kilberg has served on the Attorney General of Virginia's Task Forces on Identity Theft and on Regulatory Reform and Economic Development. Among her prior professional positions, Ms. Kilberg served as Deputy Assistant to the President for Public Liaison and Deputy Assistant to the President for Intergovernmental Affairs for President George H.W. Bush, as Associate Counsel to President Gerald R. Ford, as Vice President and General Counsel of the Roosevelt Center for American Policy Studies, as an attorney at Arnold & Porter, and

---

[Table of Contents](#)

Management

as a White House Fellow in the Nixon Administration. Ms. Kilberg received her law degree from Yale University, a Masters Degree in Political Science from Columbia University and a Bachelors Degree from Vassar College.

**Edward G. Murphy, M.D.** has served as a member of our board of directors since September 2005. Dr. Murphy is chairman of our compensation committee and a member of our nominating and corporate governance committee. Since January 2001, Dr. Murphy has served as President and Chief Executive Officer of Carilion Health System, where he served as Executive Vice President and Chief Operating Officer from January 2000 until January 2001. Dr. Murphy holds a B.S. in Biochemistry and Economics from the University of New York at Albany and an M.D. from Harvard Medical School. Dr. Murphy is not related to Kent A. Murphy, Ph.D., our President, Chief Executive Officer, Secretary, Treasurer and Chairman of our board of directors.

**Richard W. Roedel** has served as a member of our board of directors since September 2005. Mr. Roedel is chairman of our audit committee and a member of our nominating and corporate governance and compensation committees. From 1985 through 2000, he was employed by BDO Seidman, LLC as an Audit Partner, later being promoted in 1990 to Managing Partner in Chicago and then Managing Partner in New York in 1994 and finally in 1999 to Chairman and Chief Executive Officer. In October of 2002, he joined the Board of Directors of Take-Two Interactive Software, Inc. (TTWO) as Chairman of the Audit Committee and served in several capacities through June 2005, including Chairman and Chief Executive Officer. Mr. Roedel is currently a member of the Board of Directors and Chairman of the Audit Committees of two Nasdaq traded companies, Brightpoint, Inc. (CELL) and Dade Behring Holdings, Inc. (DADE), and a member of the Board of Directors of IHS, Inc., a NYSE traded company. He is also a member of the Board of Directors of the Association of Audit Committee Members, Inc., a not-for-profit organization dedicated to strengthening the audit committee by developing best practices. Mr. Roedel holds a B.S. in Accounting and Economics from The Ohio State University and is a Certified Public Accountant.

**Paul E. Torgersen, Ph.D.** has served as a member of our board of directors since 2000. Dr. Torgersen is a member of our audit and compensation committees. Dr. Torgersen is President Emeritus of Virginia Tech where he has served as the John W. Hancock Chair in Engineering since January 2000. From 1993 until 2000, Dr. Torgersen served as President of Virginia Tech. Dr. Torgersen currently serves on the board of directors of Electrical Distribution Design and formerly served on the board of Roanoke Electric Steel Corporation. Dr. Torgersen holds a B.S. in Industrial Engineering from Lehigh University and a M.S. and Ph.D. in Industrial Engineering from The Ohio State University.

**Significant Employees**

Certain of our key employees who are not also executive officers or directors are as follows:

Name	Age	Position
Mark Froggatt, Ph.D.	36	Chief Technology Officer
Joseph S. Heyman, Ph.D.	62	Chief Scientific Officer
Kenneth L. Walker, Ph.D.	53	Executive Vice President of Luna nanoWorks Division
Stephen R. Wilson, Ph.D.	59	Chief Technical Officer of Luna nanoWorks Division

**Mark Froggatt, Ph.D.** has been our Chief Technology Officer since September 2005. He co-founded Luna Technologies in the fall of 2000 to develop instrumentation for fiber optic devices. Dr. Froggatt is the primary inventor of the technology used in the OVA and a leading expert in the field of interferometric measurement. Before joining Luna Technologies, Dr. Froggatt worked at the NASA Langley Research Center developing ultrasonic and optical instrumentation for which he received eight patents. He received his B.S. and M.S. degrees in Electrical Engineering from Virginia Tech and a Ph.D. from the University of Rochester Institute of Optics.

**Joseph S. Heyman, Ph.D.** has served as our Chief Scientific Officer since May 2003. Dr. Heyman has over 30 patents and the distinction of winning four international IR-100 awards as one of the 100 most significant technology developments of the year. Dr. Heyman served as Vice President and Chief Technology Officer of Nascent Technology Solutions from July 2001 to May 2003. He had a 36 year career at the NASA Langley Research Center, retiring as the Langley Chief Technologist for the

---

[Table of Contents](#)

## Management

Director. Dr. Heyman is an Adjunct Professor of Physics and Applied Science at The College of William and Mary. He received his B.A. in Physics from Northeastern University and his M.A. in Solid State Physics and Physical Acoustics and his Ph.D. in Solid State Physics and Ultrasonics at Washington University.

**Kenneth L. Walker, Ph.D.** has served as Executive Vice President of our Luna nanoWorks Division since May 2005. Dr. Walker founded a specialty photonic devices business within Lucent Technologies Inc. which grew from a concept to a business with over \$200.0 million in revenues. Upon the divestiture of this business to Furukawa Co., Ltd., Dr. Walker continued as President of the division. Dr. Walker received his undergraduate degree from the California Institute of Technology and his Ph.D. degree from Stanford University.

**Stephen R. Wilson, Ph.D.** has served as Chief Technical Officer of our Luna nanoWorks Division since May 2004 and served as acting Chief Executive Officer of our Luna nanoWorks Division from May 2004 until May 2005. From 1985 through 2004, he served in a tenured faculty position in the Chemistry department at New York University. He founded and served as Chief Executive Officer of Sphere Biosystems, Inc., a fullerene biomedical company which was the predecessor of C Sixty Inc., a bionanotechnology company. Dr. Wilson is the author of more than 220 peer-reviewed articles, books, book chapters and patents. Dr. Wilson received his B.A. in Chemistry and M.S. and Ph.D. in Organic Chemistry from Rice University.

## Executive Officers

Our executive officers are elected by, and serve at the discretion of, our board of directors.

## Board of Directors

Our authorized number of directors is seven. Upon completion of this offering, our amended and restated certificate of incorporation will provide that our board of directors will be divided into three classes, each with staggered three-year terms: Class I, Class II and Class III. As a result, only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. Dr. Edward Murphy and Dr. Kent Murphy have been designated as Class I directors, whose terms will expire at the 2007 annual meeting of stockholders. Bobbie Kilberg, and Dr. Paul Torgersen have been designated as Class II directors, whose terms will expire at the 2007 annual meeting of stockholders. Mr. John Backus, N. Leigh Andersen and Mr. Richard Roedel have been designated as Class III directors, whose terms will expire at the 2008 annual meeting of stockholders. This classification of the board of directors may delay or prevent a change in control of our company or our management. See "Description of capital stock—Anti-Takeover Effects of Provisions of the Amended and Restated Certificate of Incorporation and Bylaws."

A majority of the members of our board of directors, who are N. Leigh Anderson, Ph.D., John C. Backus, Jr., Bobbie Kilberg, Edward G. Murphy, M.D., Richard W. Roedel and Paul E. Torgersen, Ph.D., are independent within the meaning of applicable Nasdaq rules.

### *Board Committees*

Our board of directors has an audit committee, a compensation committee, and a nominating and corporate governance committee.

*Audit Committee.* The audit committee of our board of directors recommends the appointment of our independent auditors, reviews our internal accounting procedures and financial statements, and consults with and reviews the services provided by our independent auditors, including the results and scope of their audit. The audit committee is currently comprised of John C. Backus, Jr., Richard W. Roedel and Paul E. Torgersen, Ph.D., each of whom is independent, within the meaning of the requirements of the Sarbanes-Oxley Act of 2002, and applicable SEC and Nasdaq rules. Richard W. Roedel is chairman of our audit committee as well as our audit committee financial expert, as currently defined under the SEC rules

## Management

implementing the Sarbanes-Oxley Act of 2002. We believe that the composition and functioning of our audit committee complies with all applicable requirements of the Sarbanes-Oxley Act of 2002, The Nasdaq National Market, and SEC rules and regulations.

*Compensation Committee.* The compensation committee of our board of directors reviews and recommends to our board of directors the compensation and benefits for all of our executive officers, administers our stock plans, and establishes and reviews general policies relating to compensation and benefits for our employees. The compensation committee is currently comprised of Edward G. Murphy, M.D., Richard W. Roedel and Paul E. Torgersen, Ph.D., each of whom is independent, within the meaning of Nasdaq rules. Edward G. Murphy, M.D is chairman of our compensation committee. We believe that the composition and functioning of our compensation committee complies with all applicable requirements of the Sarbanes-Oxley Act of 2002, The Nasdaq National Market, and SEC rules and regulations.

*Nominating and Corporate Governance Committee.* The nominating and corporate governance committee of our board of directors is responsible for:

- reviewing the appropriate size, function and needs of the board of directors;
- developing the board's policy regarding tenure and retirement of directors;
- establishing criteria for evaluating and selecting new members of the board, subject to board approval thereof;
- identifying and recommending to the board for approval individuals qualified to become members of the board of directors, consistent with criteria established by the committee and by the board;
- overseeing the evaluation of management and the board; and
- monitoring and making recommendations to the board on matters relating to corporate governance.

The nominating and corporate governance committee currently consists of John C. Backus, Jr., Edward G. Murphy, M.D., and Richard W. Roedel each of whom is independent, within the meaning of applicable Nasdaq rules. John C. Backus, Jr. is chairman of our nominating and corporate governance committee. We believe that the composition and functioning of our nominating and corporate governance committee complies with all applicable requirements of the Sarbanes-Oxley Act of 2002, The Nasdaq National Market, and SEC rules and regulations.

## Compensation Committee Interlocks and Insider Participation

None of the members of our compensation committee has, at any time, been one of our officers or employees. None of our executive officers currently serves, or in the past year has served, as a member of the board of directors or compensation committee of any entity that has one or more executive officers serving on our board of directors or compensation committee.

## Director Compensation

Our non-employee directors are reimbursed for certain of their out-of-pocket expenses incurred in connection with attending board and committee meetings. In the past, we have granted to our directors options to purchase our common stock pursuant to the terms of our 2003 Stock Plan. Each non-employee director appointed to the board after the completion of this offering will receive an initial option under our 2006 Equity Incentive Plan to purchase 100,000 shares of common stock upon such appointment except for those directors who become non-employee directors by ceasing to be employee directors. This option will vest as to 33,333 shares subject to the option on the first anniversary of the date of grant and as to 2,778 shares each month thereafter, subject to the director's continued service on each relevant vesting date. All options granted under these provisions have a term of ten years and an exercise price equal to fair market value on the date of grant. See "—Benefit Plans" below for further information.

## Management

**Executive Compensation**

The following table sets forth the summary information concerning compensation during 2005 for the following persons: (i) our chief executive officer, (ii) those of our executive officers who received compensation during 2005 of at least \$100 thousand and who were executive officers on December 31, 2005, and (iii) two additional former executive officers who would have been included under clause (ii) above if they had been executive officers on December 31, 2005. We refer to these persons as our “named executive officers” elsewhere in this prospectus. Except as provided below, none of our named executive officers received any other compensation required to be disclosed by law or in excess of 10% of their total annual compensation.

**Summary Compensation Table**

Name and Position	Year	Annual Compensation		Long Term Compensation Awards	All Other Compensation (\$)
		Salary (\$)	Bonus (\$)	Securities Underlying Options (#)	
Kent A. Murphy, Ph.D. President, Chief Executive Officer, Secretary, Treasurer and Chairman of the Board of Directors	2005	\$210,208	\$32,120	200,000	\$6,708(1)
Scott A. Graeff(2) Chief Financial Officer and Executive Vice President, Corporate Development	2005	76,318	26,250	400,000	1,181(3)
Scott A. Meller President, Contract Research Group	2005	125,401	609	—	4,410(4)
Robert P. Lenk, Ph.D.(5) President, Luna nanoWorks Division	2005	68,993	15,566	200,000	76,491(6)
Stephen R. Wilson, Ph.D.(7) Chief Technical Officer, Luna nanoWorks Division	2005	200,641	974	150,000	11,546(8)
Michael F. Gunther(9) Vice President, Patents and Licensing	2005	129,864	180,604(10)	—	5,026(11)

(1) Reflects \$6,708 in 401(k) matching contributions made by us.

(2) On July 1, 2005, Mr. Graeff was appointed our Chief Financial Officer, and subsequently our Executive Vice President, Corporate Development.

(3) Reflects \$1,181 in 401(k) matching contributions made by us.

(4) Reflects \$4,410 in 401(k) matching contributions made by us.

(5) On August 13, 2005, Dr. Lenk was appointed President of Luna nanoWorks Division.

(6) Reflects \$75,000 in consulting fees paid prior to Dr. Lenk becoming a full time employee and relocation expense reimbursement.

(7) Dr. Wilson served as executive officer in charge of Luna nanoWorks until May 2005.

(8) Reflects \$6,707 in 401(k) matching contributions made by us as well as relocation expense reimbursement.

(9) Mr. Gunther served as an executive officer (Vice President of Operations) until September 30, 2005.

[Table of Contents](#)

Management

- (10) Reflects payment made pursuant to that certain Cash Bonus Agreement dated March 21, 2003, by and between us and Mr. Gunther, whereby we were obligated to pay Mr. Gunther a fixed cash bonus over a period of three years, of which \$180,000 remained due and payable after December 31, 2005 and has since been paid.
- (11) Reflects \$5,026 in 401(k) matching contributions made by us.

**Option Grants in Last Fiscal Year**

In 2005, we granted options to purchase an aggregate of 4,555,374 shares of our common stock to our employees, directors, advisory board members and consultants, all of which were granted under the 2003 Stock Plan. These options generally vest at the rate of 25% after one year of service from the date of grant, and monthly thereafter, in equal amounts, generally over 36 additional months.

These options have terms of no more than ten years, but may terminate before their expiration dates if the optionee's status as an employee, director or consultant is terminated, or upon the optionee's death or disability. See "—Benefit Plans" for more detail regarding these options.

We granted 950,000 stock options to our named executive officers during 2005.

**Option Grants in Last Fiscal Year**

Name	Number of Securities Underlying Options Granted(#)	% of Total Options Granted to Employees In Fiscal Year	Exercise of Base Price (\$/Sh)	Expiration Date	Potential Realizable Value at Assumed Annual Rates of Stock Price Appreciation for Options Term	
					5%	10%
Kent A. Murphy, Ph.D.	200,000	4.4%	\$0.22	5/20/15	\$16,000	\$36,000
Scott A. Graeff	100,000	2.2%	0.20	5/20/15	10,000	20,000
	40,000	0.8%	0.20	6/3/15	4,000	8,000
	100,000	2.2%	0.20	7/1/15	10,000	20,000
	160,000	3.5%	0.20	8/1/15	16,000	32,000
Scott A. Meller	—	—	—	—	—	—
Robert P. Lenk, Ph.D.	100,000	2.2%	0.20	5/20/15	10,000	20,000
	100,000	2.2%	1.00	10/26/15	50,000	100,000
Stephen R. Wilson, Ph.D.	150,000	3.3%	0.20	5/20/15	15,000	30,000
Michael F. Gunther	—	—	—	—	—	—

**Aggregated Option Exercises in 2005 and Year-End Option Values**

The following table sets forth certain information concerning the number and value of unexercised options held by each of the named executive officers, as of December 31, 2005. No options were exercised by the named executive officers in 2005. The value of in-the-money stock options represents the fair market value of the shares underlying the options, which is based upon the assumed initial public offering price of \$ per share, minus the exercise price per share, multiplied by the number of shares underlying the options.

## Management

**2005 Aggregated Option Exercises and Year-End Values**

Name	Number of Securities Underlying Unexercised Options at December 31, 2005		Value of Unexercised In-The-Money Options at December 31, 2005	
	Exercisable	Unexercisable	Exercisable	Unexercisable
Kent A. Murphy, Ph.D.	—	200,000(1)		
Scott A. Graeff	300,000	100,000		
Scott A. Meller	416,248	63,752		
Robert P. Lenk, Ph.D.	—	200,000		
Stephen R. Wilson, Ph.D.	—	150,000		
Michael F. Gunther	—	—		

(1) Excludes options to purchase 64,000 shares of common stock of Luna Analytics, Inc. at an exercise price of \$0.11 per share granted on January 17, 2002, pursuant to the Luna Analytics, Inc. 2001 Stock Plan.

**Benefit Plans**

The following section provides more details concerning our 2003 Stock Plan and 2006 Equity Incentive Plan.

*2003 Stock Plan*

Our 2003 Stock Plan was adopted by our board of directors and approved by our stockholders, as amended, on March 16, 2004. Our 2003 Stock Plan provides for the grant of incentive stock options, within the meaning of Section 422 of the Internal Revenue Code, to our employees and our parent and subsidiary corporations' employees, and for the grant of nonstatutory stock options to our employees, directors and consultants and our parent and subsidiary corporations' employees and consultants. We will not grant any additional options under our 2003 Stock Plan following this offering. Instead, we will grant options and other equity-based awards under our 2006 Equity Incentive Plan.

As of December 31, 2005, we have reserved a total of 8,000,000 shares of our common stock for issuance pursuant to the 2003 Stock Plan, of which 556,623 shares have been issued upon exercise of options granted under the 2003 Stock Plan. Also as of December 31, 2005, options to purchase 7,033,517 shares of common stock were outstanding and 409,860 shares were available for future grant under this plan. The maximum aggregate number of shares that may be subject to option and sold under the 2003 Stock Plan is 8,000,000 shares, unless adjusted by the administrator. In February 2006, we increased the shares reserved and authorized to be issued under the 2003 Stock Plan by 1,715,000 shares to 9,715,000 shares.

Our compensation committee appointed by our board of directors administers our 2003 Stock Plan. The administrator has the power to determine the terms of the options, including the service providers who will receive awards, the number of shares subject to each such option, the exercisability of options and the form of consideration payable upon exercise.

In addition, the administrator determines the exercise price of options granted under our 2003 Stock Plan. With respect to all incentive stock options, the exercise price may not be less than the fair market value of our common stock on the date of grant. The term of an incentive stock option may not exceed ten years, except that with respect to any participant who owns more than 10% of the voting power of all classes of our outstanding stock, the term must not exceed five years and the exercise price may not be less than 110% of the fair market value on the grant date. The administrator determines the term of all other options.

After termination of an employee, director or consultant, he or she may exercise his or her option for the period of time as the administrator may determine. In the absence of a specified time, the option will remain exercisable for three months following

## Management

termination other than by reason of death or disability and for twelve months following termination for death or disability. If, on the date of termination, the employee, director or consultant is not vested as to his or her entire option, the shares covered by the unvested portion of the option will revert to the 2003 Stock Plan.

Unless the administrator provides otherwise, our 2003 Stock Plan does not allow for the transfer of options other than by will or the laws of descent and distribution and only the recipient of an option may exercise an option during his or her lifetime.

Our 2003 Stock Plan provides that in the event of our “change in control,” the successor corporation or its parent or subsidiary will assume or substitute an equivalent award for each outstanding option. If there is no assumption or substitution of outstanding options, the administrator will provide notice to the recipient that he or she has the right to exercise the option as to all of the shares subject to the option for a period of 15 days from the date of such notice. The option will terminate upon the expiration of that 15-day period.

Our 2003 Stock Plan will automatically terminate in 2014, unless we terminate it sooner. In addition, our board of directors has the authority to amend, suspend or terminate the 2003 Stock Plan, provided such action does not impair the rights of any participant. Our board of directors has decided to suspend the 2003 Stock Plan as of the completion of this offering.

### *2006 Equity Incentive Plan*

Our board of directors recommended that our stockholders approve our 2006 Equity Incentive Plan on January 29, 2006, and the plan is pending their approval. Our 2006 Equity Incentive Plan provides for the grant of incentive stock options, within the meaning of Section 422 of the Internal Revenue Code, to our employees and our parent and subsidiary corporations’ employees, and for the grant of nonstatutory stock options, restricted stock, stock appreciation rights, performance units and performance shares to our employees, directors and consultants and our parent and subsidiary corporations’ employees and consultants.

We have reserved a total of 3,000,000 shares of our common stock for issuance pursuant to the 2006 Equity Incentive Plan plus (a) any shares remaining available for grant under our 2003 Stock Plan as of the effective date of this offering and (b) any shares that otherwise would have been returned to our 2003 Stock Plan on or after the effective date of this offering as a result of termination of options or the repurchase of shares issued under the 2003 Stock Plan. In addition, our 2006 Equity Incentive Plan provides for annual increases in the number of shares available for issuance thereunder on the first day of each fiscal year, beginning with our fiscal year 2007, equal to the least of:

- 10% of the outstanding shares of our common stock on the first day of the fiscal year;
- 3,000,000 shares; and
- such other amounts as our board of directors may determine.

Our compensation committee of our board of directors administers our 2006 Equity Incentive Plan. In the case of awards intended to qualify as “performance-based compensation” within the meaning of Section 162(m) of the Internal Revenue Code, the committee or a subcommittee of that committee granting the awards will consist of two or more “outside directors” within the meaning of Section 162(m) of the Code. The administrator has the power to determine the terms of the awards, including the exercise price, the number of shares subject to each such award, the exercisability of the awards and the form of consideration payable upon exercise. The administrator also has the authority to institute an exchange program whereby the exercise prices of outstanding awards may be reduced or outstanding awards may be surrendered in exchange for awards with a lower exercise price.

The administrator determines the exercise price of options granted under our 2006 Equity Incentive Plan, but with respect to all incentive stock options, the exercise price may not be less than the fair market value of our common stock on the date of grant. The term of an incentive stock option may not exceed ten years, except that with respect to any participant who owns

---

[Table of Contents](#)

## Management

more than 10% of the voting power of all classes of our outstanding stock, the term must not exceed five years and the exercise price may not be less than 110% of the fair market value on the grant date. The administrator determines the term of all other options.

No optionee may be granted in any fiscal year an option to purchase more than 750,000 shares. However, in connection with his or her initial service, an optionee may be granted an option to purchase up to 2,750,000 shares.

After termination of an employee, director or consultant, he or she may exercise his or her option for the period of time stated in the option agreement. Generally, if termination is due to death or disability, the option will remain exercisable for 12 months. In all other cases, the option will generally remain exercisable for three months. However, an option generally may not be exercised later than the expiration of its term.

Stock appreciation rights may be granted under our 2006 Equity Incentive Plan. Stock appreciation rights allow the recipient to receive the appreciation in the fair market value of our common stock between the date of grant and the exercise date. The administrator determines the terms of stock appreciation rights, including when such rights become exercisable and whether to pay the appreciation in cash or with shares of our common stock, or a combination thereof; however, stock appreciation rights expire under the same rules that apply to stock options.

Restricted stock may be granted under our 2006 Equity Incentive Plan. Restricted stock awards are shares of our common stock that vest in accordance with terms and conditions established by the administrator. The administrator will determine the number of shares of restricted stock granted to any participant. The administrator may impose whatever conditions to vesting it determines to be appropriate. For example, the administrator may set restrictions based on the achievement of specific performance goals. Shares of restricted stock that do not vest are subject to our right of repurchase or forfeiture.

Performance units and performance shares may be granted under our 2006 Equity Incentive Plan. Performance units and performance shares are awards that will result in a payment to a participant only if performance goals established by the administrator are achieved or the awards otherwise vest. The administrator will establish organizational or individual performance goals in its discretion, which, depending on the extent to which they are met, will determine the number and/or the value of performance units and performance shares to be paid out to participants. Performance units will have an initial dollar value established by the administrator prior to the grant date. Performance shares will have an initial value equal to the fair market value of our common stock on the grant date. Payment for performance units and performance shares may be made in cash or in shares of our common stock with equivalent value, or in some combination, as determined by the administrator.

Unless the administrator provides otherwise, our 2006 Equity Incentive Plan does not allow for the transfer of awards and only the recipient of an award may exercise an award during his or her lifetime.

Our 2006 Equity Incentive Plan provides that in the event of our "change in control," the successor corporation or its parent or subsidiary will assume or substitute an equivalent award for each outstanding award. If there is no assumption or substitution of outstanding awards, the administrator will provide notice to the recipient that he or she has the right to exercise the option and stock appreciation right as to all of the shares subject to the award, all restrictions on restricted stock will lapse, and all performance goals or other vesting requirements for performance shares and units will be deemed achieved, and all other terms and conditions met. The option or stock appreciation right will terminate upon the expiration of the period of time the administrator provides in the notice. In the event the service of an outside director is terminated on or following a change in control, other than pursuant to a voluntary resignation, his or her options and stock appreciation rights will fully vest and become immediately exercisable, all restrictions on restricted stock will lapse, and all performance goals or other vesting requirements for performance shares and units will be deemed achieved, and all other terms and conditions met.

---

[Table of Contents](#)

Management

Our 2006 Equity Incentive Plan will automatically terminate in 2016, unless we terminate it sooner. In addition, our board of directors has the authority to amend, suspend or terminate the 2006 Equity Incentive Plan provided such action does not impair the rights of any participant.

**Employment Agreements and Change in Control Arrangements**

Employment at our company is at will. As discussed in note 14 of the Luna Technologies, Inc. 2004 financial statements included elsewhere in this prospectus, the president of that company previously had an employment agreement with Luna Technologies. In connection with our repurchase and consolidation of Luna Technologies, all employment agreements with employees in that subsidiary have been terminated. In the period from April 2005 through October 2005, we entered into officer employment letters with Scott A. Graeff, our Chief Financial Officer and Executive Vice President, Corporate Development, Robert P. Lenk, Ph. D., President of our Luna nanoWorks Division, John T. Goehrke, our Chief Operating Officer, Aaron S. Hullman, our Vice President and General Counsel, and Kenneth D. Ferris, President of our Luna Advanced Systems Division. These officer employment letters provide the officers with monthly salaries, ranging from \$10,834 to \$16,667, bonuses payable upon achievement of certain conditions or milestones, stock option grants and rights to participate in benefits plans, including our 401(k) retirement plan, health insurance plan, dental plan and life insurance plan, all as generally available to our executives.

## Certain relationships and related party transactions

We describe below the transactions and series of similar transactions that have occurred this year or during the last three fiscal years to which we or our subsidiaries were a party or will be a party, in which:

- the amounts involved exceeded or will exceed \$60,000; and
- a director, executive officer, holder of more than 5% of our common stock or any member of their immediate family had or will have a direct or indirect material interest.

### Luna Technologies Acquisition

In September 2005, we acquired all of the outstanding shares of common stock and preferred stock of Luna Technologies that we did not already own in exchange for 1,031,234 shares of our Class B Common Stock, excluding 3,601 shares of our Class B Common Stock reserved for issuance upon the exercise of warrants that were exchanged for warrants formerly issued by Luna Technologies. An additional 196,403 shares of our Class B Common Stock and warrants exercisable for 686 shares of our Class B Common Stock were held in escrow at closing pending completion of certain additional equity investments by Carilion Health System, of which 73,658 shares and warrants exercisable for 257 shares were released from escrow on December 30, 2005 upon closing of an additional \$3.0 million equity investment by Carilion Health System. The remaining 122,745 escrow shares and warrants exercisable for 429 shares are subject to either release from escrow or termination. In addition, the stockholders receiving shares of our common stock in connection with our acquisition of Luna Technologies have a redemption right for a certain percentage of the outstanding shares issued pursuant to that transaction. That redemption right will be cancelled upon the effectiveness of our offering.

Dr. Kent Murphy, our President, Chief Executive Officer, Secretary and Treasurer, was also Chairman of the Board of Directors of Luna Technologies immediately prior to the acquisition and a former stockholder of Luna Technologies. Shortly prior to this transaction, Dr. Murphy sold all of his shares of Luna Technologies stock to two other Luna Technologies stockholders for an aggregate purchase price of approximately \$10,600; as a result, Dr. Murphy did not receive any additional shares of our common stock in connection with the transaction. Also, in connection with this transaction, John Goehrke, the Chief Executive Officer of Luna Technologies, became our Chief Operating Officer and Mark Froggatt, a founder and employee of Luna Technologies, became our Chief Technology Officer. All former employees of Luna Technologies as of September 30, 2005 who became employees of Luna Innovations after the transaction received options to purchase shares of our common stock, subject to a three year vesting schedule. An aggregate of 715,000 options were issued to former Luna Technologies employees in connection with this transaction. In addition, Mr. Goehrke received \$75,000 from Luna Technologies as a bonus paid prior to close of that transaction, \$150,000 from two other Luna Technologies stockholders and \$25,000 from us as a signing bonus in connection with the transaction. Dr. Paul Torgersen, a member of our board of directors, was also a former stockholder in Luna Technologies and received common stock of Luna Innovations upon the same terms and conditions as other stockholders of Luna Technologies. Scott Graeff, a former member of our board of directors and our Chief Financial Officer and Executive Vice President, Corporate Development, was formerly acting Chief Financial Officer of Luna Technologies from August 2003 until July 2005.

Because there was no public market for our shares at the time of the transaction, the number of shares of our nonvoting Class B Common Stock paid as consideration in the transaction was arrived at by negotiating a percentage of the financial ownership of our company that the Luna Technologies stockholders would receive. As a result, the parties to the transaction did not assign a specific value to the shares issued in the transaction. The number of shares and percentage were determined by arms-length negotiations with the three largest stockholders of Luna Technologies prior to the acquisition. Subsequent to this transaction, we engaged an independent third-party appraiser, who estimated the value of Luna Technologies to be approximately \$2.0 million as of September 30, 2005 and also estimated that our nonvoting Class B Common Stock was valued at \$0.92 per share on that date, or \$948,735 for the 1,031,234 shares that were issued at closing. The independent third-party appraiser also estimated that our nonvoting Class B Common Stock was valued at \$0.93 per share on December 30, 2005, or \$68,502 for the 73,658 shares that were released from escrow on that date.

## Certain relationships and related party transactions

### **Financing Transactions**

In August 2005, Carilion Health System purchased 2,639,688 shares of our Class C Common Stock for an aggregate purchase price of \$7.0 million. Dr. Edward Murphy, Chairman and Chief Executive Officer of Carilion Health System, became a member of our board of directors in connection with this transaction and was appointed chair of the Compensation Committee of our board of directors in October 2005. The purchase price for the securities was negotiated at arms length by the parties. In connection with this transaction, Scott Graeff, a former member of our board of directors and our Chief Financial Officer and Executive Vice President, Corporate Development, received fully vested stock options to purchase 300,000 shares of our common stock.

In the definitive transaction documents relating to the August 2005 financing transaction, Carilion Health System agreed to purchase additional shares of our Class C Common Stock in two tranches for aggregate additional consideration of \$8.0 million upon the achievement of certain milestones relating to, among other things, our filing of Investigational New Drug applications with the FDA. However, in December 2005, we agreed with Carilion Health System to terminate these milestone requirements in connection with Carilion Health System's purchase of an additional 1,131,294 shares of our Class C Common Stock for an aggregate purchase price of \$3.0 million. Concurrent with the December 2005 equity investment, Carilion Health System invested \$5.0 million aggregate principal amount in a series of senior convertible promissory notes. These notes accrue simple interest at a rate of 6.0% per year and are due and payable on December 30, 2009 or a later date if extended by the holders of a majority of the aggregate principal amount of the notes, absent acceleration due to an event of default. The holders of a majority of the aggregate principal amount of the notes may also extend the maturity date of these notes for one additional year by providing notice to us and may further extend the maturity date for up to an additional three consecutive one year periods if we are not eligible for or have elected not to pursue SBIR funding. After the first extension, if any, we will have the right to repay any accrued interest in cash rather than common stock. The holders of these notes have the option to convert their notes (subject to certain limitations) into shares of our common stock at maturity or upon the occurrence of certain events prior to this offering. In addition, the holders may convert their notes (subject to certain limitations) into shares of common stock if we are no longer eligible for SBIR grants or have not applied for an SBIR grant within the preceding 12 months. These notes entitle the holders to convert the principal amount of the notes into an aggregate of 1,885,490 shares of common stock and to convert accrued interest on the notes into up to an aggregate of 905,035 shares of our common stock. Under the terms of these notes, we agreed that we will not, without the prior written consent of the holders of a majority of the aggregate principal amount of the notes, draw down any amount under our existing senior secured revolving credit facility with First National Bank or incur additional indebtedness other than under certain limited conditions.

In addition, so long as Carilion Health System continues to hold any of the senior convertible promissory notes or 750,000 shares of voting common stock, and to the extent such technology is not restricted by other contractual arrangements in effect as of August 2, 2005, we have an obligation to disclose to Carilion Consolidated Laboratory for review on a confidential basis, that technology developed now or in the future by our employees or the employees of our affiliates which impacts, or has an application to, the clinical laboratory industry, at least sixty days prior to disclosing such technology to any third-party for purpose of commercialization. Carilion Consolidated Laboratory is an affiliate of Carilion Health System, and Dr. Edward Murphy, Chairman and Chief Executive Officer of Carilion Health System, is a member of our board of directors. We do not have an obligation to offer either Carilion Health System or Carilion Consolidated Laboratory the opportunity to participate in any of our commercialization efforts. The purpose of providing Carilion Consolidated Laboratory with a limited right to review this technology is to allow Carilion Consolidated Laboratory the opportunity to make a first offer to license or acquire this technology, but we will not be obligated to accept such offers, if any, from Carilion Consolidated Laboratory.

### **Other Agreements with Executive Officers**

Pursuant to that certain Cash Bonus Agreement dated March 21, 2003, by and between us and Michael Gunther, we were obligated to pay Mr. Gunther a fixed cash bonus over a period of three years, of which the last \$180 thousand payment was made in January 2006. Mr. Gunther was formerly an executive officer, our Vice President of Operations, and he is currently our Vice President, Intellectual Property.

Certain relationships and related party transactions

**Lease**

We have entered into an agreement with Carilion Medical Center to lease 20,000 square feet of office space currently being built at the Riverside Center in Roanoke, Virginia. The landlord of this property, Carilion Medical Center, is an affiliate of Carilion Health System, currently our second largest stockholder. Dr. Edward Murphy, Chairman and Chief Executive Officer of Carilion Health System became a member of our board of directors in connection with an investment by Carilion Health System in August 2005. Dr. Murphy was appointed chairman of the Compensation Committee of our board of directors in October 2005.

**Registration Rights Agreements**

In connection with the investment by Carilion Health System in August 2005 and its subsequent investment in December 2005, we entered into an amended and restated investor rights agreement dated as of December 30, 2005, with Carilion Health System and Dr. Kent Murphy. Dr. Murphy is our President, Chief Executive Officer, Secretary, Treasurer and Chairman and is also our largest individual stockholder. Pursuant to this agreement, under certain circumstances Carilion Health System and Dr. Kent Murphy are entitled to require us to register their shares of common stock under the securities laws for resale.

In connection with the acquisition of Luna Technologies in September 2005, we granted the former stockholders of Luna Technologies certain registration rights in the event we elect to file a registration statement for our common stock. Such rights are set forth in that certain Stock Purchase Agreement dated as of September 30, 2005 with the former stockholders of Luna Technologies. Unlike Carilion Health System, the former Luna Technologies stockholders do not have the right to require us to register their shares of common stock for resale if we are not otherwise filing a registration statement to sell securities. For additional information, see "Description of capital stock—Registration Rights."

**Indemnification Agreements**

We have entered into an indemnification agreement with each of our directors and officers. The indemnification agreements and our amended and restated certificate of incorporation and bylaws require us to indemnify our directors and officers to the fullest extent permitted by Delaware law.

## Principal stockholders

The following table sets forth certain information with respect to beneficial ownership of our common stock, as of December 31, 2005, after giving effect to the conversion of our Class A Common Stock, Class B Common Stock and Class C Common Stock into shares of our common stock, by:

- each beneficial owner of 5% or more of the outstanding shares of our common stock;
- each of our directors;
- each of our named executive officers; and
- all of our executive officers and directors as a group.

Beneficial ownership is determined in accordance with the rules of the SEC. In computing the number of shares beneficially owned by a person and the percentage ownership of that person, shares of common stock subject to options or warrants held by that person that are currently exercisable or exercisable within 60 days of December 31, 2005 are deemed outstanding, but are not deemed outstanding for computing the percentage ownership of any other person. Percentage of beneficial ownership is based upon 10,630,935 shares of common stock outstanding as of December 31, 2005 after giving effect to the conversion of our Class A Common Stock, Class B Common Stock and Class C Common Stock into shares of our common stock. To our knowledge, except as set forth in the footnotes to this table and subject to applicable community property laws, each person named in the table has sole voting and investment power with respect to the shares set forth opposite such person's name. Except as otherwise indicated, the address of each of the persons in this table is c/o Luna Innovations Incorporated, 10 South Jefferson Street, Suite 130, Roanoke, Virginia 24011.

Name and Address of Beneficial Owner	Beneficial Ownership Before Offering		Beneficial Ownership After Offering			
	Number of Shares	%	Excluding Exercise of Over-allotment Option		Including Exercise of Over-allotment Option	
			Number of Shares	%	Number of Shares	%
Carilion Health System (1) c/o Carilion Roanoke Memorial Hospital First Floor Roanoke, Virginia 24033	3,770,982	35.5%				
Kent A. Murphy, Ph.D.	4,665,636	43.9%				
Scott A. Graeff(2)	300,000	2.8%				
Scott A. Meller(3)	416,248	3.8%				
Robert P. Lenk, Ph.D.	—	*				
N. Leigh Anderson, Ph.D.	—	*				
John C. Backus, Jr.	—	*				
Bobbie Kilberg	—	*				
Edward G. Murphy, M.D. (1)	3,770,982	35.5%				
Richard W. Roedel	—	*				
Paul E. Torgersen, Ph.D.(4)	38,500	*				
Stephen R. Wilson, Ph.D.	—	*				
Michael F. Gunther	348,000	3.3 %				
All executive officers and directors as a group (11 persons)(1)(5)	9,191,366	80.7 %				

\* Represents less than 1% of the outstanding shares of common stock.

(1) Does not include \$5.0 million aggregate principal amount of senior convertible promissory notes which convert into up to 1,885,490 shares of common stock or accrued interest on the notes into up to an aggregate of 905,035 shares of common stock. Edward G. Murphy, M.D. is the President and Chief Executive Officer of Carilion Health System and shares voting and

---

[Table of Contents](#)

Principal stockholders

investment power over the shares beneficially owned by Carilion Health System with Don Lorton and Rob Vaughan, the Treasurer and Assistant Treasurer of Carilion Health System, respectively.

- (2) Includes 300,000 shares subject to options that are immediately exercisable or exercisable within 60 days of December 31, 2005.
- (3) Includes 416,248 shares subject to options that are immediately exercisable or exercisable within 60 days of December 31, 2005.
- (4) Includes 38,500 shares subject to options that are immediately exercisable or exercisable within 60 days of December 31, 2005.
- (5) Includes 754,748 shares subject to options that are immediately exercisable or exercisable within 60 days of December 31, 2005.

## Description of capital stock

The following information describes our common stock and preferred stock, as well as our convertible securities and options and warrants to purchase our common stock and provisions of our amended and restated certificate of incorporation and bylaws. This description is only a summary. You should also refer to our amended and restated certificate of incorporation and bylaws, which have been filed with the Securities and Exchange Commission as exhibits to our registration statement, of which this prospectus forms a part.

Upon the completion of this offering our authorized capital stock will consist of 100,000,000 shares of common stock with a \$0.001 par value per share, and 5,000,000 shares of preferred stock with a \$0.001 par value per share.

### Common Stock

As of December 31, 2005, after giving effect to the conversion of all outstanding Class A Common Stock, Class B Common Stock and Class C Common Stock into shares of common stock, there were an aggregate of 10,630,934 shares of common stock outstanding that were held of record by 39 stockholders. An additional 122,745 shares of Class B Common Stock issued or reserved for issuance in connection with the acquisition of Luna Technologies, Inc. were held in escrow on that date and will be cancelled prior to the completion of this offering. After giving effect to the sale of common stock offered in this offering, there will be \_\_\_\_\_ shares of common stock outstanding. As of December 31, 2005, there were outstanding options to purchase a total of 7,033,517 shares of our Class B Common Stock under our 2003 Stock Plan, which options will be automatically converted into options to purchase shares of our common stock upon completion of this offering. In addition, after December 31, 2005, we granted options to purchase an additional 1,537,250 shares pursuant to our 2003 Stock Plan. We recently adopted our 2006 Equity Incentive Plan, under which no options have been issued as of yet.

Holders of common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders. Our stockholders do not have cumulative voting rights in the election of directors. Accordingly, holders of a majority of the shares voting are able to elect all directors being elected at such time. Subject to preferences that may be granted to any then outstanding preferred stock, holders of common stock are entitled to receive ratably only those dividends as may be declared by the board of directors out of funds legally available therefor. See "Dividend policy." In the event of our liquidation, dissolution or winding up, holders of common stock are entitled to share ratably in all of our assets remaining after we pay our liabilities and distribute the liquidation preference of any then outstanding preferred stock. Holders of common stock have no preemptive or other subscription or conversion rights. Upon the completion of this offering, there will be no redemption or sinking fund provisions applicable to the common stock.

### Preferred Stock

Upon the completion of this offering, our board of directors will have the authority, without further action by the stockholders, to issue up to 5,000,000 shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting any series or the designation of such series, any or all of which may be greater than the rights of common stock. The issuance of preferred stock could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in our control or other corporate action. Upon completion of this offering, no shares of preferred stock will be outstanding, and we have no present plan to issue any shares of preferred stock.

### Warrants

As of December 31, 2005, there were outstanding warrants (not subject to escrow) to purchase 6,494 shares of our common stock at a weighted-average exercise price of \$12.92 per share held by two warrant holders of record. In addition, there were

## Description of capital stock

outstanding warrants to purchase 429 shares of common stock at an exercise price of \$21.06 held in escrow as of December 31, 2005. On February 8, 2006, we granted warrants for 101,773 shares of our common stock with an exercise price of \$1.00 per share to certain of our stockholders. No other warrants remain outstanding or will be exercisable following the completion of this offering.

## Senior Convertible Promissory Notes

As of December 31, 2005, we had \$5.0 million aggregate principal amount of a series of senior convertible promissory notes outstanding. The holders of these notes have the option to convert their notes (subject to certain limitations) into shares of common stock at maturity or upon the occurrence of certain events prior to this offering. In addition, the holders may convert their notes (subject to certain limitations) into shares of common stock if we are no longer eligible for SBIR grants or have not applied for an SBIR grant within the preceding 12 months. These notes entitle the holders to convert the principal amount of the notes into an aggregate of 1,885,490 shares of common stock and to convert accrued interest on the notes into up to an aggregate of 905,035 shares of our common stock.

## Registration Rights

After the closing of this offering, the holders of approximately 9,541,510 shares of our common stock will be entitled to certain rights with respect to the registration of such shares under the Securities Act. All of these holders may require us to register the resale of all or a portion of their shares on Form S-3, subject to certain conditions and limitations. Of these holders, the holders of approximately 8,436,618 shares of our common stock have additional registration rights. For example, in the event that we propose to register any of our securities under the Securities Act, either for our own account or for the account of other security holders, the holders of these approximately 8,436,618 shares are entitled to notice of such registration and are entitled to include their common stock in such registration, subject to certain marketing and other limitations. Beginning 180 days after the closing of this offering, the holders of at least 50% of such 8,436,618 shares of our common stock have the right to require us, on not more than two occasions, to file a registration statement on Form S-1 under the Securities Act in order to register the resale of their shares of common stock. We may, in certain circumstances, defer such registrations and the underwriters have the right, subject to certain limitations, to limit the number of shares included in such registrations. In addition, these holders have certain "piggyback" registration rights. If we propose to register any of our equity securities under the Securities Act other than pursuant to the registration rights noted above or specified excluded registrations, these holders may require us to include all or a portion of their registrable securities in the registration and in any related underwriting. In an underwritten offering, the managing underwriter, if any, has the right, subject to specified conditions, to limit the number of registrable securities such holders may include. Additionally, such piggyback registrations are subject to delay or termination of the registration under certain circumstances. The underwriters named in this prospectus have notified us that no holders of registration rights will be permitted to include any of their shares in this offering.

## Anti-Takeover Effects of Provisions of the Amended and Restated Certificate of Incorporation and Bylaws

Our amended and restated certificate of incorporation, to be effective upon completion of this offering, will provide for our board of directors to be divided into three classes, with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. Because our stockholders do not have cumulative voting rights, our stockholders representing a majority of the shares of common stock outstanding will be able to elect all of our directors. Our amended and restated certificate of incorporation and bylaws, to be effective upon completion of this offering, will provide that only our board of directors, chairman of the board, chief executive officer or president (in the absence of a chief executive officer) may call a special meeting of stockholders. Our amended and restated certificate of incorporation, to be effective upon completion of this offering, will require a 66 2/3% stockholder vote for the amendment, repeal or modification of certain provision of our amended and

---

[Table of Contents](#)

Description of capital stock

restated certificate of incorporation and bylaws relating to the absence of cumulative voting, the classification of our board of directors, and the designated parties entitled to call a special meeting of the stockholders.

The combination of a classified board, the lack of cumulative voting and the 66 2/3% stockholder voting requirements will make it more difficult for our existing stockholders to replace our board of directors as well as for another party to obtain control of us by replacing our board of directors. Since our board of directors has the power to retain and discharge our officers, these provisions could also make it more difficult for existing stockholders or another party to effect a change in management. In addition, the authorization of undesignated preferred stock makes it possible for our board of directors to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to change our control.

These provisions may have the effect of deterring hostile takeovers or delaying changes in our control or management. These provisions are intended to enhance the likelihood of continued stability in the composition of our board of directors and in the policies they implement, and to discourage certain types of transactions that may involve an actual or threatened change of our control. These provisions are designed to reduce our vulnerability to an unsolicited acquisition proposal. The provisions also are intended to discourage certain tactics that may be used in proxy fights. However, such provisions could have the effect of discouraging others from making tender offers for our shares and, as a consequence, they also may inhibit fluctuations in the market price of our shares that could result from actual or rumored takeover attempts. Such provisions may also have the effect of preventing changes in our management.

### **Section 203 of the General Corporation Law of the State of Delaware**

We are subject to Section 203 of the General Corporation Law of the State of Delaware, which prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years after the date that such stockholder became an interested stockholder, with the following exceptions:

- before such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the voting stock outstanding (but not the outstanding voting stock owned by the interested stockholder) those shares owned (i) by persons who are directors and also officers and (ii) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or after such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of the stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 defines business combination to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, lease, exchange, mortgage, transfer, pledge or other disposition of 10% or more of either the assets or outstanding stock of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; or

---

[Table of Contents](#)

Description of capital stock

- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits by or through the corporation.

In general, Section 203 defines interested stockholder as an entity or person who, together with affiliates and associates, beneficially owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of the outstanding voting stock of the corporation.

**Nasdaq National Market Listing**

Application has been made for quotation of our common stock on The Nasdaq National Market under the symbol "LUNA."

**Transfer Agent and Registrar**

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company. Its address is 59 Maiden Lane, Plaza Level, New York, NY 10038, and its telephone number is (800) 937-5449.

## Shares eligible for future sale

We will have \_\_\_\_\_ shares of common stock outstanding after the completion of this offering ( \_\_\_\_\_ shares if the underwriters' over-allotment is exercised in full). Of those shares, the \_\_\_\_\_ shares of common stock sold in the offering ( \_\_\_\_\_ shares if the underwriters' over-allotment option is exercised in full) will be freely transferable without restriction, unless purchased by persons deemed to be our "affiliates" as that term is defined in Rule 144 under the Securities Act. Any shares purchased by an affiliate may not be resold except pursuant to an effective registration statement or an applicable exemption from registration, including an exemption under Rule 144 promulgated under the Securities Act. The remaining \_\_\_\_\_ shares of common stock to be outstanding immediately following the completion of this offering are "restricted," which means they were originally sold in offerings that were not registered under the Securities Act. Restricted shares may be sold through registration under the Securities Act or under an available exemption from registration, such as provided through Rule 144, which rules are summarized below. Taking into account the 180-day lock up agreements described below, and assuming the underwriters do not release any stockholders from these agreements, shares of our common stock will be available for sale in the public market as follows:

- \_\_\_\_\_ shares will be immediately eligible for sale in the public market without restriction pursuant to Rule 144(k);
- \_\_\_\_\_ additional shares will be eligible for sale in the public market under Rule 144 or Rule 701 beginning 90 days after the date of this prospectus, subject to volume, manner of sale, and other limitations under those rules;
- \_\_\_\_\_ additional shares will become eligible for sale, subject to the provisions of Rule 144, Rule 144(k) or Rule 701, beginning 180 days after the date of this prospectus, upon the expiration of agreements not to sell such shares entered into between the underwriters and such stockholders; and
- \_\_\_\_\_ additional shares will be eligible for sale from time to time thereafter upon expiration of their respective one-year holding periods, but could be sold earlier if the holders exercise any available registration rights. Of such shares subject to the provisions of Rule 144, 2,639,688 and 1,131,294 shares may be sold by Carilion Health System beginning August 4, 2006 and December 30, 2006, respectively, and 183,120 shares may be sold by three individuals beginning November 22, 2006.

### Rule 144

In general, under Rule 144, as currently in effect, beginning 90 days after the effective date of this offering, a person (or persons whose shares are aggregated), including an affiliate, who has beneficially owned shares of our common stock for one year or more, may sell in the open market within any three-month period a number of shares that does not exceed the greater of:

- one percent of the then outstanding shares of our common stock (approximately \_\_\_\_\_ shares immediately after the offering); or
- the average weekly trading volume in the common stock on The Nasdaq National Market during the four calendar weeks preceding the sale.

Sales under Rule 144 are also subject to certain limitations on the manner of sale, notice requirements and the availability of our current public information.

### Rule 144(k)

Under Rule 144(k), a person (or persons whose shares are aggregated) who is deemed not to have been our affiliate at any time during the 90 days preceding a sale by him and who has beneficially owned his shares for at least two years, may sell

---

[Table of Contents](#)

Shares eligible for future sale

the shares in the public market without regard to the volume limitations, manner of sale provisions, notice requirements or the availability of current public information we refer to above.

**Rule 701**

Any of our employees, officers, directors or consultants who purchased his or her shares before the completion of this offering or who holds options as of that date pursuant to a written compensatory plan or contract is entitled to rely on the resale provisions of Rule 701, which permits non-affiliates to sell their Rule 701 shares without having to comply with the public information, holding period, volume limitation or notice provisions of Rule 144 and permits affiliates to sell their Rule 701 shares without having to comply with Rule 144's holding-period restrictions, in each case commencing 90 days after completion of this offering. Neither Rule 144, Rule 144(k) nor Rule 701 supersedes the contractual obligations of our security holders set forth in the lock-up agreements described below.

**Stock Options**

Within three months following the completion of this offering, we intend to file a registration statement on Form S-8 under the Securities Act to register 12,715,000 shares of common stock reserved for issuance under our 2003 Stock Plan (including an increase of 1,715,000 shares since December 31, 2005) and 2006 Equity Incentive Plan, thus permitting the resale of such shares.

Prior to the completion of this offering, there has been no public market for our common stock, and any sale of substantial amounts in the open market may adversely affect the market price of our common stock offered hereby.

**Warrants**

In addition, holders of warrants exercisable for up to 101,773 shares of common stock may exercise their rights and subsequently sell the underlying shares in the public market.

**Lock-Up Agreements**

Subject to certain exceptions, each of our officers, directors and security holders have agreed not to offer to sell, sell, pledge, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right, or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for our common stock, or enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of our common stock, whether any transaction is to be settled by delivery of our common stock or other securities, in cash or otherwise, without the prior written consent of ThinkEquity Partners LLC for a period of 180 days after the date of this prospectus. Notwithstanding the foregoing, for the purpose of allowing the underwriters to comply with NASD Rule 2711(f)(4), if (1) during the last 17 days of the initial 180-day lock-up period, we release earnings results or material news or a material event relating to us occurs or (2) prior to the expiration of the initial 180-day lock-up period, we announce that we will release earnings results during the 16-day period beginning on the last day of the initial 180-day lock-up period, then in each case the initial 180-day lock-up period will be extended until the expiration of the 18-day period beginning on the date of release of the earnings results or the occurrence of the material news or material event, as applicable.

**Stock Sale Restriction Agreements**

In addition, employees holding options exercisable for \_\_\_\_\_ shares of our common stock have entered into an agreement not to sell more than 20.0% of such shares in any year during the five years following the effective date of this offering,

---

[Table of Contents](#)

Shares eligible for future sale

provided, any share subject to such annual limit not sold in a year may be sold in subsequent years notwithstanding such limitation. Certain members of our management holding options exercisable for shares of our common stock have entered into an agreement not to sell more than 15.0% of such shares in any year during the five years following the effective date of this offering, provided, any share subject to such annual limit not sold in a year may be sold in subsequent years notwithstanding such limitation. We have the right to waive any of these resale restrictions for employees and management at our discretion, and in such instance, the shares would become freely tradable.

**Registration Rights**

After the offering, the holders of approximately 8,436,618 shares of our common stock will be entitled to registration rights. For more information on these registration rights, see "Description of capital stock—Registration Rights."

## **U.S. federal income and estate tax consequences to non-U.S. holders**

This section summarizes certain material U.S. federal income and estate tax considerations relating to the ownership and disposition of common stock by non-U.S. holders. This summary does not provide a complete analysis of all potential tax considerations. The information provided below is based on existing authorities. These authorities may change, or the IRS might interpret the existing authorities differently. In either case, the tax considerations of owning or disposing of common stock could differ from those described below. For purposes of this summary, a “non-U.S. holder” is any holder other than a citizen or resident of the United States, a corporation organized under the laws of the United States or any state, a trust that is (i) subject to the primary supervision of a U.S. court and the control of one of more U.S. persons or (ii) has a valid election in effect under applicable U.S. Treasury regulations to be treated as a U.S. person or an estate whose income is subject to U.S. income tax regardless of source. If a partnership or other flow-through entity is a beneficial owner of common stock, the tax treatment of a partner in the partnership or an owner of the entity will depend upon the status of the partner or other owner and the activities of the partnership or other entity. The summary generally does not address tax considerations that may be relevant to particular investors because of their specific circumstances, or because they are subject to special rules. Finally, the summary does not describe the effects of any applicable foreign, state or local laws.

**INVESTORS CONSIDERING THE PURCHASE OF COMMON STOCK SHOULD CONSULT THEIR OWN TAX ADVISORS REGARDING THE APPLICATION OF THE U.S. FEDERAL INCOME AND ESTATE TAX LAWS TO THEIR PARTICULAR SITUATIONS AND THE CONSEQUENCES OF FOREIGN, STATE, OR LOCAL LAWS AND TAX TREATIES.**

### **Dividends**

Any dividend paid to a non-U.S. holder on our common stock will generally be subject to U.S. withholding tax at a 30% rate. The withholding tax might not apply, however, or might apply at a reduced rate, if the non-U.S. holder satisfies the applicable conditions under the terms of an applicable income tax treaty between the United States and the non-U.S. holder’s country of residence. A non-U.S. holder must demonstrate its entitlement to treaty benefits by providing a properly completed Form W-8BEN or appropriate substitute form to us or our paying agent. If the holder holds the stock through a financial institution or other agent acting on the holder’s behalf, the holder will be required to provide appropriate documentation to the agent. The holder’s agent will then be required to provide certification to us or our paying agent, either directly or through other intermediaries. For payments made to a foreign partnership or other flowthrough entity, the certification requirements generally apply to the partners or other owners rather than to the partnership or other entity, and the partnership or other entity must provide the partners’ or other owners’ documentation to us or our paying agent. Special rules, described below, apply if a dividend is effectively connected with a U.S. trade or business conducted by the non-U.S. holder.

### **Sale of Common Stock**

Non-U.S. holders will generally not be subject to U.S. federal income tax on any gains realized on the sale, exchange, or other disposition of common stock. This general rule, however, is subject to several exceptions. For example, the gain would be subject to U.S. federal income tax if:

- the gain is effectively connected with the conduct by the non-U.S. holder of a U.S. trade or business (in which case the special rules described below under the caption “Dividends or Gain Effectively Connected with a U.S. Trade or Business” apply);
- the non-U.S. holder was a citizen or resident of the United States and thus is subject to special rules that apply to expatriates;

## U.S. federal income and estate tax consequences to non-U.S. holders

- subject to certain exceptions, the non-U.S. holder is an individual who is present in the United States for 183 days or more in the year of disposition, in which case the gain would be subject to a flat 30% tax, which may be offset by U.S. source capital losses, even though the individual is not considered a resident of the U.S.; or
- the rules of the Foreign Investment in Real Property Tax Act, or FIRPTA, described below, treat the gain as effectively connected with a U.S. trade or business.

The FIRPTA rules may apply to a sale, exchange or other disposition of common stock if we are, or were within five years before the transaction, a “U.S. real property holding corporation,” or USRPHC. In general, we would be a USRPHC if interests in U.S. real estate comprised most of our assets. We do not believe that we are a USRPHC or that we will become one in the future.

### **Dividends or Gain Effectively Connected With a U.S. Trade or Business**

If any dividend on common stock, or gain from the sale, exchange or other disposition of common stock, is effectively connected with a U.S. trade or business conducted by the non-U.S. holder, then the dividend or gain will be subject to U.S. federal income tax at the regular graduated rates. If the non-U.S. holder is eligible for the benefits of an income tax treaty between the United States and the holder’s country of residence, any “effectively connected” dividend or gain would generally be subject to U.S. federal income tax only if it is also attributable to a permanent establishment or fixed base maintained by the holder in the United States. Payments of dividends that are effectively connected with a U.S. trade or business, and therefore included in the gross income of a non-U.S. holder, will not be subject to the 30 percent withholding tax. To claim exemption from withholding, the holder must certify its qualification, which can be done by filing a Form W-8ECI. If the non-U.S. holder is a corporation, that portion of its earnings and profits that is effectively connected with its U.S. trade or business would generally be subject to a “branch profits tax” in addition to any regular U.S. federal income tax on the dividend or gain. The branch profits tax rate is generally 30 percent, although an applicable income tax treaty might provide for a lower rate.

### **U.S. Federal Estate Tax**

The estates of nonresident alien individuals are generally subject to U.S. federal estate tax on property with a U.S. situs. Because we are a U.S. corporation, our common stock will be U.S. situs property and therefore will be included in the taxable estate of a nonresident alien decedent. The U.S. federal estate tax liability of the estate of a nonresident alien may be affected by a tax treaty between the United States and the decedent’s country of residence.

### **Backup Withholding and Information Reporting**

The Code and the Treasury regulations require those who make specified payments to report the payments to the IRS. Among the specified payments are dividends and proceeds paid by brokers to their customers. The required information returns enable the IRS to determine whether the recipient properly included the payments in income. This reporting regime is reinforced by “backup withholding” rules. These rules require the payors to withhold tax from payments subject to information reporting if the recipient fails to cooperate with the reporting regime by failing to provide his taxpayer identification number to the payor, furnishing an incorrect identification number, or repeatedly failing to report interest or dividends on his returns. The withholding tax rate is currently 28 percent. The backup withholding rules do not apply to payments to corporations, whether domestic or foreign.

Payments to non-U.S. holders of dividends on common stock will generally not be subject to backup withholding, and payments of proceeds made to non-U.S. holders by a broker upon a sale of common stock will not be subject to information reporting or backup withholding, in each case so long as the non-U.S. holder certifies its nonresident status. Some of the common means of certifying nonresident status are described under “—Dividends.” We must report annually to the IRS any

---

[Table of Contents](#)

U.S. federal income and estate tax consequences to non-U.S. holders

dividends paid to each non-U.S. holder and the tax withheld, if any, with respect to such dividends. Copies of these reports may be made available to tax authorities in the country where the non-U.S. holder resides.

Any amounts withheld from a payment to a holder of common stock under the backup withholding rules can be credited against any U.S. federal income tax liability of the holder.

THE PRECEDING DISCUSSION OF U.S. FEDERAL INCOME TAX CONSIDERATIONS IS FOR GENERAL INFORMATION ONLY IT IS NOT TAX ADVICE. EACH PROSPECTIVE INVESTOR SHOULD CONSULT ITS OWN TAX ADVISOR REGARDING THE PARTICULAR U.S. FEDERAL, STATE, LOCAL, AND FOREIGN TAX CONSEQUENCES OF PURCHASING, HOLDING, AND DISPOSING OF OUR COMMON STOCK, INCLUDING THE CONSEQUENCES OF ANY PROPOSED CHANGE IN APPLICABLE LAWS.

## Underwriting

ThinkEquity Partners LLC is acting as sole book-runner of this offering, and, together with WR Hambrecht + Co, LLC and Merriman Curhan Ford & Co., are acting as representatives of the underwriters named below. Subject to the terms and conditions stated in the underwriting agreement, each underwriter named below has agreed to purchase, and we have agreed to sell to that underwriter, the number of shares of common stock set forth opposite that underwriter's name.

<b>Underwriters</b>	<b>Number of Shares</b>
ThinkEquity Partners LLC	
WR Hambrecht + Co, LLC	
Merriman Curhan Ford & Co.	
<b>Total</b>	

The underwriting agreement provides that the obligations of the underwriters to purchase the shares included in this offering are subject to approval of legal matters by counsel and to other conditions. The underwriters are obligated to purchase all the shares, other than those covered by the over-allotment option described below, if they purchase any of the shares.

The underwriters have advised us that they propose to offer the shares initially to the public at \$ \_\_\_\_\_ per share. The underwriters propose to offer the shares to certain dealers at the same price less a concession of not more than \$ \_\_\_\_\_ per share. The underwriters may allow and the dealers may reallocate a concession of not more than \$ \_\_\_\_\_ per share on sales to certain other brokers and dealers. If all the shares are not sold at the initial public offering price, the representatives may change the offering price and other selling terms.

We have granted to the underwriters an over-allotment option to purchase up to an additional \_\_\_\_\_ shares of our common stock from us at the same price as to the public, and with the same underwriting discount, as set forth on the front cover of this prospectus. The underwriters may exercise this option any time during the 30-day period after the date of this prospectus, but only to cover over-allotments, if any. To the extent the underwriters exercise the option, each underwriter will become obligated, subject to certain conditions, to purchase approximately the same percentage of the additional shares as it was obligated to purchase under the underwriting agreement.

Each underwriter has represented, warranted and agreed that:

- it has not offered or sold and, prior to the expiry of a period of 12 months from the closing date, will not offer or sell any shares included in this offering to any persons in the United Kingdom other than to qualified investors (within the meaning of 586(7) of the Financial Services and Markets Act 2000, or FSMA, or otherwise in circumstances which do not comprise an offer of transferable securities to the public for the purposes of 585(1) FSMA;
- it has only communicated and caused to be communicated and will only communicate or cause to be communicated any invitation or inducement to engage in investment activity (within the meaning of section 21 of the Financial Services and Markets Act 2000 ("FSMA")) received by it in connection with the issue or sale of any shares included in this offering in circumstances in which section 21(1) of the FSMA does not apply to us; and
- it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares included in this offering in, from or otherwise involving the United Kingdom.

We have applied to have our common stock included for quotation on The Nasdaq National Market under the symbol "LUNA."

[Table of Contents](#)

## Underwriting

The following table shows the underwriting discount and commissions to be paid to the underwriters in connection with this offering. These amounts are shown assuming both no exercise and full exercise of the over-allotment option.

	<u>No Exercise</u>	<u>Full Exercise</u>
Per share	\$	\$
Total to be paid by us	\$	\$

We estimate that the total expenses of this offering payable by us, excluding the underwriting discount and commissions, will be approximately \$ . We have agreed to indemnify the underwriters against certain liabilities that may be based upon an untrue statement of material fact contained in this prospectus, including civil liabilities under the Securities Act, or to contribute to payments that the underwriters may be required to make in respect of those liabilities.

The underwriters have informed us that neither they, nor any other underwriter participating in the distribution of this offering, will make sales of our common stock offered by this prospectus to accounts over which they exercise discretionary authority without the prior specific written approval of the customer.

The offering of our shares of common stock is made for delivery when and if accepted by the underwriters and subject to prior sale and to withdrawal, cancellation, or modification of this offering without notice. The underwriters reserve the right to reject an order for the purchase of shares in whole or part.

Subject to certain exceptions, we and each of our officers, directors and security holders, have agreed not to offer to sell, sell, pledge, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right, or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for our common stock, or enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of our common stock, whether any transaction is to be settled by delivery of common stock or other securities, in cash or otherwise, without the prior written consent of ThinkEquity Partners LLC for a period of 180 days after the date of this prospectus. Notwithstanding the foregoing, for the purpose of allowing the underwriters to comply with NASD Rule 2711(f)(4), if (1) during the last 17 days of the initial 180-day lock-up period, we release earnings results or material news or a material event relating to us occurs or (2) prior to the expiration of the initial 180-day lock-up period, we announce that we will release earnings results during the 16-day period beginning on the last day of the initial 180-day lock-up period, then in each case the initial 180-day lock-up period will be extended until the expiration of the 18-day period beginning on the date of release of the earnings results or the occurrence of the material news or material event, as applicable.

Prior to this offering, there has been no established trading market for our common stock. The initial public offering price for the shares of our common stock offered by this prospectus was negotiated between us and the underwriters immediately prior to this offering. Factors considered in determining the initial public offering price included:

- the history of, and the prospects for, the markets in which we compete;
- our past and present operations;
- our historical results of operations;
- our prospects for future earnings;
- the recent market prices of securities of generally comparable companies; and
- the general condition of the securities markets at the time of this offering and other relevant factors.

The initial public offering price of our common stock may not correspond to the price at which our common stock will trade in the public market subsequent to this offering, and an active public market for our common stock may never develop or, if it does develop, continue after this offering.

## Underwriting

To facilitate this offering, the underwriters may engage in transactions that stabilize, maintain, or otherwise affect the price of our common stock during and after this offering. Specifically, the underwriters may over-allot or otherwise create a short position in our common stock for their own account by selling more shares of our common stock than have been sold to them by us. Short sales involve the sale by the underwriters of a greater number of shares than they are required to purchase in this offering. "Covered" short sales are sales made in an amount not greater than the underwriters' option to purchase additional shares from us in this offering. The underwriters may close out any covered short position by either exercising their option to purchase additional shares or purchasing shares in the open market. In determining the source of shares to close out the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the over-allotment option. "Naked" short sales are sales in excess of this option. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of our common stock in the open market after pricing that could adversely affect investors who purchase in this offering.

In addition, the underwriters may stabilize or maintain the price of our common stock by bidding for or purchasing shares of our common stock in the open market and may impose penalty bids. If penalty bids are imposed, selling concessions allowed to syndicate members or other broker-dealers participating in this offering are reclaimed if shares of our common stock previously distributed in this offering are repurchased, whether in connection with stabilization transactions or otherwise. The effect of these transactions may be to stabilize or maintain the market price of our common stock at a level above that which might otherwise prevail in the open market. The imposition of a penalty bid may also affect the price of our common stock to the extent that it discourages resales of our common stock. The magnitude or effect of any stabilization or other transactions is uncertain. These transactions may be effected on The Nasdaq National Market or otherwise and, if commenced, may be discontinued at any time.

Other than in connection with this offering, the underwriters have not performed investment banking and advisory services for us. The underwriters may, from time to time, engage in transactions with and perform services for us in the ordinary course of their business.

A prospectus in electronic format may be made available on the Internet sites or through other online services maintained by the underwriters participating in this offering or by their affiliates. In those cases, prospective investors may view offering terms and this prospectus online and, depending upon the underwriter, prospective investors may be allowed to place orders online or through their financial advisor. The underwriters may agree with us to allocate a specific number of shares for sale to online brokerage account holders. Any such allocation for online distributions will be made by the underwriters on the same basis as other allocations.

Other than this prospectus in electronic format, the information on any underwriter's website and any information contained in any other website maintained by the underwriters is not part of this prospectus or the registration statement of which the prospectus forms a part, has not been approved or endorsed by us or the underwriters in its capacity as underwriter and should not be relied upon by investors.

## **Legal matters**

The validity of the shares of common stock offered hereby has been passed upon for Luna Innovations Incorporated by Wilson Sonsini Goodrich & Rosati, Professional Corporation, Reston, Virginia. Various legal matters relating to the offering will be passed upon for the underwriters by DLA Piper Rudnick Gray Cary US LLP, New York, New York.

## **Experts**

Grant Thornton LLP, an independent registered public accounting firm, has audited our consolidated financial statements at December 31, 2004 and 2005, and for each of the three years during the period ended December 31, 2005, as set forth in their report. We have included our consolidated financial statements in this prospectus and elsewhere in the registration statement in reliance on Grant Thornton LLP's report, given on their authority as experts in accounting and auditing.

Brown, Edwards & Company, L.L.P., an independent registered public accounting firm, has audited the financial statements of Luna Technologies, Inc. at December 31, 2004, and for the year ended December 31, 2004 as set forth in their report. We have included the financial statements of Luna Technologies, Inc. in this prospectus and elsewhere in the registration statement in reliance on Brown, Edwards & Company, L.L.P.'s report, given on their authority as experts in accounting and auditing.

## **Where you can find more information**

We have filed a registration statement on Form S-1 with the SEC for the stock we are offering by this prospectus. This prospectus does not include all of the information contained in the registration statement. You should refer to the registration statement and its exhibits for additional information. Whenever we make reference in this prospectus to any of our contracts, agreements or other documents, the references are not necessarily complete and you should refer to the exhibits attached to the registration statement for copies of the actual contract, agreement or other document. When we complete this offering, we will also be required to file annual, quarterly and special reports, proxy statements and other information with the SEC.

You can read our SEC filings, including the registration statement, over the Internet at the SEC's web site at [www.sec.gov](http://www.sec.gov). You may also read and copy any document we file with the SEC at its public reference facilities at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. You may also obtain copies of the documents at prescribed rates by writing to the Public Reference Section of the SEC at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference facilities.

## Index to financial statements

	<b>Page</b>
<b>Luna Innovations Incorporated and Subsidiaries consolidated financial statements as of December 31, 2004 and 2005 and for the years ended December 31, 2003, 2004 and 2005</b>	
Report of independent registered public accounting firm	F-2
Consolidated balance sheets as of December 31, 2004 and 2005	F-3
Consolidated statements of operations for the years ended December 31, 2003, 2004 and 2005	F-4
Consolidated statements of changes in stockholders' equity (deficit) for the years ended December 31, 2003, 2004 and 2005	
	F-5
Consolidated statements of cash flows for the years ended December 31, 2003, 2004 and 2005	F-6
Notes to consolidated financial statements	F-7
<b>Luna Technologies, Inc. financial statements as of December 31, 2004 and September 30, 2005 (unaudited) and for the year ended December 31, 2004 and the nine months ended September 30, 2004 and 2005 (unaudited)</b>	
Report of independent registered public accounting firm	F-26
Balance sheets as of December 31, 2004 and September 30, 2005 (unaudited)	F-27
Statements of operations for the year ended December 31, 2004 and the nine months ended September 30, 2004 and 2005 (unaudited)	
	F-28
Statements of changes in stockholders' equity (deficit) for the year ended December 31, 2004 and the nine months ended September 30, 2005 (unaudited)	
	F-29
Statements of cash flows for the year ended December 31, 2004 and the nine months ended September 30, 2004 and 2005 (unaudited)	
	F-30
Notes to financial statements	F-31
<b>Luna Innovations Incorporated unaudited pro forma consolidated financial statement for the year ended December 31, 2005</b>	
Introduction to unaudited pro forma consolidated financial statement	F-41
Unaudited pro forma consolidated statement of operations for the year ended December 31, 2005	F-42
Notes to unaudited pro forma consolidated financial statement	F-43

Luna Innovations Incorporated

## **Report of independent registered public accounting firm**

### **Board of Directors and Shareholders**

#### *Luna Innovations Incorporated and Subsidiaries*

We have audited the accompanying consolidated balance sheets of Luna Innovations Incorporated and Subsidiaries (the Company) as of December 31, 2004 and 2005, and the related consolidated statements of operations, changes in stockholders' equity and cash flows for each year of the three years in the period ended December 31, 2005. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement. The Company is not required to have, nor were we engaged to perform an audit of its internal control over financial reporting. Our audits include consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of Luna Innovations Incorporated and Subsidiaries as of December 31, 2004 and 2005, and the consolidated results of its operations and its cash flows for each of the three years in the period ended December 31, 2005, in conformity with accounting principles generally accepted in the United States of America.

/s/ Grant Thornton LLP

Vienna, Virginia  
March 21, 2006

Luna Innovations Incorporated

## Consolidated balance sheets

	December 31,	
	2004	2005
<b>Assets</b>		
Current assets:		
Cash and cash equivalents	\$609,636	\$12,514,839
Accounts receivable	3,023,205	5,129,911
Refundable income taxes	876,802	514,797
Inventory	98,447	448,475
Other current assets	123,206	227,409
<b>Total current assets</b>	<b>4,731,296</b>	<b>18,835,431</b>
Property and equipment, net	2,045,648	2,972,287
Intangible assets, net	390,212	999,544
Deferred offering costs	—	710,018
Deferred tax asset	472,855	600,000
Other assets	107,459	16,550
<b>Total assets</b>	<b>\$7,747,470</b>	<b>\$24,133,830</b>
<b>Liabilities and stockholders' equity</b>		
Current liabilities:		
Line of credit	\$1,500,000	\$—
Current portion of capital lease obligation	96,177	98,820
Accounts payable	519,284	3,647,505
Accrued liabilities	1,742,094	1,788,162
Deferred tax liability	30,106	—
Deferred credits	586,166	1,458,393
<b>Total current liabilities</b>	<b>4,473,827</b>	<b>6,992,880</b>
Long-term capital lease obligation	206,390	117,134
Long-term debt obligation	—	5,214,955
Deferred credits	900,000	450,000
<b>Total liabilities</b>	<b>5,580,217</b>	<b>12,774,969</b>
Redeemable Class B common stock, 545,295 shares at December 31, 2005	—	504,984
Stockholders' equity:		
Common stock; 49,785,326 shares authorized for the following classes:		
Class A voting Common Stock, par value \$0.001; 5,015,318 shares, issued and outstanding at December 31, 2004 and 2005	5,015	5,015
Class B non-voting Common Stock, par value \$0.001; 135,249 and 1,299,341 and shares issued and outstanding at December 31, 2004 and 2005, respectively	135	1,299
Class C voting Common Stock, par value \$0.001; 3,770,982 issued and outstanding at December 31, 2005	—	3,771
Additional paid-in capital	254,918	10,930,664
Retained earnings (deficit)	1,907,185	(86,872)
<b>Total stockholders' equity</b>	<b>2,167,253</b>	<b>10,853,877</b>
<b>Total liabilities and stockholders' equity</b>	<b>\$7,747,470</b>	<b>\$24,133,830</b>

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

Luna Innovations Incorporated

## Consolidated statements of operations

	Year Ended December 31,		
	2003	2004	2005
Revenues:			
Contract research revenues	\$10,358,044	\$13,834,751	\$15,379,667
Product and license revenues	7,233,799	8,752,155	1,074,221
Total revenues	17,591,843	22,586,906	16,453,888
Cost of revenues:			
Contract research costs	8,949,378	10,985,164	12,552,122
Product and license costs	1,543,098	2,880,606	409,772
Total cost of revenues	10,492,476	13,865,770	12,961,894
Gross profit	7,099,367	8,721,136	3,491,994
Operating expense	4,856,110	4,189,629	6,003,644
Operating income (loss)	2,243,257	4,531,507	(2,511,650)
Other income (expense):			
Other income (expense)	705	117	1,592
Interest income (expense), net	(86,800)	(90,304)	(41,251)
Loss from equity method investees	(150,271)	(256,904)	—
Total other income (expense)	(236,366)	(347,091)	(39,659)
Income (loss) before minority interests and income taxes	2,006,891	4,184,416	(2,551,309)
Minority interests	11,265	—	—
Income (loss) before income taxes	2,018,156	4,184,416	(2,551,309)
Income tax expense (benefit)	885,882	128,234	(557,252)
Net income (loss)	\$1,132,274	\$4,056,182	\$(1,994,057)
Net income (loss) per share:			
Basic	\$0.23	\$0.79	\$(0.30)
Diluted	\$0.22	\$0.64	\$(0.30)
Weighted average shares:			
Basic	5,030,428	5,136,001	6,609,364
Diluted	5,141,003	6,301,484	6,609,364

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

Luna Innovations Incorporated

## Consolidated statements of changes in stockholders' equity (deficit)

	Class A Common Stock		Class B Common Stock		Class C Common Stock		Additional Paid-in Capital	Retained Earnings (Deficit)	Total
	Shares	\$	Shares	\$	Shares	\$			
Balance—December 31, 2002	5,015,318	\$5,015	—	\$ —	—	\$ —	\$188,323	\$(3,281,271)	\$(3,087,933)
Exercise of stock options	—	—	118,750	119	—	—	23,631	—	23,750
Net income	—	—	—	—	—	—	—	1,132,274	1,132,274
Balance—December 31, 2003	5,015,318	5,015	118,750	119	—	—	211,954	(2,148,997)	(1,931,909)
Exercise of stock options	—	—	16,499	16	—	—	3,284	—	3,300
Employee stock-based compensation	—	—	—	—	—	—	39,680	—	39,680
Net income	—	—	—	—	—	—	—	4,056,182	4,056,182
Balance—December 31, 2004	5,015,318	5,015	135,249	135	—	—	254,918	1,907,185	2,167,253
Exercise of stock options	—	—	421,374	421	—	—	83,854	—	84,275
Exercise of warrants	—	—	183,121	183	—	—	—	—	183
Issuance of common stock in Carilion financing transaction, net	—	—	—	—	3,770,982	3,771	9,908,697	—	9,912,468
Issuance of common stock in conjunction with Luna Technologies acquisition	—	—	559,597	560	—	—	514,269	—	514,829
Share based payment expense	—	—	—	—	—	—	168,926	—	168,926
Net loss	—	—	—	—	—	—	—	(1,994,057)	(1,994,057)
Balance—December 31, 2005	5,015,318	\$5,015	1,299,341	\$1,299	3,770,982	\$3,771	\$10,930,664	\$(86,872)	\$10,853,877

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

Luna Innovations Incorporated

**Consolidated statements of cash flows**

	Year Ended December 31,		
	2003	2004	2005
<b>Cash flows from (used in) operating activities:</b>			
Net income (loss)	\$1,132,274	\$4,056,182	\$(1,994,057)
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Depreciation and amortization	346,937	381,052	540,145
Deferred income taxes	1,192,119	957,898	(157,251)
Loss on investments in and advances to affiliates	150,271	256,904	—
Minority interests	(11,265)	—	—
Share based compensation	—	39,680	168,926
Change in assets and liabilities:			
Accounts receivable	53,057	(1,232,336)	(1,314,485)
Refundable income taxes	(272,873)	(603,929)	362,005
Other assets	(70,857)	21,181	(26,194)
Accounts payable and accrued expenses	(592,299)	928,611	1,911,095
Deferred credits	(2,041,248)	(3,323,086)	422,227
Net cash from (used in) operating activities	(113,884)	1,482,157	(87,589)
<b>Cash flows from (used) in investing activities:</b>			
Acquisition of property and equipment	(158,016)	(1,376,402)	(877,144)
Intangible property costs	(156,906)	(192,101)	(430,847)
Net cash from acquisition of Luna Technologies	—	—	33,676
Investments in and advances to affiliates	(180,000)	(378,000)	—
Capitalized software development costs	—	—	(122,642)
Net cash used in investing activities	(494,922)	(1,946,503)	(1,396,957)
<b>Cash flows from (used in) financing activities:</b>			
Net (payments) borrowings on line of credit	(2,331)	500,000	(1,500,000)
Payments on capital lease obligation	(63,871)	(71,495)	(107,177)
Proceeds from convertible debt	—	—	5,000,000
Proceeds from the issuance of common stock, net	—	—	9,912,468
Proceeds from the exercise of options and warrants	23,750	3,300	84,458
Net cash from (used in) financing activities	(42,452)	431,805	13,389,749
<b>Net change in cash</b>	(651,258)	(32,541)	11,905,203
Cash—beginning of period	1,293,435	642,177	609,636
Cash—end of period	\$642,177	\$609,636	\$12,514,839
<b>Supplemental disclosure of cash flow information</b>			
Cash paid for interest	\$87,494	\$95,967	\$108,211
Cash paid for income taxes	444,043	30,000	—
Property and equipment financed by capital leases	\$380,354	\$319,768	\$11,700

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

Luna Innovations Incorporated

## Notes to consolidated financial statements

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

Luna Innovations Incorporated (“Luna Innovations”) was incorporated in the Commonwealth of Virginia in 1990 and subsequently reincorporated in the State of Delaware in April 2003. We are engaged in the research, development and commercialization of innovative technologies in the areas of molecular technology solutions and sensing solutions. We are organized into three main groups, which work closely together to turn ideas into products: our Contract Research Group, our Commercialization Strategy Group and our Products Group. We have a disciplined and integrated business model that is designed to accelerate the process of bringing new and innovative technologies to market. We identify technology that can fulfill identified market needs. We then take these solutions from the applied research stage through commercialization.

#### *Basis of Presentation and Consolidation*

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States (US GAAP) and include our accounts, our wholly owned subsidiaries and other entities in which we have a controlling financial interest. We consolidate all entities in which we own more than 50% of the outstanding voting stock unless we do not control the entity. In accordance with Financial Accounting Standards Board Interpretation No. 46 revised, *Consolidation of Variable Interest Entities*, (FIN 46R), we also consolidate any variable interest entities for which we are deemed to be the primary beneficiary.

We use the equity method to account for our investments for which we have the ability to exercise significant influence over operating and financial policies. Consolidated net income or loss includes our share of the net earnings or losses of the investees. Our share of losses in the investees is limited to our investment and advances unless we have guaranteed certain obligations of the investee or are otherwise committed to provide financial support to such investee.

In those cases where the our investment is less than 20% and significant influence does not exist, such investments are carried at cost

We eliminate from our financial results all significant intercompany transactions.

#### *Use of Estimates*

The preparation of our consolidated financial statements in accordance with US GAAP requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements and accompanying notes. Although these estimates are based on our knowledge of current events and actions we may undertake in the future, actual results may differ from such estimates and assumptions.

#### *Contract Research Revenues*

We perform research and development for U.S. Federal government agencies, educational institutions and commercial organizations. We recognize revenues under research contracts when a contract has been executed, the contract price is fixed and determinable, delivery of services or products has occurred and collectibility of the contract price is considered probable. Revenues are earned under cost reimbursable, time and materials and fixed price contracts. Direct contract costs are expensed as incurred.

Under cost reimbursable contracts, we are reimbursed for allowable costs and paid a fixed fee. Revenues on cost reimbursable contracts are recognized as costs are incurred plus a portion of the fee earned. Revenues on time and materials contracts are recognized based on direct labor hours expended at contract billing rates plus other billable direct costs.

## Luna Innovations Incorporated

Revenue for fixed price research contracts that involve the delivery of services and a prototype model are recognized under the percentage of completion method in accordance with Statement of Position (SOP) 81-1, *Accounting for Performance of Construction-Type and Certain Production-Type Contracts*. Fixed price arrangements that involve the delivery of research reports are recognized under the proportional performance method as this method more accurately reflects the satisfaction of our obligations to our customers. Losses on contracts, if any, are recognized in the period in which they become known.

For the years ended December 31, 2003, 2004 and 2005, contract research revenues from agencies of the U.S. government accounted for approximately 51%, 51% and 70%, respectively, of total revenues for the same period. See Note 15 for additional details concerning our relationship with major customers.

### *Intellectual Property License Revenues*

Amounts received from third parties for licenses to our intellectual property are recognized when earned under the terms of the agreements. Revenues are recognized upon transfer of the license unless we have continuing obligations for which fair value cannot be established, in which case the revenues are recognized over the period of the obligation. If there are extended payment terms, license fee revenues are recognized as these payments become due and collectibility is probable. We consider all arrangements with payment terms extending beyond 12 months not to be fixed and determinable.

Certain of our license arrangements have also required us to enter into research and development agreements. We apply the guidance from the Emerging Issues Taskforce Consensus on Issue 00-21, *Revenue Arrangements with Multiple—Deliverables* (EITF 00-21). Accordingly, we will allocate our arrangement fees to the various elements based upon objective reliable evidence of fair value, if available. For those arrangements in which evidence of fair value is not available, we will defer revenues from any up-front payments and recognize them over the service period in the arrangement. Certain of these arrangements also include the payment of performance bonuses based upon the achievement of specific milestones. Generally, there are no assurances at the onset of these arrangements that the milestones will be achieved. As such, fees related to such milestones are excluded from the initial allocation of the arrangement fee in accordance with EITF 00-21 and are recognized upon achievement of the milestone provided that such fees are non-refundable and collection is probable.

Revenues derived from our arrangement with Baker Hughes Oilfield Operations, Inc. (BHI) accounted for 37% and 35% total revenues for the years ended December 31, 2003 and 2004. As discussed in Note 5 our arrangement with BHI ended in 2004.

### *Product Sales Revenues*

Revenues from product sales are generated by the sale of commercial products and services under various sales programs to the end user and through distribution channels. We sell fiber optic sensing systems to end users for use in numerous fiber-optic based measurement applications.

Revenues from product sales that require no ongoing obligations are recognized as revenues when shipped to the customer, title has passed and collection is reasonably assured. In transactions where a right-of-return exists, revenues are deferred until acceptance has occurred and the period for the right-of-return has lapsed. As of December 31, 2003, 2004 and 2005, we have not entered into sales transactions where rights of return exist.

### *Allowance for Uncollectible Receivables*

We review the status of our uncollected receivables on a regular basis. In determining the need for an allowance for uncollectible receivables, we consider our customers financial stability, past payment history and other factors that bear on the ultimate collection of such amounts. Given our favorable collection history, we have not considered it necessary to establish an allowance for uncollected receivables.

### *Cash Equivalents*

We consider all highly liquid investments purchased with maturities of three months or less to be cash equivalents.

Luna Innovations Incorporated

*Fair Value of Financial Instruments*

Our financial instruments include cash and cash equivalents, accounts receivables, accounts payable, a line-of-credit and accrued liabilities. The carrying amounts of financial instruments approximate fair value due to their short maturities. Additionally, the line-of-credit is subject to a variable interest rate based upon the prime rate as published by the Wall Street Journal.

*Property and Equipment*

Property and 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*

Intangible assets consist of patents related to certain intellectual property that we have developed or acquired. Such amounts are carried at cost and are amortized over a period of five years.

*Research and Development*

Research and development costs not related to contract performance are expensed as incurred. For the years ended December 31, 2003, 2004 and 2005, non-contract related research and development costs were not significant.

*Capitalized Software Costs*

The Company capitalized costs of \$122,642 for the year ended December 31, 2005 related to new software products. Costs related to the development of new software products and significant enhancements to existing software products are expensed as incurred until technological feasibility has been established and are amortized over three years. There were no capitalized costs during the years ended December 31, 2004 and 2003.

*Valuation of Long-Lived Assets*

We account for long-lived assets in accordance with the provisions of Statement of Financial Accounting Standards (SFAS) No. 144, *Accounting for the Impairment or Disposal of Long-Lived Assets*. SFAS No. 144 requires that long-lived assets and certain identifiable intangibles be reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets is measured by comparing the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds their fair value. Assets to be disposed of by sale are reflected at the lower of their carrying amount or fair value less cost to sell.

*Inventory*

Inventory consists of finished goods and parts valued at the lower of cost (determined on the first-in, first-out basis) or market. We provide reserves for estimated obsolescence or unmarketable inventory equal to the difference between the cost of the inventory and the estimated market value based upon assumptions about future demand and market conditions.

## Luna Innovations Incorporated

*Net Income (Loss) Per Share*

We compute net income (loss) per share in accordance with SFAS No. 128, *Earnings Per Share*. Basic per share data is computed by dividing income (loss) available to common stockholders by the weighted average number of shares outstanding during the period. Diluted per share data is computed by dividing income (loss) available to common stockholders by the weighted average shares outstanding during the period increased to include, if dilutive, the number of additional common share equivalents that would have been outstanding if potential common shares had been issued using the treasury stock method. Diluted per share data would also include the potential common share equivalents relating to convertible securities by application of the if-converted method.

Basic and diluted net income (loss) per share were computed as follows for the periods indicated:

	December 31,		
	2003	2004	2005
Net income (loss)	\$1,132,274	\$4,056,182	(\$1,994,057)
Weighted average shares—basic	5,030,428	5,136,001	6,609,364
Dilutive effect of common stock equivalents:			
Shares issued upon assumed exercise of stock options and warrants	110,575	1,165,483	—
Weighted average shares—diluted	5,141,003	6,301,484	6,609,364
Net income (loss) per share—basic	\$0.23	\$0.79	(\$0.30)
Net income (loss) per share—diluted	\$0.22	\$0.64	(\$0.30)

The effect of 4,438,101 common stock equivalents are ignored for the year ended December 31, 2005, as they are antidilutive to earnings per share. In addition, the conversion of the \$5.0 million in senior convertible promissory notes would have been antidilutive. The effect of 35,193,552 common stock equivalents are ignored for the year ended December 31, 2003, as they are antidilutive to earnings per share.

*Stock-Based Compensation*

We have a stock-based compensation plan, which is described further in Note 9. We account for stock-based employee compensation arrangements using the intrinsic value method in accordance with the provisions of Accounting Principles Board Opinion (APB) No. 25, *Accounting for Stock Issued to Employees* and related amendments and interpretations. We comply with the disclosure provisions of Statement of Financial Accounting Standards (SFAS) No. 123, *Accounting for Stock-based Compensation*, as amended by SFAS No. 148, *Accounting for Stock Based Compensation—Transition and Disclosure*, which requires fair value recognition for employee stock-based compensation. We account for equity instruments issued to non-employees in accordance with the provisions of SFAS 123 and Emerging Issues Task Force (EITF) Issue No. 96-18.

Generally, we award options to employees and directors with exercise prices equal to or greater than the estimated fair value of our common stock on the date of grant. As more fully described in Note 9, we entered into an option exchange with our employees in September 2003 that resulted in the new option grant being considered a re-pricing in accordance with FASB Interpretation No. 44, *Accounting for Certain Transactions Involving Stock Compensation* (FIN 44). We apply variable plan accounting to outstanding options related to this award and measure compensation expense at each reporting period equal to an amount that reflects the change in the fair value of the underlying security.

[Table of Contents](#)

## Luna Innovations Incorporated

Had compensation expense been measured under the fair value method prescribed by SFAS No. 123, our pro forma net income (loss), and pro forma net income (loss) per share would have been as follows:

	Years Ended December 31,		
	2003	2004	2005
Net income (loss):			
As reported	\$1,132,274	\$4,056,182	(\$1,994,057)
Add - stock based employee compensation expense in reported net income (loss), net of related tax effects	—	39,680	133,901
Deduct - total stock based employee compensation (expense) benefit determined under Black-Scholes method for all awards, net of related tax effects	629,508	(114,553)	(386,108)
Pro forma net income (loss)	\$1,761,782	\$3,981,309	(2,246,264)
Basic net income (loss) per common share:			
As reported	\$0.23	\$0.79	(\$0.30)
Pro forma	\$0.35	\$0.78	(\$0.34)
Diluted net income (loss) per common share:			
As reported	\$0.22	\$0.64	(\$0.30)
Pro forma	\$0.34	\$0.63	(\$0.34)

The \$629,508 benefit in 2003 resulted from 505,396 unvested options being forfeited during the period.

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

	2003	2004	2005
Risk-free interest rate range	3.52%	3.87%	3.9-4.6%
Expected life of option-years	7	7	4.5-7
Expected stock price volatility	66%	63%	64%
Expected dividend yield	—	—	—

*Advertising*

We charge the cost of advertising to expense as incurred. Such amounts have not been significant to our operations.

*Income Taxes*

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

*Recent Accounting Pronouncements*

In December 2004, the FASB issued SFAS No. 123 (revised 2004), *Share-Based Payment* (SFAS No. 123R), to revise SFAS No. 123, *Accounting for Stock-Based Compensation*, which had allowed companies to choose between expensing stock-based compensation or showing pro forma disclosure only. SFAS No. 123R supersedes APB Opinion No. 25, *Accounting for Stock Issued to Employees*, and amends SFAS No. 95, *Statement of Cash Flows*. Generally, the approach in SFAS No. 123R is similar to the approach described in SFAS No. 123. However, SFAS No. 123R requires all share-based payments to employees, including grants of employee stock options, to be recognized in the income statement based on their fair values. Pro forma disclosure is no longer an alternative.

Luna Innovations Incorporated

SFAS 123R requires the use of an option pricing model for estimating fair value, which is amortized to expense over the requisite service periods. Effective January 1, 2006, we have elected to use the modified prospective transition method. As such, we will be required to recognize compensation expense on all future option grants and any modification to existing option grants.

We presently are not contractually obligated to grant additional options to any contractors. However, we expect to continue to use stock options as a significant means of compensating existing employees as well as to attract future employees. Should we continue to grant options consistent with historical levels, the impact of SFAS 123R is expected to have a material effect on our results of operations. In February 2006, we granted 1,537,250 options to our employees. We are currently determining the fair value associated with such options and the related compensation expense to be recognized over the corresponding service period.

In November 2004, the FASB issued SFAS No. 151, *Inventory Costs*, which is an amendment of ARB No. 43 *Inventory Pricing*, to clarify the accounting for abnormal amounts of idle facility expense, freight, handling costs and wasted material (spoilage). This statement is effective for inventory costs incurred during fiscal year beginning after June 15, 2005. We do not believe that the effect of SFAS No. 151 will have a significant effect on our consolidated financial statements.

In May 2005, the FASB issued SFAS No. 154, *Accounting Changes and Error Corrections*, which replaces APB Opinion No. 20, *Accounting Changes* and SFAS No. 3, *Reporting Accounting Changes in Interim Financial Statement*. SFAS No. 154 requires that a voluntary change in accounting principle be applied retrospectively with all prior period financial statements presented on the new accounting principle. SFAS No. 154 also requires that a change in method of depreciating or amortizing a long-lived non-financial asset be accounted for prospectively as a change in estimate, and correction of errors in previously issued financial statements should be termed a "restatement." SFAS No. 154 is effective for accounting changes and correction of errors made in fiscal years beginning after December 15, 2005. The adoption of SFAS No. 154 is not expected to have a material impact on our consolidated financial statements.

*Reclassifications*

Certain amounts in prior years have been reclassified to conform to the current year presentation.

**2. Accounts Receivable—Trade**

Accounts receivable consist of the following at:

	December 31,	
	2004	2005
Billed	\$1,755,600	\$3,359,045
Unbilled	1,199,843	1,757,263
Other	67,762	13,603
	<u>\$3,023,205</u>	<u>\$5,129,911</u>

Unbilled receivables result from contract retainages and revenues that have been earned in advance of billing and can be invoiced at contractually defined intervals or milestones, or at completion of the contract. Advance payments on uncompleted contracts amounts to \$420,652 and \$744,056 for the periods ended December 31, 2004 and 2005, respectively. Such amounts are included in deferred revenues in our accompanying balance sheet.

[Table of Contents](#)

Luna Innovations Incorporated

### 3. Property and Equipment

Property and equipment consists of the following at:

	December 31,	
	2004	2005
Equipment	\$1,368,855	\$2,799,702
Furniture and fixtures	127,421	189,285
Software	521,590	791,439
Leasehold improvements	1,380,634	1,896,278
	<u>3,398,500</u>	<u>5,676,704</u>
Less—accumulated depreciation	(1,352,852)	(2,704,420)
	<u>\$2,045,648</u>	<u>\$2,972,284</u>

Depreciation for the periods ended December 31, 2003, 2004 and 2005 was approximately \$330,000, \$353,000, and \$380,000, respectively.

### 4. Intangible Assets

The following is a summary of intangible assets:

	December 31,	
	2004	2005
Patent costs	\$439,498	\$1,205,621
Accumulated amortization	(49,286)	(206,077)
	<u>\$390,212</u>	<u>\$999,544</u>

Amortization for the periods ended December 31, 2003, 2004 and 2005 was approximately \$17,000, \$28,000 and \$160,000, respectively.

Estimated aggregate amortization for each of the next five years is as follows:

Year Ended December 31,	
2006	\$314,346
2007	245,225
2008	212,310
2009	144,058
2010	83,605
Thereafter	—
	<u>\$999,544</u>

### 5. Investment in Affiliates

We had investments in two affiliates, Luna Technologies, Inc. (“Luna Technologies”) and Luna Energy, LLC (“Luna Energy”), which were accounted for using the equity method of accounting. As discussed in Note 1, our consolidated statements of operations includes our share of net earnings or losses of these companies to the extent of investments in and advances to such companies.

## Luna Innovations Incorporated

*Luna Technologies*

Luna Technologies, formerly a wholly-owned subsidiary until 2000, is engaged in the development and production of optical fiber test equipment and data acquisition systems. In fiscal year 2000, the Board of Directors of Luna Technologies approved a plan to spin-off Luna Technologies and raise additional equity financing in order for management to more fully execute Luna Technologies' business plan. We retained a minority interest in Luna Technologies of approximately 23.0% subsequent to the spin-off. Between December 2000 and March 2003, Luna Technologies had received additional equity financing from non-affiliated investors which diluted our ownership percentage to approximately 7.0%. As our Chief Executive Officer and certain members of management maintained representation at the board level, allowing us to exercise significant influence over the operations of Luna Technologies. We accounted for our interest under the equity method during 2003 and 2004 and for the nine month period ended September 30, 2005.

Our share of losses in Luna Technologies for the years ended December 31, 2003, 2004, and for the nine months ended September 30, 2005 were \$150,271, \$58,904 and \$0, respectively. We also recognized \$32,000, \$3,000 and \$13,500 in revenues from Luna Technologies for various administrative and consulting services in these periods.

Following is a summary of financial position and results of operations of Luna Technologies as of and for the years ended December 31, 2003 and 2004 and the nine months ended September 30, 2005.

	December 31,		September 30,
	2003	2004	2005
Current assets	\$1,079,665	\$1,567,988	\$1,343,341
Non-current assets	597,191	309,676	457,664
<b>Total assets</b>	<b>1,676,856</b>	<b>1,877,664</b>	<b>1,801,005</b>
Current liabilities	632,200	406,321	553,176
Non-current liabilities	265,115	214,953	214,953
<b>Total liabilities</b>	<b>897,315</b>	<b>621,274</b>	<b>768,129</b>
Stockholders' equity and redeemable preferred stock	779,541	1,256,390	1,032,876
<b>Total liabilities and stockholders' equity</b>	<b>\$1,676,856</b>	<b>\$1,877,664</b>	<b>\$1,801,005</b>
Revenues	\$1,428,965	\$1,775,082	2,204,196
Gross profit	434,348	958,011	1,129,842
Net loss	(2,372,027)	(959,632)	(390,239)

On September 30, 2005, we entered into an Agreement and Plan of Merger with Luna Technologies to acquire 100.0% of its outstanding capital stock through an exchange of our Class B common stock. We exchanged 1,031,234 of Class B common stock valued at \$0.92 per share or \$948,735 as determined by a third party appraisal firm, for all of the issued and outstanding shares of common and preferred stock of Luna Technology. An additional 193,488 shares of Class B common stock were been placed in escrow and are issuable upon achievement of certain conditions as defined in the agreement. On December 30, 2005, 73,658 shares of Class B common stock valued at approximately \$68,000 were released from escrow. Additionally, we exchanged 3,601 warrants with an aggregate value of approximately \$3,300 and incurred direct costs of approximately \$81,000 to arrive at an initial purchase price of approximately \$1,101,000.

Luna Technologies produces test and measurement equipment which monitor the integrity of fiber optic network components and subassemblies. The acquisition of Luna Technologies will enable us to expand our sale of fiber optic testing equipment beyond the telecommunications industry into avionics, defense and academic research laboratories.

---

[Table of Contents](#)

## Luna Innovations Incorporated

This transaction was accounted for as a purchase business combination in accordance with SFAS No. 141 *Business Combinations*. As such, the net assets acquired were recorded at fair value. The results of operations for Luna Technologies have been included in the accompanying statement of operations from the acquisition date, September 30, 2005, through December 31, 2005.

The following table summarizes the estimated fair value of assets and liabilities assumed at the acquisition date:

---

	<b>September 30, 2005</b>
Current assets	\$1,343,341
Property and equipment, net	286,134
Other assets	4,804
Intangible assets	166,726
Current liabilities	(553,176)
Long-term liabilities	(214,953)
<b>Net Assets</b>	<b>\$1,032,876</b>

---

Intangible assets acquired in the transaction relate primarily to intellectual property rights which will be amortized over an estimated life of 5 years.

The following unaudited pro forma combined condensed statements of operations set forth the consolidated results of our operations for the years ended December 31, 2004 and December 31, 2005 as if the above described acquisition of Luna Technologies had occurred at the beginning of each period presented. This unaudited pro forma information does not purport to be indicative of the actual results that would actually have occurred if the combination had been in effect for the years ended December 31, 2004 and December 31, 2005.

---

	<b>Years Ended</b>	
	<b>December 31, 2004</b>	<b>December 31, 2005</b>
Revenue	\$24,315,810	\$18,642,213
Net income	\$ 3,082,354	\$ (2,385,682)
Diluted earnings per share	\$0.49	\$ (0.36)

---

*Luna Energy*

We formed Luna Energy on February 12, 2002, for the purpose of transferring certain intellectual property rights related to technology to be used in the oil and gas industry. On February 19, 2002, we entered into a Purchase and Sale agreement with a subsidiary of Baker Hughes Oilfields Operations, Inc. (BHI) for the purchase of a 40% interest in Luna Energy. BHI paid us an up-front payment of \$10 million for the 40% equity interest as well as licensing rights to use the intellectual property transferred to Luna Energy. In connection with this agreement, we were also required to enter into a Research and Development Agreement with Luna Energy for the development of certain new technology for the benefit of BHI. BHI committed to pay us an additional \$8 million upon achievement of certain milestones which were tied to the development of the new technology. Additionally, BHI committed to provide Luna Energy with \$12 million in financing over an estimated collaboration period of three years.

As there was no objective and reliable evidence of fair value for deliverables in this arrangement, consistent with the revenue recognition provisions of Staff Accounting Bulletin No. 104 *Revenue Recognition* and the multi-element arrangement provisions of EITF 00-21, the proceeds from the \$10 million payment were recognized ratably over the expected three year collaboration period as license revenues.

## Luna Innovations Incorporated

As previously discussed, BHI agreed to provide substantially all of the working capital required to fund Luna Energy's operations for three years. Additionally, in accordance with Luna Energy's Amended and Restated LLC agreement, BHI was provided certain approval rights which gave them substantive participation in the operations of Luna Energy. These rights included, but were not limited to, approval over the adoption or amendment of annual and period operating and capital budgets, approval over any single material expenditure by Luna Energy in excess of \$10,000, approval over any action by Luna Energy to cease the operations of Luna Energy or to change its business focus, and approval over the election or re-election of officers of Luna Energy. Accordingly, consistent with the provisions of EITF Issue No. 96-16, *Investor's Accounting for an Investee when the Investor Has a Majority of the Voting Interest but the Minority Shareholder or Shareholder Have Certain Approval or Veto Rights*, we did not consolidate Luna Energy but accounted for our interest under the equity method. We were not required to provide any capital financing to Luna Energy from inception through the three-year collaboration period, nor was there any carrying value for the intellectual property transferred to Luna Energy. Therefore, we had no basis to record losses from Luna Energy until 2004 when we advanced it \$198,000. Luna Energy's operating results did not have a material effect on our financial position or our results of operations. As such, condensed financial information on Luna Energy has not been presented.

In December 2004, BHI acquired all of our remaining equity interest in Luna Energy for a non-refundable payment of \$990,000. Such amount was recognized as revenue at that date as we had no further obligation to Luna Energy or BHI.

In addition to our licensing and development arrangement, we also performed subcontract services on certain research contracts for Luna Energy. Total revenues earned from such contracts for the years ended December 31, 2003 and 2004 were \$628,050 and 176,802, respectively.

### 6. Accrued Liabilities

Accrued liabilities consist of the following at:

	December 31,	
	2004	2005
Accrued compensation and related liabilities	\$594,856	\$646,657
Accrued professional fees	179,621	448,634
Accrued severance and bonuses	508,946	401,095
Accrued settlement costs	165,335	—
Accrued Royalty	—	120,000
Deferred Rent	81,324	72,048
Other	212,012	99,728
	<u>\$1,742,094</u>	<u>\$1,788,162</u>

### 7. Debt Agreements

#### *Working Capital Facility*

We entered into a line of credit agreement with First National Bank (FNB) in December 2001. This agreement, as amended, enabled us to borrow up to \$3,000,000, subject to an eligible borrowing base, with interest payable monthly based upon the Wall Street Journal prime rate (5.0% at December 31, 2004). The line of credit is collateralized by a blanket interest in our assets. As of December 31, 2004, the line of credit was subject to certain financial covenants.

[Table of Contents](#)

Luna Innovations Incorporated

We received a modified commitment for renewal of the line of credit in May 2005. Under the May 2005 commitment, we may draw up to \$2,500,000 for working capital needs. Interest accrues on any outstanding balance at the Wall Street Journal prime rate (7.25% at December 31, 2005). Any outstanding principal balance is payable in full on demand or at maturity, May 30, 2006. Outstanding borrowings on the line of credit were \$1,500,000 and \$-0- as of December 31, 2004 and 2005, respectively.

*Milestone Credit Facility*

In connection with the BHI transaction discussed in Note 5, we entered into a "Milestone" working capital line of credit with FNB on May 16, 2003 for \$1,500,000. Interest was payable monthly at the Wall Street Journal prime rate plus 3.0%. Advances under the line of credit were governed by us providing FNB written evidence of BHI's acceptance and approval of payment for milestone payments under the contract with BHI. In connection with acceptance and approval for Milestone 3, we were able to borrow \$1,500,000 against the line of credit. The line of credit was collateralized by a blanket interest in our assets, as well as 40.0% of the payments for Milestones 3 and 4 under the Purchase and Sale Agreement. Additionally, the line of credit was guaranteed by an officer and stockholder and was subject to certain financial covenants. The line of credit expired on March 15, 2004 and was not renewed.

*Virginia Tech Foundation Note*

In connection with the Luna Technologies acquisition discussed in Note 5, the Company assumed a promissory note due to the Virginia Tech Foundation for \$214,955. The principal amount is due on January 31, 2007. Interest is payable monthly and accrues at 5.0% per annum. The note is collateralized by a blanket interest in the assets of Luna Technologies.

The following table presents a summary of debt at December 31,

	<u>2004</u>	<u>2005</u>
Line of credit	1,500,000	—
Carilion Health Systems financing (see note 14)	\$ —	\$ 5,000,000
Virginia Tech Foundation	—	214,955
	<u>1,500,000</u>	<u>5,214,955</u>
Less: current payable	(1,500,000)	—
	<u>\$ —</u>	<u>\$5,214,955</u>

Future maturities of long-term debt as of December 31, 2005 are as follows:

	<u>Amount</u>
Year ending December 31,	
2006	\$ —
2007	214,955
2008	—
2009	5,000,000
Total debt	<u>\$5,214,955</u>

[Table of Contents](#)

Luna Innovations Incorporated

**8. Income Taxes**

Deferred tax assets and liabilities consist of the following components:

	December 31,	
	2004	2005
Research and development credits	\$623,181	\$1,325,105
Net operating loss carryforwards	19,064	800,565
Deferred revenues	370,498	—
Accrued liabilities	151,675	132,759
Stock-based compensation	76,943	141,067
Depreciation and amortization	(126,260)	(128,804)
Change in tax return accounting method - current (liability)	(30,106)	—
	<u>1,084,995</u>	<u>2,270,692</u>
Valuation allowance	(642,246)	1,670,692
Net deferred tax asset	<u>\$442,749</u>	<u>600,000</u>

The reconciliation of expected income tax expense (benefit) to actual income tax expense (benefit) was as follows:

	December 31,		
	2003	2004	2005
Statutory federal rate	34.0%	34.0%	34.0%
State tax net of federal benefit	3.9%	3.9%	3.9%
Research and development credit and carryforwards	(10.2%)	(0.6%)	22.9%
Change in valuation allowance	3.9%	(19.5%)	(42.4%)
Capital loss deduction	—	(18.3%)	—
Permanent differences and other	3.7%	3.5%	3.4%
Income tax expense (benefit)	<u>35.3%</u>	<u>3.0%</u>	<u>21.8%</u>

The income tax provision (benefit) consists of the following for:

	December 31,		
	2003	2004	2005
Current:			
Federal	\$ (397,722)	\$(746,343)	\$ —
State	91,485	(83,321)	—
Deferred Federal	1,068,139	852,276	(523,817)
Deferred State	123,980	105,622	(33,435)
Income tax expense (benefit)	<u>\$ 885,882</u>	<u>\$ 128,234</u>	<u>(557,252)</u>

Realization of deferred income tax assets is dependent upon sufficient future taxable income during the period that deductible temporary differences are expected to be available to reduce taxable income. In assessing the realizability

## Luna Innovations Incorporated

of deferred tax assets, we consider whether it is more likely than not, that some portion, or all of the deferred tax asset will be realized. We consider scheduled reversals of deferred tax liabilities, projected future taxable income, and tax planning strategies that can be implemented by us in making this assessment of the realizability of such assets. We have net operating loss carryforward available at December 31, 2006 of approximately \$3.0 million that expire at varying dates through 2025. We have recorded a refundable income tax receivable, of approximately \$400,000, representing net operating losses that we plan to carry back to recover income taxes previously paid. This results in remaining net operating loss carryforwards that we anticipate using in the future of approximately \$800,000. The Company also has R&D tax credits of approximately \$1.3 million which expire at varying dates through 2025.

A tax benefit of \$600,000 was recorded at December 31, 2005. Based upon management's assessment that more likely than not the benefit will be realized in future periods.

## 9. Stockholders' Equity

### *Stock split*

On September 22, 2003, we effected a 58:1 stock split in the form of a stock dividend on the Class A Common Stock. All prior period common stock and applicable share and per share amounts have been retroactively adjusted to reflect the stock split.

### *Redeemable Class B Common Stock*

In connection with our acquisition of Luna Technologies on September 30, 2005, we gave the shareholders of Luna Technologies a right to put 548,896 of their shares of Class B Common Stock back to us in the event we are unsuccessful in completing an initial public offering of our common stock by December 31, 2006. Such shares have been classified as Redeemable Class B Common Stock on our December 31, 2005 consolidated balance sheet.

### *Warrants*

Warrants to purchase 183,120 shares of our Class B Common Stock for \$0.001 per share were exercised in November 2005.

### *Common Stock*

Upon the completion of our initial public offering all of the outstanding shares of Class A Common Stock, Class B Common Stock and Class C Common Stock will convert into one class of common stock on a one-for-one basis.

### *Incentive Stock Option Plan*

On August 20, 1999, we adopted the Luna Innovations Incorporated Stock Purchase Plan (the 1999 Plan) which permitted our Board of Directors to grant options to officers, directors and employees of our Company. There was no pre-established number of shares of common stock reserved for issuance under this plan. Options granted under the 1999 Plan generally had a life of 5 years and an exercise price equal to the estimated fair value of the Company as determined by the Board of Directors.

In connection with our reincorporation in April 2003, we adopted the Luna Innovations Incorporated 2003 Stock Plan (the 2003 Plan). Under the 2003 Plan, our Board of Directors is authorized to grant both incentive and nonstatutory stock options to employees, directors and consultants of our Company to purchase Class B shares of Common Stock. Options generally have a life of 10 years and exercise price equal to or greater than the fair market value of the Class B Common Stock as determined by the Board of Directors. A total of 5,000,000 shares of Class B Common Stock were reserved for issuance under the 2003 Plan. On March 16, 2004, our Board of Directors increased the number of shares reserved under the Plan to 8,000,000. The expiration date of the options cannot be more than 10 years from date of grant. A total of 4,032,446 and 966,483 were available for future grant as of December 31, 2004 and 2005, respectively.

Luna Innovations Incorporated

On February 4, 2006, our Board of Directors increased the number of shares reserved under the 2003 Plan to 9,715,000.

In August 2003, our Board of Directors authorized an option exchange program expiring on September 19, 2003 whereby option holders of Class A Common Stock issued under the 1999 plan were given the opportunity to exchange their options for options to purchase Class B Common Stock on a one for one basis. The new option grants were immediately vested on the date of exchange, September 29, 2003, had an exercise price of \$0.20 and a life of 10 years from the date of grant. Upon completion of the option exchange program, the 1999 plan was terminated.

All of the outstanding options from the 1999 Plan had exercise prices in excess of the fair value of our Class A Common Stock as of the date of the exchange. As such, the option exchange was accounted for as a repricing in accordance with FIN 44. We are required to apply variable plan accounting to the replacement grant and measure compensation based on the change in fair value of the Class B Common Stock at each reporting period. A total of 305,230 options were exchanged in connection with this transaction, of which 70,053 were outstanding at December 31, 2005.

There was no non-cash stock option expense related to employee and director awards for the year ended December 31, 2003. Total non-cash stock option expense for the years ended December 31, 2004 and 2005 was \$39,680 and \$133,901, respectively.

The following table sets forth the activity of our stock options to purchase class A and class B common stock.

	Class A Common Stock		Class B Common Stock	
	Number of Options	Exercise Price	Number of Options	Exercise Price
<b>Balance at December 31, 2002</b>	48,072,198	\$0.09		
Cancelled pursuant to the exchange offer	(50,081,898)	0.09		\$0.20
Issued pursuant to the exchange offer	—		367,525	0.20
Forfeited	—		(369,159)	0.20
Exercised	—		(118,750)	0.20
Granted	2,009,700	0.09	4,114,511	0.20
<b>Balance at December 31, 2003</b>	—		3,994,127	
Forfeited	—		(265,074)	0.20
Exercised	—		(16,499)	0.20
Granted	—		255,000	0.20
<b>Balance at December 31, 2004</b>	—		3,967,554	
Forfeited	—		(1,068,037)	0.20
Exercised	—		(421,374)	0.20
Granted	—		4,555,374	0.20 – 1.00
<b>Balance at December 31, 2005</b>	—		7,033,517	

As noted above, on September 22, 2003, the Company forward split its Class A common stock on a 58 to 1 basis. This stock split occurred chronologically after the exchange offer was made to exchange options to purchase shares of Class A common stock for options to purchase Class B common stock on a one-for-one basis (pre-split). As shown in the above table, the Company cancelled 50,081,898 shares of Class A common stock (863,481 shares prior to the stock split noted above) in exchange for the option to purchase 367,025 shares of Class B common stock. Options representing the right to purchase 496,456 shares of Class A common stock held by certain founding stockholders were not exchanged and were cancelled without any compensation to the holder.

[Table of Contents](#)

Luna Innovations Incorporated

On the date of the exchange, the pre-split exercise price of the Class A common stock was \$5.22 (post-split exercise price at \$0.09 per share). Management determined that prior to the exchange offer, since the options to purchase Class A common stock exceeded its market value that it was in the best interest to effectuate the exchange offer, and offer the Class A option holders the right to receive a similar number of options to purchase Class B common shares at the new market price.

Year ended December 31,	Range of Exercise Prices	Options Outstanding			Options Exercisable	
		Options Outstanding	Weighted Average Remaining Life in Years	Weighted Average Exercise Price	Options Exercisable	Weighted Average Exercise Price of Options Exercisable
2003	\$0.20	3,994,127	9.7	\$0.20	2,086,511	\$0.20
2004	\$0.20	3,967,554	8.8	0.20	2,821,656	0.20
2005	\$0.20-\$1.00	7,033,517	8.9	0.38	2,688,104	0.20

Weighted average grant date fair value for December 31, 2003, 2004, and 2005 was \$0.13, \$0.13 and \$0.22, respectively.

**10. Commitments and Contingencies**

*Obligation Under Operating Leases*

We lease our facilities in Blacksburg, Charlottesville, Danville and Hampton, Virginia under non-cancellable operating leases that expire between July 2005 and May 2009. Certain of the leases are subject to fixed escalations. We recognize rent expense on such leases on a straight-line basis over the lease term. Rent expense under these leases was approximately \$406,000, \$560,000 and \$600,000 for the years ended December 31, 2003, 2004 and 2005, respectively.

Minimum future rentals, as of December 31, 2005, under the aforementioned operating leases for each of the next five periods ending are:

2006	\$650,469
2007	771,191
2008	683,330
2009	527,762
2010	502,721
Thereafter	339,587
	<b>\$3,475,060</b>

*New Facility Lease*

We have entered into an agreement with Carilion Medical Center to lease 20,000 square feet of office space at the Riverside Centre in Roanoke, Virginia that will serve as our headquarters. The landlord of this property, Carilion Medical Center, is an affiliate of Carilion Health System, currently our second largest stockholder. Dr. Edward Murphy, Chairman and Chief Executive Officer of Carilion Health System became a member of our board of directors in connection with the investment of \$7.0 million by Carilion Health System in August 2005. The lease has a five year term commencing on the later of September 1, 2006 or the date Carilion Medical Center provides us with a certificate of occupancy. Base rent will be \$480,000 per year, subject to annual escalations of two percent. As of December 31, 2005, we had not received a certificate of occupancy.

---

[Table of Contents](#)

## Luna Innovations Incorporated

*Obligation Under Capital Leases*

We are obligated under capital leases covering certain equipment and software that expire at various dates during the next four years. Minimum lease payments as of December 31, 2005 were as follows:

2006	\$105,947
2007	91,636
2008	24,060
2009	4,643
	<hr/>
	226,286
Less—amount representing interest	10,331
	<hr/>
Present value of net minimum obligation	215,955
Less—current obligation	98,820
	<hr/>
Long-term obligation	\$117,135
	<hr/>

The gross amount of property and equipment and related accumulated amortization recorded under capital leases were as follows at December 31:

---

	2004	2005
Equipment	\$292,580	\$458,035
Software	164,085	514,121
	<hr/>	<hr/>
Less—accumulated amortization	456,665	972,156
	(92,528)	(363,040)
	<hr/>	<hr/>
	\$364,137	\$609,116
	<hr/>	<hr/>

---

*Governor's Opportunity Fund*

In March 2004, we received a \$900,000 grant (the "Grant") from the City of Danville, Virginia (the "City") to be used for the expansion of economic and commercial growth within the City. Specifically, \$450,000 of the grant will be used to offset certain capital expenditures for leasehold improvements being made at our Danville facility, and the remaining \$450,000 is to be used for our creation of new jobs.

The Grant stipulates that we must make estimated capital expenditures of at least \$6,409,000 and create 54 new full time jobs at our Danville facility, at an average wage of at least \$39,000 plus benefits within 30 months of the award, and then maintain such employment levels for an additional 30 months. We could be required to repay the grant funds on a pro-rata basis should we fail to satisfy the conditions stipulated in this agreement by September 25, 2006 at the earliest. As such, since we have not yet met the stipulations of the grant, we have included the \$900,000 in deferred revenue and other credits in the accompanying consolidated balance sheets as of December 31, 2004 and 2005.

**11. Employee Profit Sharing Plan**

We maintain a salary reduction/profit-sharing plan under provisions of Section 401(k) of the Internal Revenue Code. The plan is offered to employees who have completed three months of service with us. We contribute 50% of the salary deferral elected by each employee up to a maximum deferral of 10% of annual salary.

We may, at our option, contribute additional amounts to the plan. We contributed approximately \$165,000, \$156,000 and \$213,000 to the plan for the years ended December 31, 2003, 2004 and 2005, respectively.

Luna Innovations Incorporated

## **12. Transfers of Intellectual Property**

### *Luna i-Monitoring*

We formed Luna i-Monitoring, Inc., in February 2002, to focus on the commercialization of integrated wireless telesensing systems for managing remote assets. On October 1, 2003, we, along with our individual stockholders, agreed to the terms of a share purchase and asset transfer agreement with IHS Energy Group, Inc. and for the sale of all of the issued and outstanding capital stock of Luna i-Monitoring Inc., as well as the rights, title and interest in its intellectual property. Total consideration received at closing was approximately \$700,000.

Luna i-Monitoring had no substantial assets or operations from inception through the date of the sale of IHS Energy Group, Inc., but did hold the rights to intellectual property. We recorded the payment of \$700,000 upon the sale of Luna i-Monitoring and intellectual property in accordance with SAB 104 since we had no further obligations to IHS Energy Group, Inc.

### *Biotechnology Company*

On December 1, 2003, our subsidiary, Luna Analytics, entered into a license agreement with a biotechnology company granting a worldwide exclusive license for the use of certain patents and technology subject to the terms of the agreement for work in the field of life sciences research applications. We also entered into a research and development agreement with the licensee to develop additional technology. In exchange for the license rights, we were paid a one-time technology access fee of \$1,000,000. The agreement also called for additional payments aggregating to \$1.5 million each upon achievement of certain milestones.

Since there was no objective and reliable evidence of fair value for deliverables in this arrangement, we deferred the up-front payment of \$1,000,000 and were recognizing it ratably over the 10 year collaboration period. In October 2004, this biotechnology company notified us of its desire to terminate the research and development agreement. Since we had no further obligations to this biotechnology company under this arrangement, we recognized the remaining revenues upon the termination of the agreement.

## **13. Litigation and Other Contingencies**

We are not party to any material legal proceedings, nor are we currently aware of any threatened material proceedings. From time to time, we may become involved in litigation in relation to claims arising out of our operations in the normal course of business. While management currently believes the amount of ultimate liability, if any, with respect to these actions will not materially affect our financial position, results of operations, or liquidity, the ultimate outcome of any litigation is uncertain. Were an unfavorable outcome to occur, or if protracted litigation were to ensue, the impact could be material to us.

In March 2003, the Office of Inspector General of the Department of Commerce advised us that the government was investigating anonymous allegations of contract improprieties. We have cooperated fully and extensively with that investigation through interviews and document production. In April 2003, the government advised our regulatory counsel that to date no wrongdoing had been identified, although the government indicated that we may not have fully complied with contractual reporting requirements in one or two instances, which the government did not specify. We believe that the investigation has been resolved favorably, based on statements by the government investigator to our employees in June 2003, and that this matter effectively is at an end absent any advice or communication from the government to the contrary. However, there can be no assurance as to how or whether our relationships, business, financial condition or results of operations will ultimately be affected, if at all, by the investigation.

On November 9, 2004, we received a subpoena from the Department of Defense's Office of the Inspector General covering certain government research contracts awarded to us between January 1, 1998 and November 9, 2004 to determine if we had duplicated work in our submission of project reports to the government. In connection with the

Luna Innovations Incorporated

investigation, the government alleged that duplication occurred in three research reports that we prepared under the contracts. We submitted a response to the Inspector General in September 2005 challenging the government's findings. On November 15, 2005, we entered into a settlement agreement with the government and received a general release with respect to this matter in return for a payment of \$165,333. Such amount has been accrued for in the December 31, 2004 and 2005 balance sheets.

In July 2005, we received a letter from legal counsel retained by a former employee that such law firm is investigating whether such former employee has any claims against us, including breaches of contract, fiduciary duty, implied covenants of good faith and fair dealing as well as potential violations of minority stockholder rights that such former employee may have as a stockholder in one of our subsidiaries. In 2006, we responded to additional inquiries from counsel for such former employee seeking information about the relationship between us and the subsidiary in which the employee holds stock. Although we believe none of these potential claims has merit, we cannot currently predict whether such former employee will file litigation against us or the ultimate outcome of any such potential litigation.

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

#### **14. Carilion Transactions**

In August 2005, we entered into a Class C Common Stock Financing Agreement with Carilion Health System (Carilion) whereby Carilion committed to providing approximately \$15.0 million in equity financing in three tranches subject to certain conditions outlined in the agreement. Carilion purchased 2,639,688 shares of our Class C Common Stock (the first tranche) for an aggregate purchase price of \$7.0 million at closing.

In connection with the agreement, we also entered into an investor rights agreement with Carilion giving them certain registration rights in the event that we are successful in completing an initial public offering of our common stock.

On December 30, 2005, we reached an agreement with Carilion to terminate the August 2005 equity Financing Agreement and enter into a new Class C Common Stock Financing Agreement (the "New Agreement"). Under the New Agreement, Carilion agreed to provide \$5.0 million in exchange for five \$1.0 million convertible promissory notes, and \$3.0 million in exchange for 1,131,294 shares of Class C Common Stock, subject to certain conditions.

The notes are convertible into Class C Common Stock at a fixed rate of \$2.65183 per share. These notes accrue simple interest at a rate of 6.0% per year and are due and payable on December 30, 2009 or a later date if extended by the holders of a majority of the aggregate principal amount of the notes, absent acceleration due to an event of default. The holders of a majority of the aggregate principal amount of the notes may also extend the maturity date of these notes for one additional year by providing notice to us and may further extend the maturity date for up to an additional three consecutive one year periods if we are not eligible for or have elected not to pursue SBIR funding. After the first extension, if any, we will have the right to repay any accrued interest in cash rather than common stock. The holders of these notes have the option to convert their notes (subject to certain limitations) into shares of our common stock at maturity or upon the occurrence of certain events prior to this offering. In addition, the holders may convert their notes (subject to certain limitations) into shares of common stock if we are no longer eligible for SBIR grants or have not applied for an SBIR grant within the preceding 12 months.

In connection with the New Agreement, we amended and restated the investor rights agreement granting Carilion and certain other shareholders the rights to require us to register their shares of Common Stock for resale. Although we could be required to register shares held by these shareholders, there is no liquidated damages provision in the event such shares are not registered and the conversion of such debt can be satisfied with unregistered shares of Class C Common Stock.

Luna Innovations Incorporated

**15. Relationship With Major Customers**

During the years ended December 31, 2003, 2004 and 2005, approximately 51%, 51% and 70%, respectively, of our consolidated revenues were attributable to prime contracts with the U.S. government. In addition, during the years ended December 31, 2003, 2004 and 2005, two of our non-government customers accounted for approximately 37%, 35% and 14% of our consolidated revenues, respectively, although these customers are not expected to be an ongoing source of revenues of that amount in the future. Our revenues from these major customers are as follows:

---

	Year ended December 31,		
	2003	2004	2005
U.S. Government	\$8,969,004	\$11,509,964	\$11,471,447
Non-Government Customer	6,428,571	7,918,571	2,245,762

---

Luna Technologies, Inc.

## **Report of independent registered public accounting firm**

### *INDEPENDENT AUDITOR'S REPORT*

To the Board of Directors

Luna Technologies, Inc.

Blacksburg, Virginia

We have audited the accompanying balance sheet of Luna Technologies, Inc. as of December 31, 2004, and the related statements of operations, changes in stockholders' equity (deficit), and cash flows for the year then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Luna Technologies, Inc. as of December 31, 2004, and the results of its operations and its cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.

/s/ Brown, Edwards & Company, L. L. P.

CERTIFIED PUBLIC ACCOUNTANTS

Christiansburg, Virginia

September 22, 2005

Luna Technologies, Inc.

## Balance sheets

	December 31, 2004	September 30, 2005
		(unaudited)
<b>Assets</b>		
Current assets:		
Cash and cash equivalents	\$624,552	\$114,541
Receivables, net of allowance for doubtful accounts of \$552 and \$2,052 at December 31, 2004 and September 30, 2005, respectively	680,591	784,688
Due from related party	9,268	7,533
Inventories, net	212,722	382,969
Other current assets	40,855	53,610
<b>Total current assets</b>	<b>1,567,988</b>	<b>1,343,341</b>
Property and equipment, net	300,947	286,134
Other assets	8,729	4,804
<b>Total Assets</b>	<b>\$1,877,664</b>	<b>\$1,634,279</b>
<b>Liabilities and stockholders' equity (deficit)</b>		
Current liabilities:		
Accounts payable	\$74,978	\$279,215
Accrued liabilities	331,343	273,962
<b>Total current liabilities</b>	<b>406,321</b>	<b>553,177</b>
Long term debt payable, net of current portion	214,953	214,953
<b>Total liabilities</b>	<b>621,274</b>	<b>768,130</b>
Redeemable Convertible Series B Preferred Stock, \$0.001 par value per share; 64,600,000 shares authorized; 52,600,255 shares issued and outstanding at December 31, 2004 and September 30, 2005	3,200,565	3,373,670
Redeemable Convertible Series A and Series A-1 Preferred Stock, \$0.001 par value per share; 26,000,000 shares authorized; 12,798,685 shares issued and outstanding at December 31, 2004 and September 30, 2005	11,960,763	12,513,836
Stockholders' equity:		
Common stock, \$0.001 par value; 160,000,000 shares authorized at December 31, 2004 and September 30, 2005; 5,923,844 shares issued and outstanding at December 31, 2004 and September 30, 2005	5,924	5,924
Retained earnings (deficit)	(13,910,862)	(15,027,281)
<b>Total stockholders' equity</b>	<b>(13,904,938)</b>	<b>(15,021,357)</b>
<b>Total liabilities and stockholders' equity</b>	<b>\$1,877,664</b>	<b>\$1,634,279</b>

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

Luna Technologies, Inc.

## Statements of operations

	Year ended December 31, 2004	Nine Months Ended September 30,	
		2004	2005
		(unaudited)	(unaudited)
Revenues	\$1,775,082	\$1,049,299	\$2,204,196
Cost of revenues	817,071	517,152	1,074,354
Gross profit	958,011	532,147	1,129,842
Operating expenses	1,884,606	1,416,386	1,507,864
Loss from operations	(926,595)	(884,239)	(378,022)
Other income (expense):			
Interest expense	(30,730)	(26,079)	(12,217)
Loss on disposal of fixed assets	(2,813)	(1,327)	—
Miscellaneous income (expense)	506	—	—
Total other income (expense)	(33,037)	(27,406)	(12,217)
Net loss	\$(959,632)	\$(911,645)	\$(390,239)
Net loss per share—basic and diluted	\$(0.16)	\$(0.15)	\$(0.07)
Weighted average number of common shares outstanding—basic and diluted	5,923,894	5,923,894	5,923,894

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

Luna Technologies, Inc.

## Statements of changes in stockholders' equity (deficit)

	<u>Shares</u>	<u>Common Stock</u>	<u>Retained Earnings (Deficit)</u>	<u>Total</u>
Balance—December 31, 2003	6,127,727	\$ 6,128	\$(11,849,413)	\$(11,843,285)
Net loss	—	—	(959,632)	(959,632)
Conversion of Common Stock to Series A	(203,883)	(204)	(147,040)	(147,244)
Accretion of Preferred Stock	—	—	(962,277)	(962,277)
Gain on redemption of Series B Preferred Stock	—	—	7,500	7,500
Balance—December 31, 2004	5,923,844	5,924	(13,910,862)	(13,904,938)
Net loss (unaudited)	—	—	(390,239)	(390,239)
Accretion of Preferred Stock (unaudited)	—	—	(726,180)	(726,180)
Balance—September 30, 2005 (unaudited)	5,923,844	\$ 5,924	\$(15,027,281)	\$ 15,021,357

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

Luna Technologies, Inc.

**Statements of cash flows**

	Year Ended December 31, 2004	Nine Months Ended September 30, 2004	Nine Months Ended September 30, 2005
		(unaudited)	(unaudited)
<b>Cash flows from (used in) operating activities:</b>			
Net loss	\$(959,632)	\$(911,645)	\$(390,239)
Adjustments to reconcile to net loss to net cash used in operating activities:			
Depreciation and amortization	252,933	171,826	112,182
Provision for doubtful accounts	(26,839)	(26,839)	1,500
Amortization of deferred financing costs	21,064	—	—
Loss on disposal of property and equipment	2,813	1,327	—
Change in current assets and liabilities:			
(Increase) decrease in:			
Accounts receivable	(386,081)	(109,744)	(133,784)
Due from related party	18,998	—	1,735
Inventories	106,270	52,626	(170,247)
Note receivable	51,484	25,743	28,187
Prepaid expenses and other current assets	24,804	15,388	(12,755)
Other assets	(15,827)	(19,752)	—
(Decrease) increase in:			
Accounts payable	(101,826)	75,023	208,097
Accrued compensation	108,514	—	—
Accrued liabilities	(7,509)	(164,578)	(61,242)
Deferred revenues	(79,671)	—	—
Net cash flows used in operating activities	(990,505)	(890,625)	(416,566)
<b>Cash flows from (used in) investing activities:</b>			
Purchase of property and equipment	(11,430)	(9,744)	(93,445)
Proceeds from sale of property and equipment	6,000	6,000	—
Net cash (used in) investing activities	(5,430)	(3,744)	(93,445)
<b>Cash flows from financing activities:</b>			
Proceeds (repayments) from issuance of notes payable	(195,549)	(195,549)	—
Proceeds from the issuance of preferred stock	1,441,481	1,441,481	—
Repurchase of preferred stock	(5,000)	(5,000)	—
Net cash provided by financing activities	1,240,932	1,240,932	—
Increase (decrease) in cash and cash equivalents	244,997	346,563	(510,011)
<b>Cash and cash equivalents:</b>			
Beginning	379,555	379,555	624,552
Ending	\$624,552	\$726,118	\$114,541
<b>Supplemental disclosure of cash flow information</b>			
Interest paid	\$30,730	\$26,079	\$12,217
<b>Schedule of non-cash investing and financing activities</b>			
Accretion of preferred stock and related dividends	\$962,277	\$717,531	\$726,180
Conversion of common stock to Series A preferred stock	\$147,040	\$147,040	—

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

## Notes to financial statements

(Information for the nine months ended September 30, 2004 and 2005 is unaudited)

### 1. Organization and Nature of Business

Luna Technologies, Inc. (the "Company") was originally incorporated on July 24, 1998 in the Commonwealth of Virginia as a wholly-owned subsidiary of Luna Innovations Incorporated ("Luna Innovations"). On December 11, 2000, we were reincorporated in the State of Delaware.

We develop and sell test instruments to measure the integrity of fiber optic network components and modules. Due to the nature of our products, the volume of sales transactions tends to be very low with relatively high average revenues per sale. Although we have repeat customers, we depend primarily on sales to new customers each year to maintain and increase revenues.

### 2. Summary of Significant Accounting Policies

#### *Basis of Presentation*

Our audited financial statements have been prepared in accordance with accounting principles generally accepted in the United States (US GAAP). Our unaudited financial statements have been prepared in accordance with US GAAP for interim financial information and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, they do not include all of the information and footnotes required to be presented for complete financial statements. The accompanying financial statements include all adjustments (consisting only of normal recurring accruals), which are, in the opinion of our management, necessary for a fair presentation of the results for the interim periods presented. The results of operations for the nine months ended September 30, 2005 are not necessarily indicative of the results that may be expected for the year ended December 31, 2005.

The unaudited financial statements and related disclosures have been prepared with the presumption that users of the interim financial information have read or have access to the audited financial statements for the preceding fiscal year. Accordingly, these financial statements should be read in conjunction with the audited financial statements and the related notes included for 2004. The unaudited financial statements as of and for the nine months ended September 30, 2005 include the effects of the acquisition of the Company by Luna Innovations.

#### *Use of Estimates*

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

#### *Cash and Cash Equivalents*

Cash and cash equivalents consist of highly liquid investments with an original maturity of three months or less.

We maintain our cash in bank deposit accounts which, at times, may exceed federally insured limits. We have not experienced any losses in such account. We believe we are not exposed to any significant credit risk on cash and cash equivalents.

#### *Financial Instruments*

Our balance sheet includes various financial instruments (primarily cash and cash equivalents, accounts receivable, note receivable, accounts payable, accrued compensation and accrued liabilities). The fair values of these financial instruments approximate the carrying values due to their short maturities. The fair value of debt approximated its

---

[Table of Contents](#)

Luna Technologies, Inc.

carrying amount as of December 31, 2004 and September 30, 2005 based on rates currently available to us for debt with similar terms and remaining maturities.

*Concentration of Credit Risk*

Financial instruments that potentially subject us to concentrations of credit risk consist primarily of cash and cash equivalents, accounts receivable, and notes receivable. We deposit our cash with financial institutions in the United States that we consider to be of high credit quality.

*Accounts Receivable*

With respect to accounts receivable and notes receivable, we perform ongoing credit evaluations of our customers, generally do not require collateral, and maintain an allowance for doubtful accounts based on historical experience and management's expectations.

*Inventories*

Inventory consists of component parts, work-in-progress, and finished goods. Inventory is stated at the lower of cost, determined on the first-in, first-out (FIFO) basis, or market.

*Property and Equipment*

Property and equipment are recorded at cost. Depreciation and amortization are calculated on the straight-line method over the following estimated useful lives of the assets:

Computer and sale demo equipment	3 – 7 years
Furniture and equipment	3 – 7 years
Software	3 – 7 years
Leasehold improvements	Lesser of lease term or life of improvements
Vehicles	5 years

Depreciation expense for the year ended December 31, 2004 and the nine months ended September 30, 2004 and 2005 was \$252,933, \$171,826 and \$112,182, respectively.

Certain equipment held under capital leases is classified as property and equipment and is amortized using the straight-line method over the term of the lease. The related obligations are recorded as liabilities. Lease amortization expense is included in depreciation and amortization expense. Maintenance and repairs are charged to expense as incurred.

*Impairment of Long-Lived Assets*

We evaluate our long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of any asset to future net undiscounted cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by future discounted cash flows compared to the carrying amount of the assets. No such indicators existed as of December 31, 2004 and as of September 30, 2005.

*Revenue Recognition*

Revenues are derived from product sales. We recognize revenues when all the following criteria are met: (i) persuasive evidence of an arrangement exists, (ii) delivery has occurred, (iii) the fee is fixed or determinable, and (iv) collectibility is probable.

We accrue for warranty costs, sales returns and other allowances on our best estimate of costs that will be incurred on the delivered product.

*Stock-Based Compensation*

We have a stock-based employee compensation plan, which is more fully described in Note 11. We account for stock-based employee compensation arrangements in accordance with Accounting Principles Board Opinion No. 25, *Accounting for Stock Issued to Employees* (APB 25), and comply with the disclosure provisions of Statement of Financial Accounting Standards No. 123, *Accounting for Stock-Based Compensation* (SFAS No. 123). Awards under our current plan vest over a period of up to five years. We account for equity instruments issued to nonemployees in accordance with SFAS No. 123 and EITF 96-18, *Accounting for Equity Instruments that are Issued to Others than Employees for Acquiring, or in Conjunction with Selling, Goods or Services*. For the year ended December 31, 2004 and the nine months ended September 30, 2004 and 2005, applying the value-based method under SFAS 123 to all outstanding and unvested options would have not have a material impact on the net loss as reported by us.

The fair value of each option grant is estimated on the date of grant using the Minimum Value option-pricing model with the following assumptions: dividend yield of 0.00%; riskfree interest rate of 5.00%; and an expected life of five years. In determining the value of the options, management also considers the fundamentals of Luna Technologies, including earnings performance, liquidation performances, and dilution of common stock by preferred stock conversion rights. The effect of applying SFAS No. 123 to the calculation of the pro forma net loss as stated above is not necessarily representative of the effects on reported net loss for future years due to, among other things, (1) the vesting period of the stock options and (2) the fair market value of additional stock options in future years.

In December 2004, the FASB issued SFAS No. 123 (revised 2004), *Share-Based Payment*, which is a revision of SFAS No. 123, *Accounting for Stock-Based Compensation* (SFAS No. 123R). SFAS No. 123R supersedes APB Opinion No. 25, *Accounting for Stock Issued to Employees*, and amends SFAS No. 95, *Statement of Cash Flows*. Generally, the approach in SFAS No. 123R is similar to the approach described in SFAS No. 123. However, SFAS No. 123R requires all share-based payments to employees, including grants of employee stock options, to be recognized in the income statement based on their fair values. Pro forma disclosure is no longer an alternative. Publicly traded companies are required to adopt SFAS No. 123R on January 1, 2006.

On September 30, 2005, all outstanding options were cancelled in conjunction with the acquisition by Luna Innovations.

*Advertising Costs*

We expense all advertising costs as incurred. We incurred approximately \$44,000, \$13,325 and \$73,490 of advertising expense during the year ended December 31, 2004 and the nine months ended September 30, 2004 and 2005, respectively.

*Research and Development Costs*

Expenditures relating to the development of new products and processes, including significant improvements to existing products, are expensed as incurred. Software development costs are subject to capitalization beginning when a product's technological feasibility has been established and ending when a product is available for release to customers. Our products are released soon after technological feasibility has been established. As a result, the costs subsequent to achieving technological feasibility have been insignificant and all software development costs have been expensed.

Luna Technologies, Inc.

*Income Taxes*

We provide for income taxes in accordance with the liability method required by Statement of Financial Accounting Standards No. 109, *Accounting for Income Taxes* (SFAS 109). Under this method, deferred tax assets and liabilities are determined based on differences between financial reporting and tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse.

**3. Inventories**

Inventories consist of the following at:

	<b>December 31, 2004</b>	<b>September 30, 2005</b>
Finished goods	\$30,000	\$—
Raw materials	76,494	384,473
Work-in-process	116,228	10,198
	<u>222,722</u>	<u>394,671</u>
Obsolescence reserve	(10,000)	(11,702)
	<u>\$212,722</u>	<u>\$382,969</u>

**4. Note Receivable**

As partial payment for a product sale, we accepted a promissory note payable for 36 equal installments of \$4,290 beginning on August 1, 2002. The note bears interest at a rate of 6.5% per annum, with the product as collateral. The revenues on the remaining balance of the note receivable were \$79,671 as of December 31, 2003. We recognized the remaining revenues related to the sale in 2004 because the maker of the note was purchased by a third party and our management believes there is minimal risk of default on the note and repossession of the equipment.

**5. Property and Equipment**

Property and equipment, at cost, including equipment under capital lease obligations, consist of the following at December 31, 2004:

Computer and sales demo equipment	\$53,309
Furniture and equipment	801,146
Computer software	270,154
Leasehold improvements	43,020
	<u>1,167,629</u>
Less accumulated depreciation and amortization	866,682
	<u>\$300,947</u>

## 6. Debt

On August 31, 2001, we entered into an equipment term note (the "Term Note") with a financial institution that provides for borrowings up to \$800,000. At December 31, 2004, no balance was outstanding under the Term Note.

In conjunction with the execution of the Term Note, we issued warrants to purchase 88,642 shares of Series A Preferred Stock at \$0.7222 per share. The warrants were fully vested upon issuance and expire on August 31, 2007. The fair value of the warrants was calculated using the Black-Scholes option-pricing model using the following assumptions: (a) 73% expected volatility; (b) 44 month expected life; (c) 0% expected dividend yield; and (d) 5.0% risk-free interest rate. We recorded deferred financing costs of \$51,803, of which \$46,094 related to the fair value of the warrants issued to the financial institution. The deferred financing costs are being amortized to interest expense using the effective interest method over the period the related debt is expected to be outstanding (three years). During the year ended December 31, 2004, we recognized additional interest expense of \$15,828.

On August 31, 2003, we refinanced two previous loans totaling \$214,953 with an affiliated organization in return for an interest only note payable beginning September 30, 2003 and bearing interest of 5% per annum. The note calls for 23 interest payments of \$897, with a balloon payment of \$214,953 due on August 1, 2005. At December 31, 2004, \$214,953 was outstanding under this term note. In April 2005, the maker of the note extended the term until July 31, 2007. Consequently, the balance of the note is presented as a non-current liability.

On September 1, 2002, we agreed to borrow an aggregate of \$105,060 from an affiliated organization in return for (i) a promissory note and (ii) warrants to purchase 36,364 shares of Series A Preferred Stock at \$0.7222 per share. The warrants were fully vested upon issuance and expire on September 1, 2007. The fair value of the warrants was calculated using the Black-Scholes option-pricing model using the following assumptions: (a) 77% expected volatility; (b) five-year expected life; (c) 0% expected dividend yield; and (d) 5.0% risk-free interest rate. We recorded deferred financing costs of \$26,182 related to the fair value of the warrants issued to the financial institution. The deferred financing costs are being amortized to interest expense using the effective interest method over the original four year term of the note. During the year ended December 31, 2004, we recognized additional interest expense of \$5,236 per year. This note was refinanced as part of the interest only loan described above.

Annual maturities of all long-term debt are as follows:

Year ended December 31:

2005	\$ —
2006	—
2007	214,953
	<u>214,953</u>

## 7. Related Party Transactions

During the year ended December 31, 2004, we incurred approximately \$1,966 of administrative fees paid to a stockholder.

During the year ended December 31, 2004, we sold products and services to the same stockholder valued at approximately \$46,178.

Luna Technologies, Inc.

## 8. Income Taxes

Significant components of the provision for (benefit from) income taxes attributable to operations consist of the following at December 31, 2004:

Current	\$—
Deferred	(316,637)
Valuation allowance	316,637
	<u>\$—</u>

The difference between the tax provision and the amount that would be computed by applying the statutory federal income tax rate to income before taxes is primarily attributable to the valuation allowance for deferred tax assets.

Temporary differences and carryforwards, which give rise to a significant portion of deferred tax assets and liabilities, are as follows at December 31, 2004:

Deferred tax assets:	
Net operating loss carryforwards	\$3,937,451
Depreciation	(18,098)
Accrued other	34,706
Valuation allowance	(3,954,059)
Net deferred tax assets	<u>\$—</u>

We have net operating loss carryforwards for federal income tax purposes of approximately \$10,200,000, which expire, if unused, from the year 2019 through the year 2024. The timing and manner in which this net operating loss carryforward may be utilized in any year by us may be limited to our ability to generate future earnings and also be limited by certain provisions of the U.S. tax code. Realization of total deferred tax assets is contingent upon the generation of future taxable income. Due to the uncertainty of realization of these tax benefits, we have provided a valuation allowance for the full amount of its deferred tax assets.

## 9. Lease Commitments

We lease office facilities and office equipment under operating lease agreements. Rent expense for the year ended December 31, 2004 was approximately \$96,400.

Future minimum rental payments associated with non-cancelable lease obligations are as follows at December 31, 2004:

2005	\$104,431
2006	104,431
2007	8,703
	<u>\$217,565</u>

**10. Redeemable Preferred Stock***Series A*

On December 22, 2000, we entered into the Series A Preferred Stock Purchase Agreement (Purchase Agreement). The sale of Series A Preferred Stock was effected in three closings occurring during 2001. The first closing occurred simultaneous with the execution of the Purchase Agreement whereby we issued 6,923,290 shares of Series A Preferred Stock at \$0.7222 per share for gross proceeds of \$5 million, less offering costs of \$76,783. The second closing of the Purchase Agreement was executed on March 19, 2001, whereby we issued 1,841,591 shares of Series A Preferred Stock at \$0.7222 per share for gross proceeds of \$1,329,997, less offering costs of \$14,630. The third closing of the Purchase Agreement was executed on October 10, 2001, whereby we issued 3,615,343 shares of Series A Preferred Stock at \$0.7222 for gross proceeds of \$2,611,001, less offering costs of \$8,401.

The holders of Series A Preferred Stock are entitled to receive, when declared by our Board of Directors, cumulative dividends, accruing from the date of issuance at a rate of 8% per annum on each outstanding share of Series A Preferred Stock.

Each share of the Series A Preferred Stock is convertible into one share of common stock at the election of the holder, subject to certain anti-dilutive provisions. Conversions are automatic in the event of public offering of common stock in which the net proceeds to us are at least \$25 million or upon the closing of an acquisition or asset transfer resulting in gross cash proceeds of at least \$75.0 million. The holders of Series A Preferred Stock are entitled to one vote per share. Furthermore, the holders of Series A Preferred Stock are entitled to elect a certain number of members to the Board of Directors as well as vote on significant matters affecting us. In addition, the holders of Series A Preferred Stock have a liquidation preference in the event of our dissolution. The liquidation price is equal to the sum of the original issuance price per share of Series A Preferred Stock, plus any accrued and unpaid dividends. Holders of Series A Preferred Stock are entitled to redemption any time after the fifth anniversary of original issuance of the Series A Preferred Stock in two equal annual installments. The redemption price is equal to the sum of the original issuance price per share of Series A Preferred Stock, plus any accrued and unpaid dividends.

The difference between the redemption price of the Series A Preferred Stock and the carrying value of the Series A Preferred Stock is being accreted over the period from the issuance date to the redemption date using the effective-interest method.

In conjunction with the issuance of Series B shares described below, certain holders of common stock were entitled to convert shares of common stock to Series A Preferred Stock. The shares converted and the related carrying values of the common and preferred shares are as follows:

---

	<b>Shares Converted</b>	<b>Par Value Common Stock</b>	<b>Series A Preferred Stock</b>
2004	203,883	\$(204)	\$147,244

---

*Series A-1*

Pursuant to the issue of Series B Preferred Stock described below, we authorized 13,000,000 shares of Series A-1 Preferred Stock to convert the Series A Preferred Stock for stockholders who opted not to participate in the Series B Preferred Stock issue. Series A-1 Preferred Stock has the same dividend, redemption, and conversion features as Series A Preferred Stock, but is subordinated in liquidation. 214,631 shares of Series A Preferred Stock were converted to Series A-1 Preferred Stock during 2003.

Luna Technologies, Inc.

*Series B*

On March 31, 2003, we entered into the Series B Preferred Stock Purchase Agreement (Purchase Agreement). The sale of Series B Preferred Stock was effected in two closings. The first closing occurred simultaneous with the execution of the Purchase Agreement whereby we issued 26,618,308 shares of Series B Preferred Stock at \$0.055 per share for net proceeds of \$1,464,007. The second closing occurred during 2004 whereby we issued 26,209,218 additional shares of Series B Preferred Stock at \$0.055 per share for net proceeds of \$1,441,481.

The holders of Series B Preferred Stock are entitled to receive, when declared by our Board of Directors, cumulative dividends, accruing from the date of issuance at a rate of 8% per annum on each outstanding share of Series B Preferred Stock.

Each share of the Series B Preferred Stock is convertible into one share of common stock at the election of the holder, subject to certain anti-dilutive provisions. Conversions are automatic in the event of public offering of common stock in which the net proceeds to us are at least \$25 million or upon the closing of an acquisition or asset transfer resulting in gross cash proceeds of at least \$75 million. The holders of Series B Preferred Stock are entitled to one vote per share. Furthermore, the holders of Series B Preferred Stock are entitled to elect a certain number of members to the Board of Directors as well as vote on significant matters affecting us. In addition, the holders of Series B Preferred Stock have a liquidation preference in the event of our dissolution. The liquidation price is equal to the sum of the original issuance price per share of Series B Preferred Stock, plus any accrued and unpaid dividends. Holders of Series B Preferred Stock are entitled to redemption any time after the fifth anniversary of original issuance of the Series B Preferred Stock in two equal annual installments. The redemption price is equal to the sum of the original issuance price per share of Series B Preferred Stock, plus any accrued and unpaid dividends.

The difference between the redemption price of the Series B Preferred Stock and the carrying value of the Series B Preferred Stock is being accreted over the period from the issuance date to the redemption date using the effective-interest method.

## **11. Stockholders' Equity (Deficit)**

*Common Stock*

We have authorized 160 million shares of common stock with a \$0.001 par value. Dividends may be declared and paid on the common stock, subject in all cases to the rights and preferences of the holders of Series A and Series B Preferred Stock and to authorization by the Board of Directors. In the event of liquidation or winding up of Luna Technologies and after the payment of all preferential amounts required to be paid to the holders of Series A and Series B Preferred Stock, any remaining funds shall be distributed among the holders of the issued and outstanding common stock.

*Stock Options*

On September 7, 2000, we adopted the Luna Technologies, Inc. 2000 Incentive Stock Option Plan (the Plan) to provide for the granting of stock awards, such as stock options, to employees, directors and other individuals as determined by the Board of Directors. We have reserved 9,900,000 shares of common stock under the Plan. Stock options granted under the Plan may be either incentive stock options (ISOs) as defined by the Internal Revenue Code, or nonqualified stock options. The Board of Directors determines who will receive options under the Plan and determines the vesting period, which is generally five years. Options may have a maximum term of no more than 10 years. The exercise price of ISOs granted under the Plan shall not be less than 100% of the fair market value of the common stock on the date of grant. The Board of Directors determines the exercise price of nonqualified options.

[Table of Contents](#)

Luna Technologies, Inc.

Additional information with respect to stock option activity is summarized as follows for the year ended December 31, 2004:

	Shares	Weighted Average Exercise Price
Outstanding, beginning	6,594,955	\$0.02
Options granted	12,774,470	0.01
Options canceled or expired	(35,000)	0.01
Outstanding, ending	19,334,425	0.01
Options exercisable, ending	7,966,935	\$0.01

The following table summarizes information about stock options outstanding at December 31, 2004:

Options Outstanding			Options Exercisable		
Exercise Price	Number Outstanding	Weighted- Average Remaining Contractual Life (In Years)	Weighted- Average Exercise Price	Number Exercisable	Weighted- Average Exercise Price
\$0.01	19,069,425	5.70	\$0.01	7,757,379	\$0.01
0.03	150,000	0.98	0.03	131,250	0.03
0.15	115,000	6.52	0.15	78,306	0.15
	19,334,425	5.67	0.02	7,966,935	0.01

## 12. Employee Benefit Plan

Employees of Luna Technologies participate in a 401(k) retirement plan administered by The Principal Inc. Eligible employees may elect to contribute, on a tax-deferred basis, up to 100% of their compensation, not to exceed annual maximums as defined in the Internal Revenue Code. We match one-half of a participant's contribution up to 10% of the participant's compensation. Our contributions to the plan were approximately \$28,489, \$25,196 and \$33,385 for the year ended December 31, 2004 and nine months ended September 30, 2004 and 2005 (unaudited), respectively.

## 13. Royalty Agreement

We license certain technology from the National Aeronautics and Space Administration, which is used with, and incorporated in, the manufacture of certain products. We pay a 4.0% royalty on the gross sales of all products sold which incorporate the technology and record such amount as a cost of revenue. Royalty expenses under the agreement were \$61,905 for the year ended December 31, 2004 and nine months ended September 30, 2005.

## 14. Employment Agreement

During 2003, we entered into an employment agreement with our current president. The agreement provides for payment of a quarterly bonus of 50.0% of base salary if certain revenue milestones are met. The agreement also provides for stock option grants to purchase 3,584,955 shares of common stock.

Luna Technologies, Inc.

Additionally, the agreement provides for a severance payment of \$45,752 in the event of a change of control of Luna Technologies.

**15. Consulting Agreement**

We entered into an agreement which requires us to pay up to 5.0% of the value of a sale of Luna Technologies. This requirement expires July 29, 2006 and applies to any purchaser except a current stockholder, Luna Innovations Incorporated or a company owned by Luna Innovations Incorporated.

**16. Acquisition by Luna Innovations (unaudited)**

On September 30, 2005, Luna Innovations Incorporated acquired us pursuant to an agreement and plan of merger. Our common and redeemable preferred stock outstanding at the time of the transaction was retired, and we replaced it with 1,000 shares of common stock, \$0.001 par value, all of which is held by Luna Innovations Incorporated. The unaudited financial statements do not reflect the effects of the acquisition.

\* \* \* \* \*

Luna Innovations Incorporated

## **Introduction to unaudited pro forma consolidated financial statement**

The unaudited pro forma consolidated statement of operations for the year ended December 31, 2005 gives effect to our acquisition of all outstanding shares of Luna Technologies, Inc. ("Luna Technologies") as if it had occurred on January 1, 2005, combining the consolidated statement of operations of Luna Innovations Incorporated for the year ended December 31, 2005 and the unaudited statement of operations of Luna Technologies for the nine months ended September 30, 2005.

The unaudited pro forma consolidated balance sheet as of December 31, 2005 has not been presented because the acquisition was consummated on September 30, 2005, and the balance sheet impact of the acquisition is therefore reflected in our consolidated balance sheet as of December 31, 2005.

As described in Note 5 to the Luna Innovations audited consolidated financial statements included elsewhere herein, we acquired all of the outstanding shares of Luna Technologies that we did not already own on September 30, 2005.

The pro forma consolidated statement of operations is unaudited and does not purport to represent the consolidated results that would have been obtained had the transaction occurred at the date indicated or the results which may be obtained in the future. The unaudited pro forma consolidated statement of operations does not represent the results which may be obtained in the future because, we believe that overhead and other operating costs will not continue at the same level as a result of integration efforts and synergies related to infrastructure and distribution channels, among other factors. Therefore, the results of operations reflected in the unaudited pro forma consolidated statement of operations for the period presented are not necessarily indicative of the results of operations which may be obtained in the future.

The unaudited pro forma consolidated statement of operations should be read in conjunction with: (i) our audited consolidated financial statements included in this prospectus and (ii) the audited and unaudited financial statements of Luna Technologies included in this prospectus.

Luna Innovations Incorporated

**Unaudited pro forma consolidated statement of operations**

	Luna Innovations (Year Ended December 31, 2005)	Luna Technologies (Nine Months Ended September 30, 2005)	Pro forma adjustments	Pro forma consolidated (Year Ended December 31, 2005)
		(unaudited)	(unaudited)	(unaudited)
Revenues	\$ 16,453,888	\$ 2,204,196	\$ (15,871)	\$ 18,642,213
Cost of revenues	12,961,894	1,074,354	—	14,036,248
Gross profit	3,491,994	1,129,842	(15,871)	4,605,965
Operating expense	6,003,644	1,507,864	(14,485)	7,497,023
Operating income (loss)	(2,511,650)	(378,022)	(1,386)	(2,891,058)
Other income (expense)				
Interest income (expense), net	(41,251)	(12,217)	—	(53,468)
Miscellaneous (expense)	1,592	—	—	1,592
Total other (expense)	(39,659)	(12,217)	—	(51,876)
Income (loss) before income taxes	(2,551,309)	(390,239)	(1,386)	(2,942,934)
Income tax expense (benefit)	(557,252)	—	—	(557,252)
Net income (loss)	\$ (1,994,057)	\$ (390,239)	\$ (1,386)	\$(2,385,682)
Net income (loss) per share:				
Basic	\$(0.30)			\$(0.36)
Diluted	\$(0.30)			\$(0.36)
Weighted average shares outstanding:				
Basic	6,609,364			6,609,364
Diluted	6,609,364			6,609,364

*The accompanying notes are an integral part of this unaudited pro forma consolidated financial statement.*

Luna Innovations Incorporated

## **Notes to unaudited pro forma consolidated financial statement**

### **1. Basis of Presentation**

Our unaudited pro forma consolidated financial statement has been prepared using the purchase method of accounting. The unaudited pro forma combined statement of operations for the year ended December 31, 2005 illustrates the effect of the merger of Luna Technologies, Inc. as if it had occurred on January 1, 2005, and includes the historical statement of operations for Luna Technologies for the nine months ended September 30, 2005, combined with our audited consolidated statement of operations for the year ended December 31, 2005.

Certain reclassifications have been made to the historical presentation of Luna Technologies, Inc. for conformity with the pro forma consolidated presentation.



## PART II

### Information not required in prospectus

#### ITEM 13. Other Expenses of Issuance and Distribution

The following table sets forth the costs and expenses, other than the underwriting discount and commissions, payable by Luna Innovations Incorporated in connection with the sale of the common stock being registered hereby. All amounts are estimates except the SEC Registration Fee, the NASD filing fee and the Nasdaq National Market listing fee.

	<b>Amount to be Paid</b>
Securities and Exchange Commission registration fee	\$6,152.50
NASD filing fee	6,250.00
Nasdaq National Market listing fee	*
Blue Sky fees and expenses	*
Printing and engraving expenses	*
Legal fees and expenses	*
Accounting fees and expenses	*
Transfer agent and registrar fees	*
Miscellaneous	*
Total	*

\* To be filed by amendment

#### ITEM 14. Indemnification of Directors and Officers

Section 145(a) of the Delaware General Corporation Law provides that a Delaware corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation) by reason of the fact that such person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation or enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding if he or she acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no cause to believe his or her conduct was unlawful.

Section 145(b) of the Delaware General Corporation Law provides that a Delaware corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that such person acted in any of the capacities set forth above, against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection with the defense or settlement of such action or suit if he or she acted under similar standards, except that no indemnification may be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the court in which such action or suit was brought shall determine that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to be indemnified for such expenses which the court shall deem proper.

Information not required in prospectus

Section 145 of the Delaware General Corporation Law further provides that: (i) to the extent that a former or present director or officer of a corporation has been successful in the defense of any action, suit or proceeding referred to in subsections (a) and (b) or in the defense of any claim, issue or matter therein, such person shall be indemnified against expenses (including attorneys' fees) actually and reasonably incurred by him or her in connection therewith; (ii) indemnification provided for by Section 145 shall not be deemed exclusive of any other rights to which the indemnified party may be entitled; and (iii) the corporation may purchase and maintain insurance on behalf of any present or former director, officer, employee or agent of the corporation or any person who at the request of the corporation was serving in such capacity for another entity against any liability asserted against such person and incurred by him or her in any such capacity or arising out of his or her status as such, whether or not the corporation would have the power to indemnify him or her against such liabilities under Section 145.

Article X of our amended and restated certificate of incorporation and Article VIII of our proposed amended and restated certificate of incorporation provides for the indemnification of directors to the fullest extent permissible under Delaware law.

Article VI of our proposed amended and restated bylaws provides for the indemnification of officers, directors and third parties acting on our behalf if such person acted in good faith and in a manner reasonably believed to be in and not opposed to our best interest and, with respect to any criminal action or proceeding, the indemnified party had no reason to believe his or her conduct was unlawful.

We have entered into indemnification agreements with our directors, executive officers and others, in addition to indemnification provided for in our bylaws, and intend to enter into indemnification agreements with any new directors and executive officers in the future.

We have purchased and intend to maintain insurance on behalf of any person who is or was a director or officer against any loss arising from any claim asserted against him or her and incurred by him or her in any such capacity, subject to certain exclusions.

See also the undertakings set out in response to Item 17 herein.

**ITEM 15. Recent Sales of Unregistered Securities**

In the past three years, we have issued and sold the following securities as adjusted for the -for- stock split:

1. From September 22, 2003 through the date hereof, we have granted options to purchase 10,831,660 shares of our Class B Common Stock at a weighted average exercise price of \$0.43 per share, which included 7,506,910 shares of Class B Common Stock issuable upon exercise of options outstanding at an exercise price of \$0.20 per share, 200,000 shares of Class B Common Stock issuable upon exercise of options outstanding at an exercise price of \$0.22 per share, and 3,124,750 shares of Class B Common Stock issuable upon exercise of options outstanding at an exercise price of \$1.00 per share. As of December 31, 2005, 556,623 of these options had been exercised at a price of \$0.20 per share.
2. In May 2003, we issued warrants to purchase 183,120 shares of our Class B Common Stock at a price of \$0.001 per share. Those warrants were exercised on November 22, 2005.
3. In August 2005, we issued and sold to an accredited investor 2,639,688 shares of our Class C Common Stock at a price of \$2.65 per share.
4. In September 2005, we issued 1,227,637 shares of our Class B Common Stock (of which 196,403 shares were held in escrow as of the date of issuance) and warrants for 4,287 shares of our Class B Common Stock exercisable at \$21.06 per share to accredited investors (of which 686 warrant shares were held in escrow as of the date of issuance) in consideration for the acquisition of Luna Technologies, Inc. In October 2005 we issued additional warrants for 2,636 shares of Class B Common Stock exercisable at \$1.00 per share in connection with this transaction.

Information not required in prospectus

5. In December 2005, we issued and sold to an accredited investor 1,131,294 shares of our Class C Common Stock at a price of \$2.65 per share. In connection with the transaction we issued to the same accredited investor a series of senior convertible promissory notes convertible into 1,885,490 shares of common stock upon the conversion of the principal amount outstanding under the convertible notes and, assuming we elect to convert all of the accrued interest on these notes into shares of common stock after these notes remain outstanding for eight years, up to an additional 905,035 shares of common stock.
6. In February 2006, we issued warrants to purchase 101,773 shares of our Class B Common Stock at an exercise price of \$1.00 per share.

The sales of the above securities were deemed to be exempt from registration under the Securities Act with respect to items 1 through 6 above in reliance on Section 4(2) of the Securities Act, or Regulation D promulgated thereunder, and with respect to item 1 above also in reliance on, in full or in part, Rule 701 promulgated under Section 3(b) of the Securities Act as transactions by an issuer not involving a public offering or transactions pursuant to compensatory benefit plans and contracts relating to compensation as provided under such Rule 701. The recipients of securities in each such transaction represented their intention to acquire the securities for investment only and not with a view to or for sale in connection with any distribution thereof and appropriate legends were affixed to the share certificates and warrants issued in such transactions. All recipients had adequate access, through their relationships with us, to information about us.

**ITEM 16. Exhibits and Financial Statement Schedules**

- (a) Exhibits.

A list of exhibits filed herewith is contained in the exhibit index that immediately precedes such exhibits and is incorporated herein by reference.

**ITEM 17. Undertakings**

The undersigned Registrant hereby undertakes to provide to the underwriters at the closing specified in the Underwriting Agreement certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification by the Registrant for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the provisions described in Item 14 or otherwise, the Registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

The undersigned Registrant hereby undertakes that:

- (1) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.
- (2) For the purpose of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

## Signatures

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this Amendment No. 2 to the Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Roanoke, Commonwealth of Virginia, on the tenth day of April, 2006.

Luna Innovations Incorporated

By: /s/ KENT A. MURPHY  
Kent A. Murphy, Ph.D.  
President, Chief Executive Officer and Chairman

## Power of Attorney

KNOW ALL PERSONS BY THESE PRESENT, that each person whose signature appears below hereby constitutes and appoints Kent A. Murphy, Ph.D. and Scott A. Graeff, and each of them acting individually, as his true and lawful attorneys-in-fact and agents, with full power of each to act alone, with full powers of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to sign the Registration Statement filed herewith and any and all amendments to said Registration Statement (including post-effective amendments and any related registration statements thereto filed pursuant to Rule 462 or otherwise), and file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, with full power of each to act alone, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully for all intents and purposes as he might or could do in person, hereby ratifying and 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.

Pursuant to the requirements of the Securities Act of 1933, this Amendment No. 2 to the Registration Statement has been signed by the following persons in the capacities and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ KENT A. MURPHY</u> Kent A. Murphy, Ph.D.	President, Chief Executive Officer (Principal Executive Officer) and Chairman	April 10, 2006
<u>/s/ SCOTT A GRAEFF</u> Scott A. Graeff	Chief Financial Officer (Principal Financial and Accounting Officer) and Executive Vice President, Corporate Development	April 10, 2006
<u>/s/ N. LEIGH ANDERSON</u> N. Leigh Anderson, Ph.D.	Director	April 10, 2006
<u>*</u> John C. Backus, Jr.	Director	April 10, 2006
<u>/s/ BARBARA (BOBBIE) KILBERG</u> Barbara (Bobbie) Kilberg	Director	April 10, 2006

---

[Table of Contents](#)

<u>Signature</u>	<u>Title</u>	<u>Date</u>
* _____ Edward G. Murphy, M.D.	Director	April 10, 2006
* _____ Paul E. Torgersen, Ph.D.	Director	April 10, 2006
* _____ Richard W. Roedel	Director	April 10, 2006

\*By: /s/ KENT A. MURPHY  
\_\_\_\_\_  
Kent A. Murphy  
Attorney-in-fact

## Exhibit Index

Exhibit Number	Description
1.1*	Form of Underwriting Agreement
2.1**	Agreement and Plan of Merger, dated as of September 30, 2005, by and among Luna Innovations Incorporated, Luna Technologies Acquisition Corp., Luna Technologies, Inc. and certain stockholders
3.1	Amended and Restated Certificate of Incorporation of the Registrant as currently in effect
3.2**	Form of Amended and Restated Certificate of Incorporation of the Registrant to be effective upon closing of the offering
3.3**	Amended and Restated Bylaws of the Registrant as currently in effect
3.4**	Form of Amended and Restated Bylaws of the Registrant to be effective upon closing of the offering
4.1*	Specimen Common Stock certificate of the Registrant
4.2**	Form of Senior Convertible Promissory Note
4.3**	Warrant to Purchase 1,047 Shares of Class B Common Stock of Luna Innovations Incorporated, issued on September 30, 2005
4.4**	Warrant to Purchase 2,636 Shares of Class B Common Stock of Luna Innovations Incorporated, issued on November 11, 2005
4.5**	Warrant to Purchase 2,554 Shares of Class B Common Stock of Luna Innovations Incorporated, issued on September 30, 2005
4.6**	Form of Warrant to Purchase Shares of Common Stock of Luna Innovations Incorporated
4.7**	Form of Stock Option Agreement
5.1*	Opinion of Wilson Sonsini Goodrich & Rosati, Professional Corporation
10.1**	Form of Indemnification Agreement for directors and executive officers
10.2**	Employment Letter between Scott A. Graeff and Luna Innovations Incorporated dated April 14, 2005
10.3**	Employment Letter between Robert Lenk and Luna Innovations Incorporated dated August 13, 2005
10.4**	Employment Letter between John Goehrke and Luna Innovations Incorporated dated September 20, 2005
10.5**	Employment Letter between Kenneth Ferris and Luna Innovations Incorporated dated October 24, 2005
10.6**	Loan Agreement, dated as of November 10, 2005, by and between Luna Innovations Incorporated and First National Bank
10.7**	2003 Stock Plan
10.8**	Amended and Restated Investor Rights Agreement, dated December 30, 2005, by and among Luna Innovations Incorporated, Carilion Health System and certain stockholders
10.9*	2006 Equity Incentive Plan and forms of award agreements used thereunder
10.10**	Warehouse and Office Lease, dated June 2003, between Georgia Anne Snyder-Falkinham and Luna Innovations Incorporated (2851 Commerce Street, Blacksburg, Virginia)
10.11**	Lease Agreement between William M. Sterrett, Jr. Family Limited Partnership and Luna Innovations Incorporated (2903-A Commerce Street, Blacksburg, Virginia)
10.12**	Lease Agreement between William M. Sterrett, Jr. Family Limited Partnership and Luna Innovations Incorporated (2903-B Commerce Street, Blacksburg, Virginia)

---

---

[Table of Contents](#)

<b>Exhibit Number</b>	<b>Description</b>
10.13**	Lease Agreement, dated November 29, 1999, between William M. Sterrett, Jr. Family Limited Partnership and Luna Innovations Incorporated, as amended, November 27, 2001 (2903-C Commerce Street, Blacksburg, Virginia)
10.14**	Commercial Lease, dated March 17, 2003, between Canvasback Real Estate & Investments LLC and Luna Innovations Incorporated (705 Dale Avenue, Charlottesville, Virginia)
10.15**	Full Service Office Lease, dated August 2003, between Hampton R&D Properties, LLC and Luna Innovations Incorporated (130 Research Drive, Hampton, Virginia)
10.16**	Office Service Agreement, dated August 19, 2005, between Tysons Business Center, LLC and Luna Innovations Incorporated (8300 Greensboro Drive, McLean, Virginia)
10.17**	Lease, effective as of January 1, 2005, between the Industrial Development Authority of Danville and Luna Innovations Incorporated (521 Bridge Street, Danville, Virginia)
10.18**	Sublease, dated as of February 1, 2006, between Gryphon Capital Partners, LLC and Luna Innovations Incorporated (10 South Jefferson Street, Roanoke, Virginia)
10.19**	Lease, dated December 30, 2005, between Carilion Medical Center and Luna Innovations Incorporated (Riverside Center, Roanoke, Virginia)
10.20**	Modification of Lease, dated August 26, 2003, between Virginia Tech Foundation, Inc. and Luna Technologies, Inc. (2020 Kraft Drive, Blacksburg, Virginia)
10.21**	Grant Agreement, dated March 25, 2004, by and between the City of Danville, Virginia, and Luna Innovations Incorporated
10.22†**	License Agreement No. DN-982, dated June 10, 2002, by and between the National Aeronautics and Space Administration (NASA) and Luna Innovations Incorporated; Modification No. 1 to License Agreement No. DN-982, dated January 23, 2006, by and between NASA and Luna Innovations Incorporated
10.23†**	License Agreement No. DN-951, dated December 20, 2000, by and between NASA and Luna Technologies, Inc.
10.24†**	License Agreement No. DE-384, dated October 28, 2004, by and between NASA and Luna Technologies, Inc.
10.25†**	Fiber Optic Patent License, dated September 22, 2003, by and between United Technologies Corporation and Luna Innovations Incorporated
10.26†**	Amended and Restated License Agreement, dated March 19, 2004, by and between Virginia Tech Intellectual Properties, Inc. and Luna Innovations Incorporated
10.27	Industrial Lease Agreement, dated March 21, 2006, by and between Luna Innovations Incorporated and the Industrial Development Authority of Montgomery County, Virginia (3150 State Street, Blacksburg, Virginia)
10.28	Form of Stock Sale Restriction Letter Agreement
10.29	Form of Employee Management Stock Sale Restriction Letter Agreement
10.30	Joint Cooperation Agreement, dated June 6, 2005, by and between Luna Energy LLC and Luna Technologies, Inc.
10.31*	Class C Common Stock and Note Purchase Agreement, dated December 30, 2005, by and between Luna Innovations Incorporated and Carilion Health System.
10.32*	Member Interest Purchase Agreement, dated December 17, 2004, by and between Luna Innovations Incorporated and Baker Hughes Oilfield Operations, Inc.
21.1**	List of Subsidiaries
23.1	Consent of Grant Thornton LLP, Independent Registered Public Accounting Firm
23.2	Consent of Brown, Edwards & Company, L.L.P.
23.3*	Consent of Wilson Sonsini Goodrich & Rosati, Professional Corporation (See Exhibit 5.1)
24.1	Power of Attorney (See II-4)

---

\* To be filed by amendment.

\*\* Previously filed.

† Confidential treatment has been requested for certain provisions of this Exhibit pursuant to Rule 406 promulgated under the Securities Act.

**AMENDED AND RESTATED CERTIFICATE OF INCORPORATION  
OF  
LUNA INNOVATIONS INCORPORATED**

Kent A. Murphy hereby certifies that:

**ONE:** The original name of the corporation is Luna Innovations Incorporated and the Certificate of Incorporation of this corporation was first filed with the Secretary of State of the State of Delaware on April 4, 2003 and was amended and restated on August 1, 2003, August 2, 2005, September 30, 2005, December 30, 2005 and February 8, 2006.

**TWO:** He is the duly elected and acting President and Chief Executive Officer of Luna Innovations Incorporated, a Delaware corporation.

**THREE:** The Certificate of Incorporation of this corporation is hereby amended and restated to read as follows:

**ARTICLE I**

The name of the corporation is Luna Innovations Incorporated (the “**Corporation**”).

**ARTICLE II**

The address of the Corporation’s registered office in the State of Delaware is: Corporation Trust Center, 1209 Orange Street, Wilmington, New Castle County, Delaware 19801. The name of its registered agent at such address is: The Corporation Trust Company.

**ARTICLE III**

The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of Delaware (the “**DGCL**”).

**ARTICLE IV**

1. The Corporation is authorized to issue four classes of stock to be designated, respectively, “Class A Common Stock”, “Class B Common Stock”, “Class C Common Stock”, and “Common Stock.” The total number of shares of capital stock that the Corporation shall have authority to issue is 54,245,588, of which (i) 7,269,165 shares shall be Class A Common Stock, \$0.001 par value per share (“**Class A Common Stock**”), (ii) 15,694,940 shares shall be Class B Common Stock, \$0.001 par value per share (“**Class B Common Stock**”), (iii) 5,932,044 shares shall be Class C Common Stock, \$0.001 par value per share (“**Class C Common Stock**” and together with the Class A

---

Common Stock and Class B Common Stock, the “**Class Common Stock**”), and (iv) 25,349,439 shares shall be Common Stock, \$0.001 par value per share (“**Common Stock**”).

2. The holders of Common Stock, Class A Common Stock and Class C Common Stock shall have the right to vote for the election of members of the board of directors of the Corporation (the “**Board of Directors**”) and on all other matters requiring stockholder action. The Corporation’s Class B Common Stock shall be non-voting except to the extent otherwise required under the DGCL. Each share of Class A Common Stock and Class C Common Stock shall be entitled to the number of votes set forth in Article V below, and each share of Common Stock shall be entitled to one vote. Subject to the rights of the holders of the Class C Common Stock pursuant to Article V, Section 6 herein, the number of authorized shares of any class or classes of capital stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the capital stock of the Corporation entitled to vote, voting together as a single class, irrespective of the provisions of Section 242(b)(2) of the DGCL; *provided, however*, that the affirmative vote of a majority of the voting interests of all outstanding Class C Common Stock shall also be required to increase or decrease the number of authorized shares of Class C Common Stock.

3. Other than with respect to the voting rights of the Class A Common Stock, Class C Common Stock and Common Stock set forth above in this Article IV and other than as set forth in Article V with respect to the rights, preferences and privileges of the Class Common Stock, the holders of Class A Common Stock, the Class B Common Stock, the Class C Common Stock and the Common Stock shall be entitled to the same rights and privileges, and shall share equally on a per share basis in the distribution of any funds which the Board of Directors may declare or set aside or pay out as dividends, and shall share equally on a per share basis in the distribution of any and all dividends and in the distribution of assets in connection with a Liquidation Event (as defined in Article V below), whether voluntary or involuntary, and after the payment of all debts of the Corporation, and shall be alike in all other respects. Except as may otherwise be agreed by the holders of a majority of the voting interests of the Class C Common Stock then outstanding, the consideration per share paid for Class C Common Stock in connection with a Liquidation Event shall not be less than the consideration per share paid for Class A Common Stock in connection with such Liquidation Event; *provided further*, that no discount or reduction in the valuation of the Class C Common Stock shall be deemed to apply because of any difference between the voting rights of the Class C Common Stock and the voting rights of the Class A Common Stock, or because the Class C Common Stock is convertible in part into shares of Class B Common Stock.

4. Upon the automatic conversion of all outstanding shares of the Class Common Stock in accordance with the provisions of Article V, Section 4(c) of this Certificate of Incorporation (the “Certificate”), the Corporation shall immediately thereafter be authorized to issue two classes of stock, to be designated, respectively, “Common Stock” and “Preferred Stock.” The total number of shares which the Corporation shall have authority to issue is 105,000,000 shares, consisting of 100,000,000 shares of Common Stock, par value \$0.001 per share, and 5,000,000 shares of Preferred Stock, par value \$0.001 per share. The Board of Directors is authorized, subject to any limitations prescribed by law, to provide for the issuance of shares of Preferred Stock in series, and to establish from time to time the number of shares to be included in each such series, and to fix the designation, powers, preferences, and rights of the shares of each such series and any qualifications, limitations or restrictions thereof.

## ARTICLE V

The rights, privileges and restrictions and other matters relating to the Class Common Stock are as follows:

1. Definitions. For purposes of this Article V, the following definitions shall apply:

(a) “**Change of Control**” shall mean (a) the merger or consolidation of the Corporation with or into another entity in which the stockholders of the Corporation immediately

---

prior to such merger or consolidation own less than 50% of the voting securities of the surviving entity, (b) any other transaction or series of related transactions to which the Corporation is a party as a result of which the stockholders of the Corporation immediately prior to such transaction or series of related transactions own less than 50% of the voting securities of the Corporation or other surviving entity following such transaction or related transactions (other than the sale of equity securities by the Corporation in a capital raising transaction), or (c) a sale, lease or other conveyance of all or substantially all of the assets of the Corporation.

(b) “**Convertible Securities**” shall mean any evidences of indebtedness, shares or other securities convertible into or exchangeable for Common Stock.

(c) “**Corporation**” shall mean Luna Innovations Incorporated.

(d) “**Dividend Rate**” shall mean an annual rate of six percent (6%) of the Original Purchase Price.

(e) “**Initial Issue Date**” shall mean the first date of issuance of a share of Class C Common Stock.

(f) “**Liquidation Event**” shall mean (a) any Change of Control or (b) any liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary.

(g) “**Notes**” shall mean those certain Senior Convertible Promissory Notes issued by the Company in favor of the Investors named therein under that certain Class C Common Stock and Note Purchase Agreement by and between the Company and the Investors named therein on December 30, 2005.

(h) “**Original Purchase Price**” shall mean the \$2.65183 per share for the Class C Common Stock (subject to adjustment from time to time for Recapitalizations as set forth in Sections 4(e), (f), (g) and (h) herein).

(i) “**Qualified Change of Control**” shall mean a Change of Control that (A) involves a bona fide, arm’s length transaction with a third-party unaffiliated with the Corporation, the terms of which have been negotiated in good faith by the Corporation and such third-party, and (B) in respect of a stock purchase or merger, results in such third party acquiring one hundred percent (100%) of the voting securities (excluding options, warrants or other rights to purchase capital stock of the Corporation then outstanding) of the Corporation.

(j) “**Recapitalization**” shall mean any stock dividend, stock split, combination of shares, reorganization, recapitalization, reclassification or other similar event.

## 2. Dividends.

(a) Class C Common Stock. Beginning on the date of issuance of each share of Class C Common Stock, the holders of outstanding shares of such Class C Common Stock shall be entitled to receive cumulative dividends whether or not declared by the Board of Directors, out of

---

any assets at the time legally available therefor, at the Dividend Rate specified for such shares of Class C Common Stock payable in preference and priority to any declaration or payment of any dividend on any other class of Common Stock or any other class or series of capital stock of the Corporation. For the avoidance of doubt, no dividends shall be paid with respect to the Class A Common Stock, the Class B Common Stock, the Common Stock or any capital stock of the Corporation (i) at a rate greater than the Dividend Rate and (ii) until all accrued dividends on the Class C Common Stock have been paid in full. Payment of any dividends to the holders of the Class C Common Stock shall be on a pro rata, pari passu basis in proportion to the Dividend Rate for the Class C Common Stock. The right to receive dividends on each share of Class C Common Stock shall be cumulative beginning on the date of original issue of such share of Class C Common Stock and such dividends shall accrue and be payable in shares of Class B Common Stock (or, at the election of the Corporation, in cash) upon the earlier of the date on which (i) a Liquidation Event (as defined in Section 1(f)) occurs, (ii) such share is converted pursuant to any of the provisions of Section 4 of this Article V into Class A Common Stock, Class B Common Stock or Common Stock or (iii) such share is redeemed, provided, in each case, such dividends shall be due and payable at the time of such event out of assets legally available therefor.

(b) Additional Dividends. After the payment of the dividends described in Section 2(a) above, any additional dividends declared or paid in any fiscal year may be declared or paid to the holders of the Class A Common Stock, the Class B Common Stock, the Common Stock and/or other capital stock of the Corporation in proportion to the number of shares of Common Stock then outstanding; *provided, however*, that in no event shall any dividend be paid on the Class A Common Stock, Class B Common Stock or Common Stock and/or other capital stock of the Corporation (i) at a rate greater than the Dividend Rate and (ii) until all accrued but unpaid dividends on Class C Common Stock have been paid in full. Unless otherwise declared by the Board of Directors, the Class B Common Stock shall not be entitled to the declaration and payment of dividends.

(c) Non-Cash Dividends. Whenever a dividend provided for in this Section 2 shall be payable in property other than cash, the value of such dividend shall be deemed to be the fair market value of such property as determined in good faith by the Board of Directors.

(d) Waiver. The holders of the Class C Common Stock may waive any dividend preference that such holders shall be entitled to receive under this Section 2 upon the affirmative vote or action by written consent of the holders of a majority of the voting interests of the then-outstanding Class C Common Stock (voting or acting together as a single class) (such required holders being sometimes collectively referred to herein as the “ **Required Holders**”).

### 3. Voting

(a) Voting Generally. Except as otherwise expressly provided in this Amended and Restated Certificate of Incorporation or as required by law, the holders of Class A Common Stock, Class C Common Stock and Common Stock shall vote together and not as separate classes. The Class B Common Stock shall be non-voting except to the extent otherwise required under the DGCL. Except as otherwise expressly provided herein or as required by law, there shall be no series voting.

(b) Class A Common Stock Voting. Each holder of Class A Common Stock shall be entitled to the number of votes equal to the number of shares of Common Stock issuable upon conversion of the Class A Common as of the record date pursuant to Section 4 of this Article V. Except as otherwise contemplated herein or required by the DGCL, the holders of shares of the Class A Common Stock shall be entitled to vote on all matters requiring stockholder action. Holders of Class A Common Stock shall be entitled to notice of any stockholders' meeting in accordance with the Bylaws of the Corporation. Fractional votes shall not, however, be permitted and any fractional voting rights resulting from the above formula (after aggregating all shares into which shares of Class A Common Stock held by each holder could be converted), shall be rounded to the nearest whole number.

(c) Class C Common Stock Voting. Each holder of Class C Common Stock shall be entitled to the number of votes equal to the number of shares of Class A Common Stock issuable upon conversion of the Class C Common Stock as of the record date pursuant to Section 4 of this Article V. Except as otherwise contemplated herein or required by the DGCL, the holders of shares of the Class C Common Stock shall be entitled to vote on all matters requiring stockholder action. Holders of Class C Common Stock shall be entitled to notice of any stockholders' meeting in accordance with the Bylaws of the Corporation. Fractional votes shall not, however, be permitted and any fractional voting rights resulting from the above formula (after aggregating all shares into which shares of Class C Common Stock held by each holder could be converted), shall be rounded to the nearest whole number.

(d) Election of Directors.

(i) The size of the Board of Directors shall be established by the Bylaws of the Corporation. At each meeting or pursuant to each consent of the Corporation's stockholders for the election of directors:

(1) For so long as any shares of Class C Common Stock remain outstanding, the Required Holders of the Class C Common Stock, voting as a separate class distinct from any other series or class of securities issued by the Corporation, shall be entitled (A) if the size of the Board of Directors is seven (7) or less, to elect one (1) member of the Board of Directors, (B) if the size of the Board of Directors is greater than seven (7), to elect two (2) members of the Board of Directors (each such director, a "**Class C Director**"), (C) to remove any such Class C Director from office, and (D) to fill any vacancy caused by the resignation, death or removal of any such Class C Director; *provided, however*, that in the event that there are no shares of Class C Common Stock outstanding, such members of the Board of Directors shall be elected and removed by the holders of a majority of the outstanding shares of Class A Common Stock, voting as a separate class distinct from any other series or class of securities issued by the Corporation; and

(2) The holders of a majority of the outstanding shares of Class A Common Stock, voting as a separate class distinct from any other series or class of securities issued by the Corporation, shall be entitled to elect the remaining members of the Board of Directors, to remove such directors from office, and to fill any vacancy caused by the resignation, death or removal of such directors.

---

4. General Conversion Rights. Each share of Class Common Stock shall be convertible (the “**Conversion Rights**”) into that number of fully-paid, nonassessable shares of Common Stock or a particular Class Common Stock, as may be applicable, pursuant to the applicable Conversion Rate as provided herein; *provided, however*, no conversion of the Class C Common Stock into Common Stock shall be permitted under any circumstances except in connection with a Qualified IPO (as defined herein) pursuant to subsection 4(c) of this Article V. Notwithstanding anything to the contrary of the foregoing, for purposes of determining the number of votes per share of the Class A Common Stock and Class C Common Stock, such number of votes shall be equal to (i) with respect to the Class A Common Stock, the number of shares of Common Stock issuable upon conversion of such Class A Common Stock as of the record date pursuant to the then effective Class A Conversion Rate (as defined herein), and (ii) with respect to the Class C Common Stock, the number of shares of Class A Common Stock issuable upon conversion of such Class C Common Stock as of the record date pursuant to the then effective Primary Class C Conversion Rate (as defined herein), in either such case of (i) and (ii), notwithstanding the fact that such conversion was not otherwise permitted except in connection with a Qualified IPO. The number of shares of Common Stock into which each share of Class A Common Stock may be converted is hereinafter referred to as the “**Class A Conversion Rate**.” The number of shares of Common Stock into which each share of Class B Common Stock may be converted is hereinafter referred to as the “**Class B Conversion Rate**.” The number of shares of Class Common Stock (and thereafter into Common Stock) into which each share of Class C Common Stock may be converted is hereinafter referred to as the “**Class C Conversion Rate**” (and together with the Class A Conversion Rate and the Class B Conversion Rate, collectively the “**Conversion Rate**”).

(a) Conversion Rights of Class A Common Stock and Class B Common Stock. The Class A Conversion Rate shall entitle the holder of Class A Common Stock to convert such shares into that number of shares of Common Stock equal to the product of (x) the number of shares of Class A Common Stock held by such holder, multiplied by (y) the Class A Conversion Rate. For purposes of the Conversion Rights, the Class A Conversion Rate shall initially be equal to one (1), subject to further adjustment as may be required pursuant to subsections 4(e), (f), (g) and (h) of this Article V. The Class B Conversion Rate shall entitle the holder of Class B Common Stock to convert such shares into that number of shares of Common Stock equal to the product of (x) the number of shares of Class B Common Stock held by such holder, multiplied by (y) the Class B Conversion Rate. For purposes of the Conversion Rights, the Class B Conversion Rate shall initially be equal to one (1), subject to further adjustment as may be required pursuant to subsections 4(e), (f), (g) and (h) of this Article V. Notwithstanding anything to the contrary in this Article V, no conversion of the Class A Common Stock or the Class B Common Stock into Common Stock shall be permitted under any circumstances except in connection with a Qualified IPO (as defined herein) pursuant to Section 4(c) herein.

(b) Conversion Rights of Class C Common Stock. Each share of Class C Common Stock shall be convertible, at the option of the holder thereof, at any time after the date of issuance of such share at the office of the Corporation or any transfer agent for the Class C Common Stock, into that number of fully-paid, nonassessable shares of Class A Common Stock and Class B Common Stock (and thereafter into Common Stock) as provided herein. The Class C Conversion

---

Rate shall initially entitle the holder of Class C Common Stock to convert such shares into (A) that number of shares of Class A Common Stock equal to the product of (x) the number of shares of Class C Common Stock held by such holder, multiplied by (y) the Primary Class C Conversion Rate (as defined herein), plus (B) that number of shares of Class B Common Stock equal to the product of (x) the number of shares of Class C Common Stock held by such holder, multiplied by (y) the Secondary Class C Conversion Rate (as defined herein). Notwithstanding anything to the contrary in this Article V, no conversion of the Class C Common Stock into Common Stock (through an initial conversion into Class A Common Stock and Class B Common Stock) shall be permitted under any circumstances except in connection with a Qualified IPO (as defined herein) pursuant to Section 4(c) herein. The “ **Primary Class C Conversion Rate**” shall be equal to the number that, when multiplied by the total number of outstanding shares of Class C Common Stock, will result in the percentage of voting power determined under Sections 4(b)(i) or 4(b)(ii) below, as may be applicable; and the “ **Secondary Class C Conversion Rate**” shall be equal to the number that, when multiplied by the total number of outstanding shares of Class C Common Stock and added to the number of shares of Class A Common Stock into which such shares of Class C Common Stock are convertible, will result in the percentage of equity ownership of the Corporation on a fully-diluted basis determined under Sections 4(b)(i) or 4(b)(ii) below, as may be applicable).

(i) Except as provided below in Section 4(b)(ii) and subject to adjustments that may be required pursuant to Sections 4(e), (f), (g) and (h) of this Article V, the Primary Class C Conversion Rate and the corresponding Secondary Class C Conversion Rate shall equal those numbers (calculated pursuant to the formulas above to the sixth decimal place) which would result in (A) the aggregate voting interest of all outstanding shares of Class C Common Stock (together with all outstanding shares of Class Common Stock into which shares of Class C Common Stock have been converted) representing twenty-two and twenty-two hundredths of a percent (22.22%) of the aggregate voting interests of all outstanding capital stock of the Corporation (the “ **Percentage of Voting Power**” under this Section 4(b)(i)) and (B) the aggregate equity ownership interest of all outstanding shares of Class C Common Stock (together with all outstanding shares of Class Common Stock into which shares of Class C Common Stock have been converted) representing twenty and six hundredths of a percent (20.06%) of the total equity ownership of the Corporation (on a fully diluted basis assuming the exercise or conversion of all outstanding warrants, options, Class Common Stock or other securities convertible into Common Stock, but excluding any securities issued or issuable as dividends on the Class C Common Stock pursuant to Section 2(a) and any shares of Class B Common Stock issued or issuable upon conversion of the principal amount and accrued interest under the Notes) (the “ **Percentage of Equity Ownership**” under this Section 4(b)(i)).

(ii) Subject to adjustments that may be required pursuant to Sections 4(e), (f), (g) and (h) of this Article V, in the event that the entire outstanding principal amount of all of the Notes shall have been converted into shares of Class C Common Stock, the Primary Class C Conversion Rate and the corresponding Secondary Class C Conversion Rate shall equal those numbers (calculated pursuant to the formulas above to the sixth decimal place) which would result in (A) the aggregate voting interest of all outstanding shares of Class C Common Stock (together with all outstanding shares of Class Common Stock into which shares of Class C Common Stock have

been converted) representing thirty percent (30.0%) of the aggregate voting interests of all outstanding capital stock of the Corporation (the “ **Percentage of Voting Power**” under this Section 4(b)(ii)) and (B) the aggregate equity ownership interest of all outstanding shares of Class C Common Stock (together with all outstanding shares of Class Common Stock into which shares of Class C Common Stock have been converted) representing twenty-seven and twenty-nine hundredths percent (27.29%) of the total equity ownership of the Corporation (on a fully diluted basis assuming the exercise or conversion of all outstanding warrants, options, Class Common Stock or other securities convertible into Common Stock, but excluding any securities issued or issuable as dividends on the Class C Common Stock pursuant to Section 2(a) and any shares of Class B Common Stock issued or issuable upon conversion of the principal amount and accrued interest under the Notes) (the “ **Percentage of Equity Ownership**” under this Section 4(b)(ii)). In the event that a portion of the outstanding principal amount, but less than the entire outstanding principal amount, of all of the Notes shall have been converted into shares of Class C Common Stock, such shares of Class C Common Stock issued upon conversion of the Notes shall be deemed to be shares of Class B Common Stock for all purposes under this amended and restated certificate of incorporation until such time as the entire outstanding principal amount of all of the Notes shall have been converted into shares of Class C Common Stock, at which time all of such shares of Class C Common Stock issued upon conversion of the Note shall be treated as set forth in the first sentence of this **Section 4(b)(ii)**.

(c) Automatic Conversion of Class Common Stock. Each share of Class Common Stock shall automatically be converted into fully-paid, non-assessable shares of Common Stock at the then effective applicable Conversion Rate as provided herein.

(i) Automatic Conversion of Class A Common Stock and Class B Common Stock. Each such share of Class A Common Stock and Class B Common Stock shall automatically be converted into fully-paid, non-assessable shares of Common Stock at the then effective applicable Class A Conversion Rate and Class B Conversion Rate, respectively, immediately prior to the closing of a firm commitment underwritten initial public offering pursuant to an effective registration statement filed under the Securities Act of 1933, as amended (the “ **Securities Act**”), covering the offer and sale of any class or series of the Corporation’s Common Stock, provided that the offering price per share is not less than two (2) times the Original Purchase Price per share of the Class C Common Stock (as appropriately adjusted for Recapitalizations) and the aggregate gross proceeds to the Corporation (before the deduction of underwriters’ commissions and expenses) are not less than \$20 million (a “ **Qualified IPO**”) (such event a “**Class A/B Automatic Conversion Event**”).

(ii) Automatic Conversion of Class C Common Stock. In connection with either (x) a Qualified IPO, or (y) upon the receipt by the Corporation of a written request for conversion of the Class C Common Stock from the holders of a majority of the voting interests of the Class C Common Stock then outstanding, (with such class voting as a separate class) (each of the events referred to in (x) and (y) are referred to herein as a “ **Class C Automatic Conversion Event**”), each such share of Class C Common Stock shall automatically be converted into fully-paid, non-assessable shares of (A) Class A Common Stock at the then effective applicable Primary Class C Conversion Rate and Class B Common Stock at the then effective applicable Secondary

---

Class C Conversion Rate, respectively, and (B) with respect to a Qualified IPO only, immediately following such automatic conversion into Class A Common Stock and Class B Common Stock pursuant to the foregoing clause (A), each such share of Class A Common Stock and Class B Common Stock shall then automatically be converted into fully-paid, non-assessable shares of Common Stock at the then effective applicable Class A Conversion Rate and Class B Conversion Rate, respectively. For the avoidance of doubt, in the event of a Class C Automatic Conversion Event pursuant to a written request for conversion of the Class C Common Stock from the holders of a majority of the voting interests of the Class C Common Stock then outstanding (in accordance with clause (y) above), the Class A Common Stock and Class B Common Stock issued upon such Class C Automatic Conversion Event shall not thereafter be converted to Common Stock except in connection with a Qualified IPO.

(d) Mechanics of Conversion. No fractional shares of Common Stock shall be issued upon conversion of Class Common Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the then fair market value of a share of Common Stock as determined by the Board of Directors. For such purpose, all shares of Class Common Stock held by each holder of Class Common Stock shall be aggregated, and any resulting fractional share of Common Stock shall be paid in cash. Before any holder of Class Common Stock shall be entitled to convert the same into full shares of Class Common Stock or Common Stock, as may be applicable, and to receive certificates therefor: (i) such holder shall either (A) surrender the certificate or certificates therefor, duly endorsed, at the office of the Corporation or of any transfer agent for the Class Common Stock or Common Stock or (B) notify the Corporation or its transfer agent that such certificates have been lost, stolen or destroyed and execute an agreement reasonably satisfactory to the Corporation to indemnify the Corporation from any loss incurred by it in connection with such certificates; and (ii) such holder shall give written notice to the Corporation at such office that he elects to convert the same; provided, however, that on the date of a Class A/B Automatic Conversion Event or a Class C Automatic Conversion Event, as may be applicable, the outstanding shares of Class Common Stock shall be converted automatically pursuant to the terms of Section 4(c) without any further action by the holders of such shares and whether or not the certificates representing such shares are surrendered to the Corporation or its transfer agent; provided further, however, that the Corporation shall not be obligated to issue certificates evidencing the applicable shares of Class Common Stock and/or Common Stock issuable upon such Class A/B Automatic Conversion Event or Class C Automatic Conversion Event unless either the certificates evidencing such shares of Class Common Stock are delivered to the Corporation or its transfer agent as provided above, or the holder notifies the Corporation or its transfer agent that such certificates have been lost, stolen or destroyed and executes an agreement reasonably satisfactory to the Corporation to indemnify the Corporation from any loss incurred by it in connection with such certificates. On the date of the occurrence of a Class A/B Automatic Conversion Event or Class C Automatic Conversion Event in connection with a Qualified IPO, each holder of record of shares of Class Common Stock shall be deemed to be the holder of record of the Common Stock issuable upon such conversion, notwithstanding that the certificates representing such shares of Class Common Stock shall not have been surrendered at the office of the Corporation, that notice from the Corporation shall not have been received by any

---

holder of record of shares of Class Common Stock, or that the certificates evidencing such shares of Class Common Stock shall not then be actually delivered to such holder.

The Corporation shall, as soon as practicable after such delivery, or after such agreement and indemnification, issue and deliver at such office to such holder of Class Common Stock, (i) a certificate or certificates for the number of shares of Class Common Stock and/or Common Stock to which he shall be entitled as aforesaid and (ii) a check payable to the holder in the amount of any cash amounts payable as the result of a conversion into fractional shares of Class Common Stock and/or Common Stock, plus any accrued but unpaid dividends, whether or not declared, on the converted Class Common Stock or, in lieu of such dividends upon the written election of such holder, a number of shares of Class Common Stock equal to the aggregate dollar amount of such accrued but unpaid dividends divided by the applicable Conversion Rates for such Class Common Stock. Such conversion shall be deemed to have been made immediately prior to the close of business on the date of such surrender of the shares of Class Common Stock to be converted, and the person or persons entitled to receive the shares of Class Common Stock and/or Common Stock issuable upon such conversion shall be treated for all purposes as the record holder or holders of such shares of Class Common Stock and/or Common Stock, as may be applicable, on such date; provided, however, that if the conversion is in connection with an underwritten offer of securities registered pursuant to the Securities Act or a merger, sale, financing, or liquidation of the Corporation or other event, the conversion may, at the option of any holder tendering Class Common Stock for conversion, be conditioned upon the closing of such transaction or upon the occurrence of such event, in which case the person(s) entitled to receive the Class Common Stock and/or Common Stock issuable upon such conversion of the Class Common Stock shall not be deemed to have converted such Class Common Stock until immediately prior to the closing of such transaction or the occurrence of such event.

(e) Adjustments for Subdivisions or Combinations of Common Stock. In the event the outstanding shares of Common Stock shall be subdivided (by stock split, by payment of a stock dividend or otherwise), into a greater number of shares of Common Stock, the applicable Conversion Rate of the applicable Class Common Stock in effect immediately prior to such subdivision shall, concurrently with the effectiveness of such subdivision, be proportionately increased. In the event the outstanding shares of Common Stock shall be combined (by reclassification or otherwise) into a lesser number of shares of Common Stock, the applicable Conversion Rate of the applicable Class Common Stock in effect immediately prior to such combination prior to such combination shall, concurrently with the effectiveness of such combination, be proportionately decreased. The above notwithstanding, in no event shall any adjustment pursuant to this Section 4(e) have the effect of increasing or decreasing the aggregate voting interest of all shares of Class C Common Stock (expressed as a percentage of the aggregate voting interests of all outstanding capital stock of the Corporation) or the aggregate equity ownership interest of all shares of Class C Common Stock (expressed as a percentage of the total equity ownership of the Corporation, on a fully diluted basis assuming the exercise or conversion of all outstanding warrants, options, Class Common Stock or other securities convertible into Common Stock, but excluding any securities issued or issuable as dividends on the Class C Common Stock pursuant to Section 2(a) and any shares of Class B Common Stock issued or issuable upon

---

conversion of the principal amount and accrued interest under the Notes), as such percentages are set forth in Sections 4(b)(i) and 4(b)(ii).

(f) Adjustments for Subdivisions or Combinations of Class A Common Stock or Class B Common Stock. In the event the outstanding shares of Class A Common Stock or Class B Common Stock shall be subdivided (by stock split, by payment of a stock dividend or otherwise), into a greater number of shares of Class A Common Stock or Class B Common Stock, then (i) the Conversion Rate of the affected Class A Common Stock or Class B Common Stock, as applicable, in effect immediately prior to such subdivision shall, concurrently with the effectiveness of such subdivision, be proportionately decreased and (ii) the Conversion Rate of the affected Class C Common Stock in effect immediately prior to such subdivision shall, concurrently with the effectiveness of such subdivision, be proportionately increased. In the event the outstanding shares of Class A Common Stock or Class B Common Stock shall be combined (by reclassification or otherwise) into a lesser number of shares of Class A Common Stock or Class B Common Stock, then (i) the Conversion Rate of the affected Class A Common Stock or Class B Common Stock, as applicable, in effect immediately prior to such subdivision shall, concurrently with the effectiveness of such subdivision, be proportionately increased and (ii) the Conversion Rate of the affected Class C Common Stock in effect immediately prior to such combination shall, concurrently with the effectiveness of such combination, be proportionately decreased. The above notwithstanding, in no event shall any adjustment pursuant to this Section 4(f) have the effect of increasing or decreasing the aggregate voting interest of all shares of Class C Common Stock (expressed as a percentage of the aggregate voting interests of all outstanding capital stock of the Corporation) or the aggregate equity ownership interest of all shares of Class C Common Stock (expressed as a percentage of the total equity ownership of the Corporation, on a fully diluted basis assuming the exercise or conversion of all outstanding warrants, options, Class Common Stock or other securities convertible into Common Stock, but excluding any securities issued or issuable as dividends on the Class C Common Stock pursuant to Section 2(a) and any shares of Class B Common Stock issued or issuable upon conversion of the principal amount and accrued interest under the Notes), as such percentages are set forth in Sections 4(b)(i) and 4(b)(ii).

(g) Adjustments for Subdivisions or Combinations of Class C Common Stock. In the event the outstanding shares of Class C Common Stock shall be subdivided (by stock split, by payment of a stock dividend or otherwise), into a greater number of shares of Class C Common Stock, the Conversion Rate and Original Purchase Price of the affected Class C Common Stock in effect immediately prior to such subdivision shall, concurrently with the effectiveness of such subdivision, be proportionately decreased. In the event the outstanding shares of Class C Common Stock shall be combined (by reclassification or otherwise) into a lesser number of shares of Class C Common Stock, the Conversion Rate and Original Purchase Price of the affected Class C Common Stock in effect immediately prior to such combination shall, concurrently with the effectiveness of such combination, be proportionately increased. The above notwithstanding, in no event shall any adjustment pursuant to this Section 4(g) have the effect of increasing or decreasing the aggregate voting interest of all shares of Class C Common Stock (expressed as a percentage of the aggregate voting interests of all outstanding capital stock of the Corporation) or the aggregate equity ownership interest of all shares of Class C Common Stock (expressed as a percentage of the total equity

---

ownership of the Corporation, on a fully diluted basis assuming the exercise or conversion of all outstanding warrants, options, Class Common Stock or other securities convertible into Common Stock, but excluding any securities issued or issuable as dividends on the Class C Common Stock pursuant to Section 2(a) and any shares of Class B Common Stock issued or issuable upon conversion of the principal amount and accrued interest under the Notes), as such percentages are set forth in Sections 4(b)(i) and 4(b)(ii).

(h) Adjustments for Reclassification, Exchange and Substitution. If the Class Common Stock or Common Stock issuable upon conversion of the Class Common Stock shall be changed into the same or a different number of shares of any other class or classes of stock, whether by capital reorganization, reclassification or otherwise (other than a subdivision or combination of shares provided for above), then, in any such event, in lieu of the number of shares of Class Common Stock and Common Stock which the holders would otherwise have been entitled to receive, each holder of such Class Common Stock shall have the right thereafter to convert such shares of Class Common Stock into a number of shares of such other class or classes of stock which a holder of the number of shares of Common Stock deliverable upon conversion of such Class Common Stock immediately before that change would have been entitled to receive in such reorganization or reclassification, all subject to further adjustment as provided herein with respect to such other shares; *provided, however*, in no event shall any adjustment pursuant to this Section 4(h) have the effect of increasing or decreasing the aggregate voting interest of all shares of Class C Common Stock (expressed as a percentage of the aggregate voting interests of all outstanding capital stock of the Corporation) or the aggregate equity ownership interest of all shares of Class C Common Stock (expressed as a percentage of the total equity ownership of the Corporation, on a fully diluted basis assuming the exercise or conversion of all outstanding warrants, options, Class Common Stock or other securities convertible into Common Stock, but excluding any securities issued or issuable as dividends on the Class C Common Stock pursuant to Section 2(a) and any shares of Class B Common Stock issued or issuable upon conversion of the principal amount and accrued interest under the Notes), as such percentages are set forth in Sections 4(b)(i) and 4(b)(ii).

(i) Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of the applicable Conversion Rate pursuant to this Section 4, the Corporation at its expense shall promptly compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of Class Common Stock a certificate setting forth such adjustment or readjustment and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, upon the written request at any time of any holder of Class Common Stock, furnish or cause to be furnished to such holder a like certificate setting forth (i) such adjustments and readjustments, (ii) the Conversion Rate at the time in effect and (iii) the number of shares of Class Common Stock and Common Stock, as may be applicable, and the amount, if any, of other property which at the time would be received upon the conversion of Class Common Stock.

(j) Waiver of Adjustment of Primary Class C Conversion Rate. Notwithstanding anything herein to the contrary, any adjustment of the Class C Conversion Rate of the Class C Common Stock may be waived by the consent or vote of the holders of the majority of the outstanding shares of Class C Common Stock either before or after the event causing the adjustment.

---

(k) Reservation of Stock Issuable Upon Conversion. The Corporation shall at all times reserve and keep available out of its authorized but unissued shares of Class A Common Stock, Class B Common Stock and Common Stock, for the purpose of effecting the conversion of the shares of the Class Common Stock, such number of its shares of Class A Common Stock, Class B Common Stock and Common Stock as shall from time to time be sufficient to effect the conversion of all then outstanding shares of the Class Common Stock.

5. Redemption.

(a) At any time after the six (6) year anniversary of the Initial Issue Date, at the election of the Required Holders of the Class C Common Stock upon prior written notice to the Corporation of at least one hundred twenty (120) days prior to the proposed date for redemption (the “**Redemption Date**”), this Corporation shall redeem, out of funds legally available therefor, all (but not less than all) of the outstanding shares of Class C Common Stock which have not been converted into Common Stock pursuant to Section 4 hereof. The Corporation shall redeem the shares of the Class C Common Stock by paying in cash an amount per share equal to the applicable Original Purchase Price for each share of Class C Common Stock, plus an amount equal to all accrued but unpaid dividends thereon, whether or not declared or earned, accrued up to and including the date such share is actually redeemed (collectively, the “**Redemption Price**”). Notwithstanding the foregoing, to the extent that the Corporation may not legally redeem such shares of Class C Common Stock, such redemption shall take place as soon as legally permitted; *provided, further*, that if the funds legally available for redemption of the Class C Common Stock shall be insufficient to permit the payment to such holders of the full respective Redemption Prices, the Corporation shall effect such redemption pro rata among the holders of such Class C Common Stock so that each holder of such Class C Common Stock shall receive a redemption payment equal to a fraction of the aggregate amount available for redemption, the numerator of which is the number of shares of Class C Common Stock held by such holder, and the denominator of which is the total number of shares of Class C Common Stock outstanding. To the extent that the Corporation’s available cash flow does not permit such redemption, and to the extent permitted by law, the remainder (if any) shall be paid as soon as practicable and no other dividends or distributions to other holders of any of the Corporation’s capital stock shall be made until all of the Class C Common Stock has been fully redeemed.

(b) Any redemption effected pursuant to Section 5(a) shall be made on a pro rata basis among the holders of the Class C Common Stock in proportion to the number of shares of Class C Common Stock then outstanding.

(c) At least thirty (30) days prior to each Redemption Date, written notice shall be mailed, first class postage prepaid, to each holder of record (at the close of business on the business day next preceding the day on which notice is given) of the Class C Common Stock to be redeemed, at the address last shown on the records of the Corporation for such holder, notifying such holder of the redemption to be effected, specifying the number of shares to be redeemed from such holder, the Redemption Date, the Redemption Price, the place at which payment may be obtained and calling upon such holder to surrender to the Corporation, in the manner and at the place designated, the holder’s certificate or certificates representing the shares to be redeemed (the “**Redemption**

---

**Notice**”). Except as provided herein, on or after the Redemption Date each holder of Class C Common Stock to be redeemed shall surrender to this Corporation the certificate or certificates representing such shares, in the manner and at the place designated in the Redemption Notice, and thereupon the Redemption Price of such shares shall be payable to the order of the person whose name appears on such certificate or certificates as the owner thereof and each surrendered certificate shall be cancelled. In the event less than all the shares represented by any such certificate are redeemed, a new certificate shall be issued representing the unredeemed shares.

(d) If the funds of the Corporation legally available for redemption of shares of Class C Common Stock on any Redemption Date are insufficient to redeem the total number of shares of Class C Common Stock to be redeemed on such date, those funds which are legally available will be used to redeem the maximum possible number of such shares ratably among the holders of such shares to be redeemed based upon their holdings of Class C Common Stock pursuant to Section 5(a). The shares of Class C Common Stock not redeemed shall remain outstanding and entitled to all the rights and preferences provided herein. Subject to Section 5(a) and Section 5(e), at any time thereafter when additional funds of the Corporation are legally available for the redemption of shares of Class C Common Stock such funds will immediately be used to redeem the balance of the shares which the Corporation has become obliged to redeem on any Redemption Date, but which it has not redeemed.

(e) In the event the Board of Directors determines by less than a unanimous vote that the funds legally available for redemption of the Class C Common Stock are insufficient to redeem the total number of shares of Class C Common Stock, then the Board of Directors shall appoint an *ad-hoc* committee of its disinterested (for such purpose, any person beneficially owning shares of the Corporation’s capital stock shall be deemed interested) members to make a further study of the issue and to retain separate legal counsel to advise and opine on the issue and then to report back to the full Board of Directors on its findings and the advice and opinion of the separate legal counsel.

6. Protective Provisions. As long as any issued shares of Class C Common Stock remain outstanding, the Corporation shall not, without first obtaining the approval (by vote or by written consent as provided by law) of the Required Holders of the Class C Common Stock:

(a) amend, alter, change or repeal any provision of the Certificate of Incorporation if such action would alter or change or affect the rights, preferences, privileges or powers of, or restrictions provided for the benefit of the Class A Common Stock, the Class B Common Stock or the Class C Common Stock;

(b) increase or decrease (other than for decreases resulting from conversion of the Class C Common Stock) the authorized number of, or otherwise issue, shares of Class A Common Stock, Class B Common Stock or Class C Common Stock (other than shares of Common Stock issued after approval by the compensation committee of the Board of Directors pursuant to an employee incentive plan authorized by the Board of Directors or unanimously by such compensation committee, and other than shares of Class Common Stock issued upon conversion of the principal amount and accrued interest under the Notes);

(c) authorize or declare any dividends on the Class A Common Stock, the Class B Common Stock or any other shares of capital stock of the Corporation other than the Class C Common Stock;

(d) take any action that results in the redemption of any shares of capital stock of the Corporation (other than (i) the Class C Common Stock as provided herein, (ii) pursuant to agreements between the Corporation and its employees that have been approved by the compensation committee of the Board of Directors, or (iii) in connection with any party's exercise of the Put Right as defined in and pursuant to that certain Agreement and Plan of Merger dated on or around September 30, 2005, by and among the Corporation, Luna Technologies Acquisition Corp., Luna Technologies, Inc. and the Principal Stockholders identified on Annex A thereto); and

(e) create, by reclassification or otherwise, any class or series of shares.

7. Reissuance of Class Common Stock. In the event that any shares of Class Common Stock shall be converted pursuant to Section 4, redeemed pursuant to Section 5 or otherwise repurchased by the Corporation, the shares so converted, redeemed or repurchased shall be cancelled and shall not be issuable by this Corporation.

8. Notices. Any notice required by the provisions of this Article V to be given to the holders of Class Common Stock shall be deemed given five (5) business days after deposit, postage pre-paid, with first class mail (which must be sent by certified mail, return receipt requested), in the United States mail, and addressed to each holder of record at such holder's address appearing on the books of the Corporation.

9. Special Meetings. Effective upon the closing of a firm commitment underwritten public offering of Common Stock of the Corporation, special meetings of stockholders of the Corporation may be called only by the Chairman of the Board of Directors, the Chief Executive Officer of the Corporation, or the Board of Directors acting pursuant to a resolution adopted by a majority of the Board of Directors and any power of stockholders to call a special meeting is specifically denied. Only such business shall be considered at a special meeting of stockholders as shall have been stated in the notice for such meeting.

10. Advance Notice Provisions. Effective upon the closing of a firm commitment underwritten public offering of Common Stock of the Corporation, advance notice of stockholder nominations for the election of directors and of business to be brought by stockholders before any meeting of the stockholders of the Corporation shall be given in the manner provided in the Bylaws of the Corporation.

## ARTICLE VI

The Corporation is to have perpetual existence.

## ARTICLE VII

In furtherance and not in limitation of the powers conferred by statute, the Board of Directors of the Corporation is expressly authorized to adopt, amend or repeal the Bylaws of the Corporation, provided that such action does not conflict with the provisions of this Amended and Restated Certificate of Incorporation or the provisions of any written agreement between the Corporation and any of its stockholders.

## ARTICLE VIII

1. The number of directors which constitute the Board of Directors of the Corporation shall be as designated or provided for in the Bylaws of the Corporation.

2. The provisions of this paragraph shall be effective upon the closing of a firm commitment underwritten public offering of Common Stock of the Corporation and subject to the rights of the holders of any series of Preferred Stock to elect additional directors under specified circumstances. The Board of Directors shall be divided into three classes, the members of each class to serve for a term of three years; provided that the directors shall be elected as follows: at the first annual meeting of the stockholders held following the closing of a firm commitment underwritten public offering of Common Stock of the Corporation, the directors in the first class shall be elected for a term of three years, at the second annual meeting following such date, the directors in the second class shall be elected for a term of three years, and at the third annual meeting following such date, the directors in the third class shall be elected for a term of three years. The Board of Directors by resolution shall nominate the directors to be elected for each class. At subsequent annual meetings of stockholders, a number of directors shall be elected equal to the number of directors with terms expiring at that annual meeting. Directors elected at each such subsequent annual meeting shall be elected for a term expiring with the annual meeting of stockholders three years thereafter.

3. The provisions of this paragraph shall be effective upon the closing of a firm commitment underwritten public offering of Common Stock of the Corporation and subject to the rights of the holders of any series of Preferred Stock then outstanding. Any director may be removed from office by the stockholders of the Corporation only for cause. Unless the Board of Directors otherwise determines, newly created directorships resulting from any increase in the authorized number of directors or any vacancies in the Board resulting from death, resignation, retirement, disqualification, removal from office or other cause shall, unless otherwise provided by law or by resolution of the Board of Directors, be filled only by a majority vote of the directors then in office, whether or not less than a quorum, and directors so chosen shall hold office until such director's successor is elected and qualified. No reduction in the authorized number of directors shall have the effect of removing any director before such director's term of office expires.

4. The election of directors need not be by written ballot unless the Bylaws of the Corporation shall so provide.

---

## ARTICLE IX

Effective upon the closing of a firm commitment underwritten public offering of Common Stock of the Corporation, the Board of Directors is expressly empowered to adopt, amend or repeal any of the Bylaws of the Corporation. Any adoption, amendment or repeal of the Bylaws of the Corporation by the Board of Directors shall require the approval of a majority of the Board of Directors. The stockholders shall also have power to adopt, amend or repeal the Bylaws of the Corporation; provided, however, that, in addition to any vote of the holders of any class or series of stock of the Corporation required by law or by this Certificate, the affirmative vote of the holders of at least 66 <sup>2</sup>/<sub>3</sub>% of the voting power of the then outstanding shares of voting stock entitled to vote generally in the election of directors, voting together as a single class, shall be required to adopt, amend or repeal all or any portion of Article II, Section 3.2, Section 3.3, Section 3.4, Section 3.14, Article VI or Article IX of the Bylaws of the Corporation.

## ARTICLE X

1. *Limitation of Director's Liability.* To the fullest extent permitted by the DGCL as the same exists or may hereafter be amended, a director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director of the Corporation.

2. *Indemnification of Directors and Officers.* To the fullest extent permitted by applicable law, the Corporation is authorized to provide indemnification of, and advancement of expenses to, directors, officers, employees, other agents of the Corporation and any other persons to which the DGCL permits the Corporation to provide indemnification.

3. *Repeal or Modification.* Neither the repeal, modification nor amendment of this Article X, whether by amendment of this Article X, by the adoption of any provision of the Corporation's Certificate of Incorporation inconsistent with this Article X or by operation of law, shall adversely affect any right or protection of a director, officer, employee or other agent of the Corporation existing at the time of, or increase the liability of any such person with respect to any acts or omissions in their capacity as a director, officer, employee, or other agent of the Corporation occurring prior to such repeal, amendment or modification.

## ARTICLE XI

Effective upon the closing of a firm commitment underwritten public offering of Common Stock of the Corporation, the Corporation reserves the right to amend or repeal any provision contained in this Certificate in the manner prescribed by the laws of the State of Delaware and all rights conferred upon stockholders are granted subject to this reservation; provided, however, that, notwithstanding any other provision of this Certificate, or any provision of law that might otherwise permit a lesser vote or no vote, but in addition to any vote of the holders of any class or series of the stock of this Corporation required by law or by this Certificate, the affirmative vote of the holders of at least 66 <sup>2</sup>/<sub>3</sub>% of the voting power of the then outstanding shares of voting stock entitled to vote generally in the election of directors, voting together as a single class, shall be required to amend or repeal this Article XI, Section 9 of Article V, Section 10 of Article V, Article VII, Article VIII, Article IX or Article X.

**FOUR:** This Amended and Restated Certificate of Incorporation has been duly approved by the Board of Directors of the Corporation.

**FIVE:** This Amended and Restated Certificate of Incorporation was approved by the holders of the requisite number of shares of capital stock of the Corporation in accordance with Section 228 of the DGCL. This Amended and Restated Certificate of Incorporation has been duly adopted in accordance with the provisions of Sections 242 and 245 of the DGCL by the stockholders of the Corporation.

\* \* \*

---

**IN WITNESS WHEREOF, LUNA INNOVATIONS INCORPORATED** has caused this Amended and Restated Certificate of Incorporation to be signed by its President and Chief Executive Officer this 4<sup>th</sup> day of April, 2006.

**LUNA INNOVATIONS INCORPORATED**

By: /S/ KENT A. MURPHY

---

Kent A. Murphy  
President and Chief Executive Officer

**INDUSTRIAL LEASE AGREEMENT**  
**BETWEEN**  
**LUNA INNOVATIONS INCORPORATED**  
**AS TENANT**  
**AND**  
**THE INDUSTRIAL DEVELOPMENT AUTHORITY**  
**OF MONTGOMERY COUNTY, VIRGINIA**  
**AS LANDLORD**

---

## INDUSTRIAL LEASE AGREEMENT

THIS LEASE (the "Lease" or "Agreement") is made and effective as of this 21<sup>st</sup> day of March, 2006, by and between The Industrial Development Authority of Montgomery County, Virginia ("Landlord"), a public body corporate, having a principal place of business at 755 Roanoke Street, Suite 2 H, Christiansburg, Virginia 24073, and Luna Innovations Incorporated, ("Tenant"), a Virginia Corporation having a principal place of business at 10 South Jefferson Street, Suite 130, Roanoke, Virginia 24011.

WHEREAS, Landlord is the owner of certain real property located in the Town of Blacksburg, Virginia, upon which Landlord has built a 109,000 sq. ft Technology Manufacturing Building (the "Building"), containing fifteen (15) acres situated in the Blacksburg Industrial Park, 3150 State Street, Blacksburg, VA 24060;

WHEREAS, Tenant desires to lease and occupy 31,300 square feet of the Building as shown on the attached diagram identified as Exhibit A entitled "Luna Innovations Lease Floor Plan Technology Manufacturing Building (Leased area in Red & Common Area in Blue)" (the "Premises") if the Landlord is willing to lease the said Premises to the Tenant; and

WHEREAS, Landlord is willing to lease the said Premises to the Tenant subject to and in accordance with the terms and conditions set forth below.

NOW, THEREFORE, in consideration of the rents, covenants and agreements herein set forth, and for other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

### **1. PREMISES AND TERM.**

1.1 Premises. In consideration of the obligations of Landlord and Tenant set forth herein, Landlord leases to Tenant, and Tenant hereby takes from Landlord the Premises identified on Exhibit A situated on real property owned by the Landlord within the Town of Blacksburg, County of Montgomery, State of Virginia more particularly described on Exhibit B attached hereto and incorporated herein by reference (the "Property") together with all rights, privileges, easements, appurtenances, and amenities belonging to or in any way pertaining to the Premises, to have and to hold, subject to the terms, covenants and conditions of this Lease. Without limiting the foregoing, Tenant shall have the right, as appurtenant to the Premises, to use the driveways, parking, rear drive through door in the warehouse area of the Building and other common areas on the Property. As used in this Lease, Tenant's "Proportionate Share" shall mean a fraction the numerator of which shall be the square footage of the Premises (31,300 s.f.) and the denominator of which shall be the square footage of the Building (109,000 s.f.).

1.2 Term. The term of this Lease (the "Term") shall commence on the later of (i) May 1, 2006 or (ii) the first day of the month following the completion of the improvements described in Sections 1.3 and 1.4, and reflected on Exhibit C and Exhibit D attached hereto (the "Commencement Date"), and shall expire as of September 30, 2012, unless terminated sooner, renewed or extended as provided herein. Notwithstanding the fact that the Commencement Date is subsequent to the effective date of this Lease, the parties agree that each

---

have vested rights hereunder and that this Lease constitutes a binding and valid obligation of each as of the date this Lease is fully executed. In the event the Term has not commenced by December 31, 2006 ("Completion Deadline Date") because the improvements reflected on Exhibit C and Exhibit D have not been completed, Tenant may terminate this Lease and receive an immediate return of the Letter of Credit, as defined in Section 3.1.4; provided that for each day the completion of the improvements on Exhibit C and Exhibit D is delayed due to the actions of Tenant, the Completion Deadline Date shall be extended by the same number of days.

1.3 Acceptance of the Premises. By taking possession of the Premises, Tenant acknowledges that: (i) it has inspected the Premises; (ii) it accepts the Premises as is, except for the separation improvements as indicated on Exhibit C to be installed by Landlord at Landlord's cost prior to the Commencement Date, in order to provide separate boundaries between the different tenants in the Building and the agreed upon Upfits in Section 1.4 which are indicated on Exhibit D attached hereto, (iii) the Premises are suitable for the purpose for which the Premises are leased; and (iv) except as otherwise set forth in this Lease (including all exhibits and attachments), no representations or warranties have been made by Landlord with respect to the Premises. Prior to the Commencement Date, it is acknowledged and agreed by Landlord that Tenant may take possession of and use the administrative offices; provided that in the event the Tenant occupies all the administrative offices, installs telephone and internet services and begins conducting permanent business from said offices, Tenant shall pay Landlord rent on the administrative office space at the annual rate of \$6.00 per sq. ft.

1.4 Upfit Allowance. The Landlord shall provide the Tenant with an improvement allowance of \$15.00 per sq. ft. for a maximum Up-fit allowance of Four Hundred Sixty Nine Thousand Five Hundred Dollars (\$469,500) (the "Up-fit Allowance"). Landlord and Tenant agree that should the Tenant's desired improvements exceed the Up-fit Allowance, the Tenant shall provide to the Landlord the additional funds required to pay for the additional improvements. Should the desired improvements by the Tenant exceed the Up-fit Allowance, the Landlord shall have no obligation to enter into any contract for the agreed upon Up-fit work until such time that the Tenant provides the additional funds in excess of the Up-fit Allowance. Should the Tenant not provide the Landlord with the additional funds in excess of the Up-fit Allowance within five (5) calendar days of receiving written notice from the Landlord that the funds are due, the Landlord may deem the Tenant in default and the Landlord may, in addition to any other remedy available, use the deposit money and/or Letter of Credit to pay all the architectural and engineering fees incurred up to the date of default. The list of improvements to be preformed by the Landlord prior to Commencement Date are indicated on Exhibit D and are incorporated herein as a part of this Lease.

## **2. RENEWAL; EXTENSION; SURRENDER**

### **2.1 Renewal.**

2.1.1 Tenant shall have the option to renew this Lease for an additional term of five (5) years on the same terms, covenants and conditions set forth herein (the "Renewal Term"); provided (i) that this Lease is in full force and effect immediately prior to the date of the commencement of the Renewal Term and that the Tenant is not in default, beyond applicable cure periods, under any of the provisions of this Lease at the time option to renew is exercised by Tenant, (ii) that the Base Rent for the first year of the Renewal Term shall be increased by the percentage increase in the CPI (as defined hereinafter) during the period from October 1, 2007 to September 30, 2012, and the Base Rent for each lease year thereafter during the Renewal Term shall

---

increase by the percentage increase in the CPI (as defined hereinafter) during the preceding lease year, and (iii) the Common Area Maintenance Fee shall be subject to adjustment as provided in Section 8.1.1 The term "CPI" shall mean the Consumer Price Index published by the Bureau of Labor Statistics of the United States Department of Labor, U.S. City Average, All Items and Major Group Figures for Urban Wage Earners and Clerical Workers (1982-84 = 100), or if such index is not available, a comparable index selected by Landlord and Tenant which is published by a governmental institution or a nationally recognized publisher of statistical information.

2.1.2 Tenant's desire to renew this Lease for the Renewal Term set forth above shall be expressed, if at all, by delivery of written notice (the "Renewal Notice") to Landlord no later than 240 days prior to expiration of the initial term. Time shall be of the essence with respect to Tenant's Renewal Notice.

2.2 Extension By Mutual Consent. If Tenant lawfully occupies the Premises after the end of the Term or the Renewal Term, after having requested and obtained Landlord's written consent to do so, this Lease and all its terms, provisions, conditions, covenants, waivers, remedies and any and all of Landlord's rights herein specifically given and agreed to, shall be in force for one month thereafter and thereafter from month-to-month until either party gives the other thirty (30) days written notice of its desire to terminate this Lease.

2.3 Surrender. At the expiration of this Lease (including any renewal or extension) or the sooner termination thereof, Tenant shall surrender the Premises to Landlord, together with all additions, alterations and improvements thereto, in broom clean condition and in good order and repair except for ordinary wear and tear, casualty damage not caused by Tenant, and Landlord's maintenance obligations. Nothing herein, however, shall prohibit Tenant from removing any of its computers, voice and data network components, phone system components, phone switch, TV's and other video equipment, satellite antennae, office equipment, furniture, office supplies, storage racks compressors, vacuum, wastewater and manufacturing equipment and other personal property (collectively "Tenant Equipment") in accordance with the terms of this Lease. Tenant shall repair any damage to the Premises caused by the removal of such Tenant Equipment. Any Tenant Equipment not removed by Tenant as permitted herein shall be deemed abandoned thirty (30) days after the expiration or earlier termination of the Lease, and may be stored, removed and disposed of by Landlord in its discretion, and Tenant waives all claims against Landlord for any damages resulting from Landlord's retention or disposal of same. Tenant shall be entitled to no payment or offset for the value of any abandoned property (even if sold by Landlord) and Tenant shall pay on demand all reasonable costs incurred by Landlord in connection with such removal or disposal. No retention, disposal or sale of such abandoned property shall limit remedies otherwise available to Landlord hereunder for a breach of this Agreement by Tenant. All obligations of Tenant hereunder not fully performed as of the termination or expiration of the Lease shall survive such termination or expiration, until they are performed.

2.4 Holding Over. If Tenant occupies the Premises beyond the Term of this Lease or the properly exercised Renewal Term, without Landlord's written consent (a "Hold Over"), Tenant shall be deemed to occupy the Premises as a tenant at sufferance, and all of the terms and provisions of this Lease shall be applicable during that period, except that Tenant shall pay Landlord a rental equal to one hundred twenty-five percent (125%) of the monthly Base Rent applicable hereunder at the expiration of the Term or applicable Renewal Term, prorated for the number of days of such holding over. If Tenant refuses to vacate, Landlord

---

may institute a forcible detainer or similar action against Tenant or any other party in possession of the Premises or pursue any other remedy available at law or in equity.

### **3. PAYMENT OF RENT**

#### **3.1 Payment; Proration.**

3.1.1 Payment. Beginning on the Commencement Date and for each month thereafter until September 30, 2007, Tenant shall pay to Landlord base rent for the Premises ("Base Rent") in advance, without demand or set-off, in the amount of Fifteen Thousand Six Hundred Fifty Dollars (\$15,650), based on an annual rent of \$6.00 per sq. ft., on or before the first day of each successive calendar month during the Term in lawful money of the United States of America, without prior notice or demand, at such place or places as may be designated in writing from time to time by Landlord. Beginning on October 1, 2007 for each of the next 59 calendar months thereafter, the Tenant shall pay to Landlord Base Rent for the Premises in advance, without demand or set-off, in the amount of Thirty-Three Thousand Nine Hundred Eight and 33/100 Dollars (\$33,908.33), based on an annual rent of \$13.00 per sq. ft., on or before the first day of each successive calendar month during the Term in lawful money of the United States of America, without prior notice or demand, at such place or places as may be designated in writing from time to time by Landlord. In addition to the Base Rent for the Premises, Tenant shall pay to Landlord a Utilities Fee and a Common Area Maintenance Fee for the Premises as indicated in Sections 4 and 8.1.1. The Tenant's proportionate share of the real estate taxes on the Premises have been included in the Base Rent, and the payment of the real estate taxes for the Property and the Building, of which the Premises are a part, shall be the sole responsibility of Landlord.

3.1.2 Proration. In the event that the date on which a payment obligation: (i) begins on a date other than the first day of a calendar month; or (ii) ends on a date other than the last day of a calendar month then the amount of the payment shall be prorated, based upon the number of days during said month that the obligation was effective.

3.1.3. Deposit. The Tenant shall pay the Landlord \$10,000, at the time of signing this Lease, as deposit against damages, unpaid bills, and future lease payments. Landlord shall refund the deposit within 60 days of Tenant vacating the Building less any charges for damage, unpaid bills, or unpaid lease payments.

3.1.4 Letter of Credit. In addition to the required deposit, the Tenant shall cause to be put in place within five (5) business days following written notice from Landlord that construction of the improvements shown on Exhibit C and Exhibit D is ready to commence and shall remain continuously in place until the fifth anniversary of the Commencement Date, unless otherwise provided herein or agreed by the Landlord, a letter of credit issued by a Bank in the area that is acceptable to the Landlord in the amount of Four Hundred Sixty Nine Thousand Five Hundred Dollars (\$469,500), against which the Landlord may draw upon the occurrence of an Event of Default, as defined in Section 13.1, by Tenant under this Lease (the "Letter of Credit"). Landlord agrees that the Letter of Credit may be issued and renewed on an annual basis; provided that in the event Tenant fails to provide Landlord with a renewal Letter of Credit within ten (10) days prior to the termination of any then existing Letter of Credit, an Event of Default as defined in Section 13.1 shall be

---

deemed to have occurred. The Letter of Credit shall be provided in a satisfactory form to the Landlord and be governed by the “Uniform Customs and Practices for Commercial Documentary Credits” promulgated by the XIII Congress of the International Chamber of Commerce (International Chamber of Commerce Brochure No. 500, 1993 revision) and the provisions of the Uniform Commercial Code—Letters of Credit—Title 8.5 of the Code of Virginia, 1950, as amended. The Landlord agrees that so long as the Tenant is in good standing with the Lease, the amount of the Letter of Credit shall automatically be reduced at each anniversary of the Commencement Date by the amount of Ninety Two Thousand One Hundred Dollars (\$92,100), provided the Letter of Credit shall automatically terminate on the fifth anniversary of the Commencement Date.

**4. UTILITIES** Landlord shall be responsible for providing water, sewer, electricity and natural gas to the Premises and shall promptly pay all costs and expenses associated therewith. Tenant shall be responsible for obtaining, and paying for directly, telephone, internet and all other utilities and services desired by the Tenant in connection with the Premises not provided by Landlord under this Lease. In the event that any of the utilities provided by Landlord are interrupted or stopped by the action or inaction of Landlord, its employees, agents or contractors, Landlord shall, upon notice from Tenant, immediately notify the affected utility company and use its best efforts to cause repairs to be commenced. In the event that there is a utility interruption or stoppage for more than one (1) business day, the Base Rent due hereunder shall be abated until such interruption or stoppage is corrected. In addition to the Base Rent, the Tenant shall pay Tenant’s Proportionate Share of the utilities provided by Landlord (the “Utility Fee”). For the first six months following the Commencement Date, Tenant shall pay \$3,390.83 per month based on an annual Utility Fee equal to \$1.30 per square foot. At the end of the six month period following the Commencement Date (the “Reallocation Date”), the Landlord shall determine the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the six month period and shall provide Tenant with a copy of readings and costs to Tenant. In the event the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the six month period exceeds the \$1.30 per square foot amount, Tenant shall pay Landlord the difference within thirty (30) days following Tenant’s receipt of evidence of the difference. In the event the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the six month period following the Commencement Date is less than the annual \$1.30 per square foot amount, Landlord shall reimburse Tenant the difference within thirty (30) days following Landlord’s determination that the amount is less. For the twelve (12) month period following the Reallocation Date, Tenant shall pay a Utility Fee based on the monthly average during the preceding six month period. At the end of the twelve (12) month period, Tenant shall pay to Landlord any increase in the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the preceding twelve (12) month period or Landlord shall reimburse Tenant the decrease in the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the preceding twelve (12) month period. For each twelve month (12) month period thereafter, Tenant shall pay a monthly Utility Fee based on the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the preceding twelve (12) month period. At the end of each period, Landlord shall determine the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the preceding twelve (12) month period, and either Tenant shall pay to Landlord any increase in the actual amount of Tenant’s Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the preceding twelve (12) month period or Landlord shall reimburse Tenant the decrease in the actual amount of Tenant’s

---

Proportionate Share of the water, sewer, electric, and natural gas utility usage provided by Landlord during the preceding twelve (12) month period. It is acknowledged and agreed by Landlord that Tenant shall not share in the cost and expense of the water, sewer, electric and natural gas utility usage which is separately metered to any other tenant in the Building.

## **5. USE**

5.1 Tenant agrees that it will use and occupy the Premises as a manufacturing, research and development facility and for such other lawful purposes as may be incident thereto and for no other purpose without Landlord's prior written consent, which consent shall not be unreasonably withheld, conditioned or delayed. Tenant shall comply with all governmental laws, rules, ordinances and regulations applicable to its particular use of the Premises, and promptly comply with all governmental orders and directives for the correction and abatement of nuisances in or upon the Premises caused by Tenant, all at Tenant's sole expense. Tenant recognizes and agrees that Landlord is making no warranties, expressed or implied, as to the suitability of the Premises for any particular use.

5.2 Landlord represents and warrants that it has not and will not, during the Term of this Lease, enter into an agreement which limits Tenant's ability to use the Premises for the uses set forth in Section 5.1, except by operation of law.

## **6. ALTERATIONS**

6.1 Tenant shall not make any alterations, additions or improvements to the Premises, except for non-structural alterations that cost less than \$50,000 per project without the prior written consent of Landlord, which shall not be unreasonably withheld, conditioned or delayed. Tenant, at its own cost and expense, may erect shelves, bins, machinery and trade fixtures as it desires provided that (a) such items do not alter the basic character of the Premises or the Building; (b) such items do not overload or damage the same; (c) such items may be removed without material injury to the Premises; and (d) the construction, erection or installation thereof complies with all applicable governmental laws, ordinances, regulations and all provisions of this Lease. All alterations, additions, improvements and partitions erected by Tenant shall be and remain the property of Tenant during the Term of this Lease and shall be the property of Landlord upon the expiration or earlier termination of this Lease provided that nothing herein shall prohibit Tenant from removing the Tenant Equipment or other items, in accordance with Section 2.3, above. All shelves, bins, machinery and trade fixtures installed by Tenant shall be removed in accordance with Section 2.3 within 30 days following the expiration or earlier termination of this Lease, at which time Tenant shall repair any damage caused thereby, ordinary wear and tear excepted. All alterations, installations, removals and restoration shall be performed in a good, workmanlike and lien free manner.

6.2 Mechanics Liens. Tenant shall promptly pay all contractors and material men, and will use reasonable commercial efforts to prevent any lien from attaching to the Premises or any part thereof. If any lien is filed purporting to be for labor or material furnished or to be furnished at the request of Tenant, Tenant shall do all acts necessary to discharge such lien within twenty (20) days of filing; or if Tenant desires to contest any lien, then Tenant shall bond off the lien. In the event Tenant fails to discharge the lien or fails to pay any lien claim after entry of final judgment in favor of the claimant, Landlord shall have the right to expend

---

all sums reasonably necessary to discharge the lien claim, and Tenant shall pay all sums expended by Landlord in discharging said lien, including reasonable attorney's fees within thirty (30) days of receipt of the invoice. Tenant has no express or implied authority to create or place any lien or encumbrance of any kind upon, or in any manner to bind the interest of Landlord in the Premises or to charge the rentals payable hereunder for any claim in favor of any person dealing with Tenant, including, without limitation, those who may furnish materials or perform labor for any construction or repairs requested by Tenant.

7. **SIGNAGE** Tenant shall not place or permit on any exterior door or window or any exterior wall of the Premises any sign, awning, canopy, advertising matter or lettering or at the entrance to the Property without the written consent of the Landlord, which shall not be unreasonably withheld, conditioned or delayed. It shall not be unreasonable for Landlord to withhold its consent to the placement of any sign that does not comply with any federal, state or local law or ordinance.

## 8. MAINTENANCE

8.1 Tenant's Maintenance Responsibilities. Tenant shall at all times keep the Premises and all partitions, fixtures, equipment and appurtenances thereof and all parts of the Premises not required in Section 8.2 to be maintained by Landlord in good order, condition and repair, and in compliance with all applicable laws, rules, ordinances and regulations, damage by casualty excepted. If replacement of equipment, fixtures and appurtenances thereto are necessary, Tenant shall replace the same with equipment, fixtures and appurtenances of the same quality, and shall repair all damages done in or by such replacement.

8.1.1 Common Area Maintenance Fee: Tenant shall pay, in addition to the Base Rent, a fixed monthly fee in the amount of \$912.91, based on an annual charge of \$0.35 per sq. ft, to cover the cost incurred by Landlord to maintain the common areas (which includes all restrooms, hallways, conference rooms, cafeteria, shipping and other common areas in the Building designated on Exhibit A) and exterior areas of the Building in good condition and repair, including snow removal from sidewalks and parking lots, landscaping, and grass cutting (the "Common Area Maintenance Fee"). In the event Tenant elects to renew the term of this Lease, Landlord shall provide Tenant written evidence showing the actual costs paid by Landlord to maintain the common and exterior areas of the Building for the twelve month period preceding the first day of the Renewal Term. The Common Area Maintenance Fee to be paid annually by Tenant during the Renewal Term shall be adjusted to equal Tenant's Proportionate Share of the actual costs paid by Landlord to maintain the common and exterior areas of the Building for the twelve month period preceding the first day of the Renewal Term, provided that the Common Area Maintenance Fee for the Renewal Term shall not exceed an annual charge of \$0.45 per sq. ft.

8.2 Landlord's Maintenance Responsibilities. Landlord shall provide and keep or cause to be kept, at Landlord's sole cost and expense, the HVAC, electrical, and plumbing systems (including any portion of the systems and the equipment related thereto located within the Premises) and all structural portions of the Building, including without limitation, the foundation, roof, and all load bearing and exterior walls, in good order, condition and repair, except for damage thereto due to the negligence of Tenant, Tenant's employees or invitees. The term "exterior walls" as used herein shall include windows, glass or plate glass, doors or overhead doors, special store fronts, dock bumpers and dock plates or levelers. Landlord shall keep or cause to be kept the parking area(s), and sidewalks in good order, condition and repair; provided Tenant shall be

---

responsible for repairing any damage caused by Tenant, its employees or invitees. Tenant shall immediately give Landlord written notice of defect or need for repairs, after which Landlord shall commence such repairs as soon as reasonably practicable.

If the parties so agree, Tenant may perform any maintenance or repair that is Landlord's responsibility hereunder, and Landlord shall pay the cost for the maintenance or repair within thirty (30) days following receipt of an invoice from the Tenant.

8.3 Landlord's Failure to Make Repairs. If Landlord fails to commence any repair as required under Section 8.2 within ten (10) days after notification of the need for such repair, and fails to complete such repairs within a reasonable period of time, Tenant may, in addition to any other remedies it may have, make such repairs at the expense of Landlord and Landlord shall pay to Tenant all costs and expenses reasonably incurred as a result of such repairs within thirty (30) days of receipt of invoice thereof. In the event of a bona fide emergency which may result in damage or injury to persons or Tenant's property, damage which has a material impact on Tenant's ability to conduct business as contemplated under this Agreement, or damage which otherwise exposes Tenant (in Tenant's reasonable judgment) to liability, Tenant may, unless Landlord commences and diligently pursues such repairs within five (5) days after receipt of written notice (or such shorter period as would reasonably be expected under the given circumstances), make such repairs on behalf of Landlord and Landlord shall pay to Tenant all costs and expenses reasonably incurred in making such repairs within thirty (30) days of receipt of invoice thereof.

## **9. ASSIGNMENT AND SUBLETTING**

9.1 Assignment or Subletting by Tenant. Tenant shall not, either voluntarily or by operation of law, assign, transfer, mortgage, pledge, hypothecate or encumber this Lease, or any interest therein, and shall not sublet the Premises, or any part thereof, without obtaining the prior written consent of Landlord, which consent shall not be unreasonably withheld, conditioned or delayed. In connection with any such assignment or sublease, Tenant or the assignee or subtenant of Tenant shall pay to Landlord any legal and administrative costs incurred by Landlord in approving such assignment or subletting, not to exceed \$750.00. The acceptance of rent from any other party shall not be deemed to be a waiver of any of the provisions of this Lease, or deemed consent to the assignment or subletting of the Premises. Consent to any assignment or subletting shall not be deemed consent to any future assignment or subletting. Notwithstanding the foregoing, Tenant shall have the absolute right (without obtaining Landlord's prior written consent which shall not be required) to assign this Lease in whole or in part or to sublet all or any portion of the Premises to: any affiliate controlling, controlled by or under common control with Tenant; an entity into which Tenant merges or consolidates; or to a purchaser of all or substantially all of the assets of Tenant, if the assignee or sublessee agrees, in writing delivered to Landlord, to abide by all the provisions under this Lease.

9.2 Assignment by Landlord. Landlord may assign this Lease, in whole or in part, without the prior written consent of Tenant, provided that such assignment does affect or impair the rights granted to Tenant herein, or adversely affect Tenant's possession of the Premises. Notwithstanding the foregoing, if this Lease is assigned, in whole or in part, by The Industrial Development Authority of Montgomery County,

---

Virginia, any subsequent assignment of this Lease, in whole or in part, shall require the prior written consent of Tenant.

9.3 Assignment pursuant to Provision of the Bankruptcy Code. If this Lease is assigned to any person or entity pursuant to the provisions of the Bankruptcy Code (11 U.S.C. sec. 101 et seq), any and all monies or other considerations payable or otherwise to be delivered in connection with such assignment shall be paid or delivered to the Landlord and shall be and remain the exclusive property of the Landlord and shall not constitute the property of the Tenant or the estate of the Tenant, within the meaning of the Bankruptcy Code.

**10. RIGHT OF ENTRY** Landlord, its employees and agents, shall have the right to enter the Premises with a designated representative of Tenant upon reasonable notice during regular business hours for the purpose of examining or inspecting the same, showing the same to prospective purchasers, mortgagees or tenants of the Premises, and to perform its maintenance obligations under Section 8.2, above. In the case of a bona fide emergency, Landlord shall use its best efforts to provide Tenant with the greatest possible notice under the circumstances prior to entering the Premises and in the event that representatives of Tenant are not present to accompany Landlord or to open and permit entry into the Premises during the course of a bona fide emergency, then Landlord may enter the Premises forcibly and without being accompanied by a representative of Tenant without such entry constituting an eviction of Tenant or termination of this Lease. Except in the case of a bona fide emergency, Landlord, its employees and agents shall abide by all reasonable security and safety procedures established for the Premises by Tenant.

## **11. INSURANCE**

11.1 Landlord's Obligations. Throughout the Term of this Lease, including any renewals or extensions thereof, Landlord shall maintain the following insurance coverage: (i) standard all risk coverage in an amount equal to the replacement cost of the Building; (ii) Commercial General Liability of not less than \$1,000,000 per occurrence and \$2,000,000 aggregate, naming Tenant as an additional insured; (iii) boiler insurance with coverage and in an amount reasonably satisfactory to Tenant; and (iv) at Landlord's discretion, such other insurance policies as may be deemed normal and customary for substantially similar buildings, including but not limited to coverage for loss of rent. All insurance coverage shall be primary and non-contributory and issued by insurers licensed to do business in the state in which the Premises are located. The insurance required of Landlord hereunder may be maintained by a blanket or master policy, which includes properties other than the Premises.

### 11.2 Tenant's Obligations.

11.2.1 Tenant shall keep in effect at Tenant's expense during the term of this Lease: (i) all risk property insurance covering the full replacement cost of Tenant's Equipment and all other property and improvements installed or placed in the Premises by Tenant at Tenant's expense; (ii) worker's compensation insurance with no less than the minimum limits required by law; (iii) employer's liability insurance with such limits as required by law; and (iv) commercial general liability insurance with a minimum limit of \$1,000,000 per occurrence and \$2,000,000 aggregate. All such policies and coverage shall be primary and non-contributory, issued by insurers, licensed to do business in the state in which the Premises are located and which are rated A- or better

---

by Best's Key Rating Guide, endorsed to include Landlord as additional insured (Commercial General Liability only), and endorsed to provide at least 30-days prior notification of cancellation or material change in coverage to said Landlord. Tenant may comply with its insurance obligations hereunder in whole or in part through a company-wide program of self-insurance and may maintain company-wide levels of deductibles provided the Tenant provides Landlord with an appropriate self-insurance certificate.

11.2.2 Fire and Casualty Insurance. Tenant shall not do or suffer to be done any act, matter or thing whereby the fire and casualty insurance carried by Landlord on the Building of which the Premises are a part shall be suspended or rated as more hazardous than at the commencement of this Lease. In case of breach of this covenant, Tenant agrees to pay, within thirty (30) days of receipt of written demand, any and all increase of premium for fire and casualty insurance carried by Landlord caused directly by the actions or occupancy of Tenant.

## **12. DAMAGE OR DESTRUCTION OF LEASED PREMISES**

12.1 If the Premises are damaged by fire or any other cause which renders the Premises completely untenantable, in Tenant's reasonable determination, then Tenant by a notice in writing sent no later than thirty (30) days after such damage may terminate this Lease as of the date of such damage, and any Base Rent or other amounts for the unexpired period paid in advance beyond the date of such damage, shall be refunded by Landlord to Tenant and the original Letter of Credit shall be returned promptly to Tenant.

12.2 If Tenant does not elect to terminate this Lease as provided in Section 12.1 or if the Premises are not rendered completely untenantable, Landlord shall diligently commence restoration and restore the Premises to a condition equal to its condition before the damage; provided that Landlord's obligation to repair and restore the Premises is contingent upon its receipt of insurance proceeds sufficient to make such repairs. In the event any mortgagee or lender requires any insurance proceeds to be applied to any debt, Landlord shall not be deemed to have received the proceeds, in which event Tenant may terminate this Lease unless Landlord agrees to fund the repairs. If Landlord completes such repairs, then Tenant shall promptly repair or replace its trade fixtures, furnishings, furniture, carpeting, wall covering, floor covering, drapes and equipment to the same condition as they were in immediately prior to the casualty. The Base Rent and other amounts owed hereunder, according to the extent that such damage and its repair shall interfere with the full enjoyment and use of the Premises, shall be suspended and abated from the date of such damage until Landlord's repairs have been completed. In the event that the Premises have not been restored to a condition equal to their condition before the damage within ninety (90) days after Landlord's receipt of the proceeds, then Tenant may, by a notice in writing sent prior to completion of restoration, terminate this Lease as of the date of such termination, and any Base Rent or other amounts for the unexpired period paid in advance beyond the date of such damage, shall be refunded by Landlord to Tenant and the original Letter of Credit shall be returned promptly to Tenant.

## **13. REMEDIES OF LANDLORD UPON TENANT'S DEFAULT**

13.1 Tenant's Default Defined. The following shall be considered an "Event of Default" and a breach of this Lease: (a) any failure of Tenant to pay any Base Rent, the Utility Fee, the Common Area Maintenance Fee, the money in the excess of the Up-fit Allowance or other amounts due hereunder for more than five (5) business days after receipt of written notice of non-payment; (b) any failure by Tenant to perform

---

or observe any of the other terms, provisions, conditions and covenants of this Lease for more than thirty (30) days after receipt of written notice of such failure provided, however, that if the event for which the notice is given is of a nature that may not be reasonably cured within said thirty (30) day period, Tenant shall not be in default for so long as Tenant commences to cure the default within the thirty (30) day period and diligently pursues it to conclusion; (c) Tenant files a voluntary or involuntary petition in bankruptcy which is not dismissed within thirty (30) days of the filing or makes a general assignment for the benefit of its creditors; (d) a receiver of any property of Tenant in or upon the Premises is appointed in any action, suit, or proceeding by or against Tenant and such appointment shall not be vacated or annulled within sixty (60) days; or (e) this Lease, Tenant's interest herein or in the Premises, any improvements thereon, or any property of Tenant is executed upon or attached.

13.2. Landlord's Remedies. Upon the occurrence of any Event of Default specified in Section 13.1, Landlord, in addition to all other rights or remedies Landlord may have for such default at law or in equity, shall have the right to pursue any one or more of the following remedies.

13.2.1 Terminate this Lease and, without prejudice to any other remedy which it may have for possession or arrearages in Base Rent or other amounts owed hereunder, enter upon and take possession of the Premises by summary dispossession proceedings or any other method authorized by law and recover from Tenant through the Deposit money paid pursuant to Paragraph 3.1.3 and/or the Letter of Credit provided pursuant to Paragraph 3.1.4 or by other legal means: (i) all Base Rent and other amounts due and unpaid up to the time of re-entry; (ii) the costs of repairing or otherwise putting the Premises into the condition required by this Lease; and (iii) Tenant shall continue to be liable to pay the Base Rent and other amounts owed hereunder as they become due, reduce by Landlord's net re-letting proceeds.

13.2.2 Without terminating this Lease, enter upon and take possession of the Premises, by summary dispossession proceedings or any other remedy authorized by law and re-let the Premises, or any part thereof, for such term or terms (which may extend beyond the term of this Lease), for the highest rent reasonably obtainable (even if such rent is below market value) and to recover from Tenant the difference between the Base Rent reserved by this Lease and the amount obtained through such re-letting plus the following costs, if reasonably incurred by Landlord in such re-letting: (a) brokerage fees and/or leasing commissions; (b) the costs of removing and storing Tenant's or any other occupant's property; and (c) the costs of repairing or otherwise putting the Premises into the condition required by this Lease together with the costs of alterations reasonably necessary to re-let the Premises. No such re-letting shall relieve Tenant from its obligations hereunder. In no event shall Tenant be entitled to any excess rent obtained by re-letting the Premises over and above the Base Rent reserved herein.

13.3 If the Tenant shall continue in default in the performance of any of the covenants or agreements herein contained, after any applicable cure period, Landlord may perform the same for the account of Tenant. Any amount incurred by Landlord in the performance of any such matter for the account of Tenant shall be payable by Tenant to Landlord within thirty (30) days after written demand and evidence that the same has been paid.

13.4 No re-entry or taking possession of the Premises by Landlord shall be construed as an election to terminate this Lease unless Landlord sends a written notice of termination to Tenant. Pursuit of any of the

---

foregoing remedies shall not preclude pursuit of any of the other remedies herein provided or any other remedies provided by at law or in equity, nor shall pursuit of any remedy herein provided constitute a forfeiture or waiver of any Base Rent, or other amounts due to Landlord hereunder or of any damages accruing to Landlord.

**14. REMEDIES OF TENANT UPON LANDLORD'S DEFAULT**

14.1 Landlord shall be in default of this Lease (a "Landlord Default") if it shall fail to perform any duty or obligation imposed upon it by this Lease and such failure shall continue for a period of thirty (30) days after written notice, provided, however, that if the event for which the notice is given is of a nature that may not reasonably be performed within said thirty (30) day period, Landlord shall not be in default for so long as Landlord commences its performance within said thirty day period and diligently pursues it to conclusion. Upon the occurrence of a Landlord Default, Tenant, in addition to all other rights or remedies Tenant may have for such default at law or in equity, shall have the right to exercise any self-help measures as may be reasonably necessary to cure such default. Landlord shall reimburse any costs and expenses incurred by Tenant in order to cure a Landlord Default within thirty (30) days after written demand and evidence that the same has been paid. In addition, if Landlord fails to cure any default within thirty (30) days after receiving written notice of the default, Tenant shall have the right, upon written notice to Landlord, to terminate this Lease without penalty or further obligation to Landlord, its employees, officers, agents or lenders.

14.2 All obligations of Landlord under this Lease will be deemed binding upon Landlord only during the period of its ownership of the Premises and not thereafter; provided that Landlord or any subsequent owner of the Premises shall not be released from any liability arising under this Lease during such parties' ownership of the Premises.

**15. EMINENT DOMAIN** In the event that the Premises, in whole or in part, are taken by paramount governmental authority or in any way condemned or appropriated by the exercise of the right of eminent domain or a deed or conveyance in lieu of eminent domain (each a "Taking") such that Tenant's is unable to use the Premises for the purposes set forth herein, Tenant shall have the right, at its option, within sixty (60) days after said Taking, to terminate this Lease upon thirty (30) days written notice to the Landlord. In the event Tenant elects to terminate the Lease, the Base Rent and other amounts owed under this Lease shall be abated from the date of the Taking, and Tenant's liability therefore will cease as of the date of such termination, and any prepaid Base Rent or other amounts shall be returned to Tenant, along with the original Letter of Credit. If this Lease is not terminated as provided in this Section 15 then it shall continue in full force and effect (provided no Base Rent or other amounts shall be owed by Tenant until the remainder of the Premises are restored, however, Tenant shall pay prorata Base Rent on any space Tenant occupies prior to the restoration of the Premises), and Landlord shall within a reasonable time after possession is physically taken by the condemning authority restore the remaining portion of the Premises to render it reasonably suitable for the uses permitted by this Lease and the Base Rent and other amounts owed hereunder shall be proportionately and equitably reduced. If the proceeds received in connection with the Taking are not sufficient to restore the remaining portion of the Premises to render it suitable for the uses permitted by this Lease and the Landlord is unwilling to pay the difference, Tenant may terminate this Lease. In the event any mortgagee or lender requires that all or any portion of the proceeds received from the condemning authority be applied to any debt, Landlord will not be deemed to have received such proceeds. All compensation awarded in connection with or

---

as a result of a Taking shall be the property of the Landlord, except that Tenant may apply for and keep as its property a separate award for: (i) the value of Tenant's leasehold interest; (ii) the value of Tenant Equipment or Tenant's trade fixtures or personal property; (iii) Tenant's moving expenses; (iv) Tenant's business relocation expenses; and (v) damages to Tenant's business incurred as a result of such Taking.

## **16. SUBORDINATION OF LEASE**

16.1 This Lease is and shall remain subordinate and subject to any mortgage or mortgages or deed of trust which are now, or at any time hereafter shall be placed, upon the interest of Landlord in the Premises or any part thereof or to any assignment of the interest of Landlord in this Lease; provided that the holder thereof shall execute and deliver to Tenant a non-disturbance agreement in form reasonably acceptable to Tenant. Tenant agrees to execute and deliver to Landlord, without cost, any instrument that may be deemed necessary by Landlord to further effect the subordination of this Lease to any such mortgage, mortgages or assignments in form reasonably acceptable to Tenant.

16.2 In the event of a foreclosure of any such mortgage, Landlord and Tenant hereby agree that this Lease shall not terminate by reason thereof, and Tenant further agrees to recognize as Landlord hereunder the mortgagee or purchaser at a foreclosure sale for the balance of the Term, the Renewal Term or an extension of either, subject to all the terms and provisions hereof; provided, however, that any such mortgagee or purchaser at a foreclosure sale, which shall become the Landlord hereunder, shall not be:

(a) liable for acts or omissions of Landlord occurring prior to its ownership of the Premises (but such mortgagee or purchaser shall perform any unperformed obligations under this Lease existing at the time it becomes Landlord);

(b) subject to any offsets or defenses which Tenant might have against Landlord that accrue prior to its ownership of the Premises, except as provided in this Lease;

(c) bound by any Base Rent or other amounts which Tenant may have paid to Landlord more than thirty days in advance (other than the security deposit); or

(d) bound by any amendment or modifications of said Lease made after Tenant receives written notice of such foreclosure.

**17. ESTOPPEL CERTIFICATE** Either party shall, at any time and from time to time within twenty (20) days following receipt of written request from the other party, execute, acknowledge and deliver to the requesting party a written statement certifying that this Lease is in full force and effect and unmodified (or, if modified, stating the nature of such modification), certifying the date to which the Base Rent reserved hereunder has been paid, and certifying that there are not, to the responding party's knowledge, any uncured defaults on the part of the party requesting the certificate, or specifying such defaults if any are claimed. Such a statement may be relied upon by any prospective purchaser, mortgagee or subtenant of all or any portion of the Premises. The responding party's failure to deliver such statement within said twenty-day period shall be conclusive upon such party that this Lease is in full force and effect and unmodified, and that there are no uncured defaults in the requesting party's performance hereunder.

---

**18. RULES AND REGULATIONS** Tenant and Tenant's agents, employees and invitees shall faithfully observe and comply with all reasonable, uniform rules and regulations promulgated by Landlord from time to time for the safety, care or cleanliness of the Premises and for the preservation of good order therein, provided that such rules and regulations do not materially increase Tenant's duties or obligations under this Lease. In the event of any conflict or inconsistency between the terms and conditions of this Lease and any rules and regulations promulgated by Landlord, the conflict or inconsistency shall be resolved by giving precedence to the terms and conditions of this Lease.

**19. QUIET ENJOYMENT** Landlord represents and warrants that it has the authority to enter into this Lease. Landlord further represents, warrants and covenants that so long as Tenant pays all amounts due hereunder and performs all other material covenants and conditions of this Lease to be performed by the Tenant hereunder, Landlord and its successors and assigns shall not interfere, nor permit interference, with Tenant's quiet use and enjoyment of the Premises and that, subject to the terms and conditions of this Lease, Tenant shall peaceably and quietly have, hold and enjoy the Premises for the Term hereof.

**20. ENVIRONMENTAL MATTERS**

20.1 Definitions.

20.1.1 For purposes of this Lease, the term "Environmental Laws" shall mean any and all federal, state, or local laws, statutes, rules, regulations, ordinances, or judicial or administrative decrees or orders relating to: (i) health, safety or environmental protection; (ii) the emissions, discharges, releases or threatened releases of pollutants, contaminants or toxic or hazardous materials into the environment (including, without limitation, ambient air, surface water, ground water or subsurface strata); or (iii) the use, storage, treatment, transportation, manufacture, refinement, handling, production or disposal of, or exposure to pollutants, contaminants or toxic or hazardous materials, including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act, 42 USC 9601 et seq. ("CERCLA"), as amended and judicially and administratively interpreted through the date hereof, and all regulations promulgated thereunder as of such date.

20.1.2 For purposes of this Lease, the term "Hazardous Substance" shall mean: (i) any products, materials, solvents, elements, compounds, chemical mixtures, contaminants, pollutants, or other substances identified as toxic or hazardous under CERCLA or any other Environmental Law; and (ii) the following substances: PCBs, gasoline, kerosene or other petroleum products, toxic pesticides and herbicides, volatile solvents, materials containing asbestos or formaldehyde and radioactive materials.

20.2 Tenant's Obligations.

20.2.1 Tenant shall not cause or knowingly permit any Hazardous Substance to be placed, stored, treated, released, spilled, transported or disposed of on, under, at or from the Premises in violation of any Environmental Laws. Nor will Tenant knowingly permit the Premises to be used or operated in a manner

---

that may cause the Building, or any part thereof, to be contaminated by any Hazardous Substance in violation of any Environmental Laws.

20.2.2 Tenant shall contain at or remove from the Premises or perform any other remedial action regarding any Hazardous Substance placed, held, located, released, spilled, transported or disposed of on, under, at or from the Premises by Tenant, its employees, agents or contractors, at Tenant's sole cost and expense, if, and when such containment, removal or other remedial action is required under any Environmental Law, and shall perform such containment, removal or other remediation in compliance with all Environmental Laws.

20.2.3 Tenant shall provide Landlord with written notice (and a copy as may be applicable) within ten (10) business days after Tenant obtains actual knowledge of any of the following: (a) any governmental or regulatory actions instituted or threatened under any Environmental Law affecting the Tenant or the Premises, (b) all claims made or threatened by any third party against Tenant or the Premises relating to damage, contribution, cost recovery, compensation, loss or injury resulting from any Hazardous Materials, (c) the discovery of any occurrence or condition on any real property adjoining or in the vicinity of the Premises that could cause the Premises or Property to be classified in a manner which may support a claim under any Environmental Law, and (d) the discovery of any Hazardous Substance on, under, at or from the Premises not authorized or permitted under Environmental Laws.

20.2.4 In addition to Tenant's general indemnification obligations set forth in Section 21 below, Tenant shall defend all actions against Landlord and pay, protect, indemnify and save harmless Landlord from and against any and all liabilities, losses, damages, costs, expenses (including, without limitation, reasonable attorney fees and expenses), causes of action, suits, claims, demands or judgments of any nature arising from Tenant's failure to comply with this Section 20. The indemnity contained in this Section 20.2.4 shall survive the expiration or earlier termination of this Lease indefinitely with respect to the obligations and liabilities of Tenant under Section 20.2, actual or contingent, which have arisen on or prior to such expiration or earlier termination.

20.3 Landlord's Obligations.

20.3.1 In addition to Landlord's general indemnification obligations set forth in Section 21 below, Landlord shall, to the extent permitted by law, defend all actions against Tenant and pay, protect, indemnify and save harmless Tenant from and against any and all liabilities, losses, damages, costs, expenses (including, without limitation, reasonable attorney fees and expenses), causes of action, suits, claims, demands or judgments of any nature arising out of or relating to: (i) emissions, discharges, releases or threatened releases of pollutants, contaminants or Hazardous Substances into the environment (including, without limitation, ambient air, surface water, ground water or subsurface strata) or exposure to such Hazardous Substances on, at, under, or from the Premises, or any real estate contiguous thereto, which were caused by Landlord, its employees, agents or contractors; (ii) the use, storage, treatment, transportation, manufacture, refinement, handling, production or disposal of pollutants, contaminants or Hazardous Substances on, under, at or from the Premises, or any real estate contiguous thereto, by Landlord, its employees, agents or contractors; and (iii) any actual or alleged violation of any Environmental Law on, under, at or arising from the Premises, or any real estate contiguous thereto, by Landlord, its employees, agents or contractors. The indemnity contained

---

in this Section 20.3.1 shall survive the expiration or earlier termination of this Lease indefinitely with respect to the obligations and liabilities of Landlord under Section 20.3, actual or contingent, which have arisen on or prior to such expiration or earlier termination.

20.3.2 Landlord represents to Tenant that as of the Commencement Date Landlord has no knowledge that: (i) the Premises, the Building and the ground under them and the Property are contaminated by any Hazardous Substances; (ii) all or any portion of the Premises has, at any time, been used for the treatment, storage, or disposal of any Hazardous Substances; (iii) Hazardous Substances are (or have been) used, generated or disposed of on or about the Premises, except in compliance with all applicable Environmental Laws; and (iv) any part of the Premises or surrounding common areas are on any governmental list of contaminated properties, or of any investigation, administrative order or notice, consent order, or agreement for litigation pertaining to the Building or the Property.

## **21. WAIVER; INDEMNIFICATION**

21.1 Waiver. EXCEPT AS OTHERWISE SET FORTH IN THIS LEASE, NEITHER PARTY OR ITS AGENTS OR EMPLOYEES, SHALL BE LIABLE TO THE OTHER PARTY OR ANY PERSON CLAIMING THROUGH THAT PARTY FOR ANY EXEMPLARY, SPECIAL, INCIDENTAL, OF CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS) FOR ANY CAUSE WHATSOEVER, EXCEPT CLAIMS CAUSED BY OR RESULTING FROM THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF THAT PARTY, ITS AGENTS, CONTRACTORS OR EMPLOYEES.

21.2 Tenant's Indemnity. Except to the extent caused by the breach of this Lease by Landlord or the acts or omissions of Landlord, its officers, agents, employees, contractors, or any other person or entity for whom Landlord is legally responsible, Tenant shall defend, indemnify and hold Landlord and its officers, directors, shareholders, employees, agents and representatives harmless from and against any and all claims, demands, litigation, settlements, judgments, damages, liabilities, costs and expenses (including without limitation reasonable attorneys' fees) arising directly or indirectly out of: (i) any act or omission of Tenant, its officers, agents, employees, contractors, or any other person or entity for whom Tenant is legally responsible; or (ii) a breach of any representation, warranty or covenant of Tenant contained or incorporated in this Lease. Tenant's obligations under this Section 21.2 shall survive the expiration or earlier termination of this Lease for a period of eighteen months.

21.3 Landlord's Indemnity. Except to the extent caused by the breach of this Lease by Tenant or the acts or omissions of Tenant, its officers, agents, employees, contractors, or any other person or entity for whom Tenant is legally responsible, and to the extent permitted by law, Landlord shall defend, indemnify and hold Tenant, its officers, directors, shareholders, employees, agents and representatives harmless from and against any and all claims, demands, litigation, settlements, judgments, damages, liabilities, costs and expenses (including without limitation reasonable attorneys' fees) arising directly or indirectly out of: (i) any act or omission of Landlord, its officers, agents, employees, contractors or any other person or entity for whom Landlord is legally responsible; or (ii) a breach of any representation, warranty or covenant of Landlord contained or incorporated in this Lease. Landlord's obligations under this Section 21.3 shall survive the expiration or earlier termination of this Lease for a period of eighteen months.

---

21.4 Indemnification Procedure. The party seeking indemnification (the “Indemnified Party”) shall promptly notify in writing the party from whom indemnification is being sought (the “Indemnifying Party”) of the claim or suit for which indemnification is sought. The Indemnified Party shall not make any admission as to liability or agree to any settlement of or compromise any claim without the prior written consent of the Indemnifying Party. The Indemnifying Party shall be entitled to have the exclusive conduct of and/or settle all negotiations and litigation arising from any claim and the Indemnified Party shall, at the Indemnifying Party request and expense, give the Indemnifying Party all reasonable assistance in connection with those negotiations and litigation.

## **22. MISCELLANEOUS**

22.1 Force Majeure. Notwithstanding anything to the contrary in this Lease, neither party shall be liable to the other party for nonperformance or delay in performance of any of its obligations under this Lease, (except Tenant’s obligation to pay Base Rent and other amounts owed hereunder) due to causes beyond its reasonable control, including without limitation strikes, lockouts, labor troubles, acts of God, accidents, technical failure, governmental restrictions, insurrections, riots, enemy act, war, civil commotion, fire, explosion, flood, windstorm, earthquake, natural disaster, or other casualty (“Force Majeure”). Upon the occurrence of a Force Majeure condition, the affected party shall immediately notify the other party with as much detail as possible and shall promptly inform the other party of any further developments. Immediately after the Force Majeure event is removed or abates, the affected party shall perform such obligations with all due speed. Neither party shall be deemed in default under this Agreement if a delay or other breach is caused by a Force Majeure event. Notwithstanding the foregoing, a proportion of the Base Rent and other amounts owed hereunder, according to the extent that such Force Majeure event shall interfere with the full enjoyment and use of the Premises, shall be suspended and abated from the date of commencement of such Force Majeure event until the date that such Force Majeure event subsides.

22.2 Affiliates. For purposes of this Lease, the term “Affiliate” shall mean, with respect to a party hereto, any other person or entity directly or indirectly controlling, controlled by or under common control with that party.

22.3 Successors and Assigns. The respective rights and obligations provided in this Lease shall bind and shall inure to the benefit of the parties hereto, their legal representative, heirs, successors and permitted assigns. No rights however, shall inure to the benefit of any assignee of Tenant, unless such assignment shall have been made in accordance with Section 9 above.

22.4 Brokers. Each party represents and warrants to the other that no person or entity has a claim or will claim any commission, finders fee or other amounts by, through, under or as a result of any relationship with such party because of this transaction. Landlord and Tenant each agree to defend, indemnify and hold the other party harmless from and against any and all claims, losses or damages, including without limitation reasonable attorney’s fees arising out of or relating to any breach of such party’s representations and warranties contained in this Section 22.4.

22.5 Governing Law and Construction. This Lease shall be construed, governed and enforced in accordance with the laws of the state in which the Premises are located. Landlord and Tenant acknowledge and agree that they and their counsel have reviewed, or have been given a reasonable opportunity to review, this Agreement and that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any amendments hereto.

22.6 Person; Gender; Number. As used in this Lease, the word "person" shall mean and include, where appropriate, an individual, corporation, partnership or other entity; the plural shall be substituted for the singular, and the singular for the plural, where appropriate; and words of any gender shall mean to include any other gender.

22.7 Severability. If any provisions of this Lease shall be held to be invalid, void or unenforceable, the remaining provisions hereof shall in no way be affected or impaired and such remaining provisions shall remain in full force and effect.

22.8 Waiver. The failure of any party to insist upon strict performance of any provision of this Agreement shall not be construed as a waiver of any subsequent default or breach of the same or similar nature. All rights and remedies reserved to either party shall be cumulative and shall not be in limitation of any other right or remedy which such party may have at law or in equity.

22.9 Notice. Any notice to be given hereunder shall be in writing and shall be sent by facsimile transmission, or by first class certified mail, postage prepaid, or by overnight courier service, charges prepaid, to the party notified, addressed to such party at the following address, or sent by facsimile to the following fax number, or such other address or fax number as such party may have substituted by written notice to the other parties. The sending of such notice with confirmation of receipt thereof (in the case of facsimile transmission) or receipt of such notice (in the case of delivery by mail or by overnight courier service) shall constitute the giving thereof:

If to Landlord: Industrial Development Authority of Montgomery County, VA.  
755 Roanoke Street, Suite 2H  
Christiansburg, VA 24073  
Attn: Industrial Development Authority Secretary/Treasurer  
Fax No.: (540) 381-6888

With a copy to: County Attorney  
County of Montgomery, VA  
755 Roanoke Street, Suite 2F  
Christiansburg, Virginia 24073  
Fax No.: (540) 382-6943

If to Tenant: Luna Innovations Incorporated  
10 South Jefferson Street, Suite 130  
Roanoke, Virginia 24011  
Facsimile: (540) 951-0760

---

With a copy to: C. Cooper Youell, IV  
Gentry Locke Rakes & Moore  
P.O. Box 40013  
Roanoke, VA 24022-0013  
Facsimile: (540) 983-9477

22.10 Entire Agreement. This Agreement sets forth the entire, final and complete understanding between the parties hereto relevant to the subject matter of this Agreement, and it supersedes and replaces all previous understandings or agreements, written, oral, or implied, relevant to the subject matter of this Agreement made or existing before the date of this Agreement. Except as expressly provided by this Agreement, no waiver or modification of any of the terms or conditions of this Agreement shall be effective unless in writing and signed by both parties.

22.11 Compliance with Law. The parties shall comply with, and agree that this Agreement is subject to, all applicable federal, state, and local laws, rules and regulations, and all amendments thereto, now enacted or hereafter promulgated in force during the Term, a Renewal Term or any extension of either.

22.12 Counterparts. This Lease may be executed in any number of identical counterparts and, as so executed, shall constitute one agreement, binding on all the parties hereto, notwithstanding that all the parties are not signatories to the original or the same counterpart.

22.13 Remedies Cumulative. It is agreed that, except as expressly set forth in this Lease, the rights and remedies herein provided in case of default or breach by either Landlord or Tenant are cumulative and shall not affect in any manner any other remedies that the non breaching party may have by reason of such default or breach. The exercise of any right or remedy herein provided shall be without prejudice to the right to exercise any other right or remedy provided herein, at law, or in equity.

22.14 Attorneys' Fees. If an action is brought by either party for breach of any covenant and/or to enforce or interpret any provision of this Lease, the prevailing party shall be entitled to recover its costs, expenses and reasonable attorney's fees, both at trial and on appeal, in addition to all other sums allowed by law.

22.15 Recordation of Memorandum of Lease. Landlord and Tenant mutually agree to execute a notarized memorandum (the "Memorandum") setting forth the material terms and disclosing the existence of this Lease within ten (10) days of a written request by either party with the cost of such recording being borne by the requesting party.

22.16 Time is of the Essence. Time is of the essence; and all due dates, time schedules, and conditions precedent to exercising a right shall be strictly adhered to without delay except where otherwise expressly provided.

22.17 Rear Drive Through Door and Parking. Tenant shall have access to the rear drive through door in the Warehouse area of the Building, subject to such reasonable rules and regulations as Landlord may establish from time to time (such rules and regulations to be subject to Tenant's reasonable approval). Tenant shall be entitled to priority use of 75 parking spaces on the Property based upon the Tenant's proportionate share of the Premises.

22.18 Common Areas. Tenant shall have access to use the following areas in the Building, subject to such reasonable rules and regulations as Landlord may establish from time to time:

- (a) Rear drive through door in the Warehouse area of the Building as set forth in Section 22.17.
- (b) Doors and hallways required for emergency egress.

22.19 Air and Wastewater Discharge. Tenant shall not be permitted to discharge wastewater or air through the Building's existing wastewater or air handling systems; provided Landlord shall provide Tenant with a separate wastewater handling system. It is acknowledge by Tenant that it shall be solely responsible for obtaining any necessary permits in connection with discharge of wastewater from the Premises. Nothing herein shall prohibit Tenant from discharging ordinary sanitary sewage through the Building's sanitary sewage system.

In Witness Whereof, Landlord and Tenant have executed this Lease on the 21<sup>st</sup> day of March, 2006.

**THE INDUSTRIAL DEVELOPMENT  
AUTHORITY OF MONTGOMERY  
COUNTY, VIRGINIA**

**LUNA INNOVATIONS INCORPORATED**

By: /s/ Michael B. Miller  
Name: Michael B. Miller  
Title: Chairman

By: /s/ Scott A. Graeff  
Name: Scott A. Graeff  
Title: CFO

---

COMMONWEALTH OF VIRGINIA, at large,  
COUNTY OF MONTGOMERY, to-wit;

I, the undersigned, a notary public in and for the jurisdiction aforesaid, do hereby certify that Michael B. Miller, whose name as Chairman of the Industrial Development Authority of Montgomery County is signed to the foregoing Lease, has acknowledged the same before me in my jurisdiction aforesaid.

Given under my hand this 21<sup>st</sup> day of March, 2006.  
My Commission expires:

/s/ Brenda Rigney

---

Notary Public

COMMONWEALTH OF VIRGINIA, at large,  
CITY OF ROANOKE, to-wit;

I, the undersigned, a notary public in and for the jurisdiction aforesaid, do hereby certify that Scott Graeff, whose name as CFO, of Luna Innovations Incorporated is signed to the foregoing Lease, has acknowledged the same before me in my Jurisdiction aforesaid.

Given under my hand this 21<sup>st</sup> day of March, 2006.  
My commission expires: 9-30-06

/s/ Leigh S. Holland

---

Notary Public

---

**Exhibit A**

**Description of the Premises**

---

**Exhibit B**

**Description of the Property**

All that certain tract or parcel of Land, with improvements thereon and appurtenances thereon to located and situated in the Mount Tabor Magisterial District of Montgomery County, Virginia, in the Blacksburg Industrial Park and being all of Lot Number Eight (8) containing 15.025 acres, Phase IV, Industrial Park Expansion, as shown on a plat of survey entitled "Industrial Park Expansion Phase IV", prepared by Anderson and Associates, Inc., dated 19 Dec 95 and revised 19 Feb 96, which plat is of record in the Clerk's Office of the Circuit Court of Montgomery County, Virginia, in Plat Book 16, at page 507.

---

**Exhibit C**

**Separation improvements**

---

**Exhibit D**

**Tenant's Up-Fits**

Luna Innovations Incorporated  
2851 Commerce Street  
Blacksburg, Virginia 24060

February 1, 2006

Dear Common Stockholder and/or Optionee of Luna Innovations Incorporated:

This letter agreement is being sent to you because you are either a holder of outstanding shares of common stock (the “**Common Stock**”), par value \$0.001 per share, of Luna Innovations Incorporated (“**Luna Innovations**” or the “**Company**”) or a holder of options to purchase Common Stock (each, a “**Holder**”).

As part of our strategy to grow our business and build a successful company, we are preparing to offer shares of our Common Stock to the public in the near future (the “**Public Offering**”). As a result of the Public Offering and the creation of a public market for our Common Stock, however, we risk losing our eligibility to apply for Small Business Innovation Research (“**SBIR**”) grants if too many shares of our Common Stock end up being held by stockholders who are not individuals. To be eligible for SBIR grants, greater than fifty percent of our capital stock (including outstanding stock options) must be owned by individuals and not, for example, by corporations, mutual funds or other institutional investors. We believe that we can reduce the risk of losing SBIR eligibility in the near term by reducing the number of shares that Holders are able to sell to the public.

In order to achieve this objective, and after careful consideration of different scenarios and potential solutions, we are asking each employee to agree to certain restrictions on the sale and transfer of (i) any outstanding shares of Common Stock (excluding shares that were received upon exercise of options prior to December 31, 2005) and (ii) any shares of Common Stock to be received upon exercise of options to purchase Common Stock, whether vested or unvested, that he or she currently holds and that he or she acquires from the Company prior to the Public Offering (collectively, the “**Subject Securities**”). Please note that this letter agreement applies only to the Subject Securities and not to any option grants or other securities of Luna Innovations that you may receive after the Public Offering.

#### AGREEMENT

In consideration of the execution of the underwriting agreement by the underwriters in connection with the Public Offering, and for other good and valuable consideration, by signing this letter agreement, the undersigned hereby irrevocably agrees that in any calendar year he or she will not, directly or indirectly, (i) offer for sale, sell, pledge, or otherwise dispose of greater than twenty percent (20%) of the undersigned’s Subject Securities (such number of shares, the “**Annual Limit**”) or (ii) enter into any swap or

---

other derivatives transaction that transfers to another, in whole or in part, any of the economic benefits or risks of ownership of greater than the Annual Limit of the undersigned's Subject Securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash or otherwise. Notwithstanding anything herein to the contrary, if the undersigned does not sell or transfer the full Annual Limit of the undersigned's Subject Securities in any year, the unsold portion of the Annual Limit (the "**Carryover Amount**") shall be carried over to the following year such that Annual Limit for the following year shall be increased by the Carryover Amount.

This letter agreement and the restrictions contained herein will terminate upon the five (5) year anniversary of our Public Offering, unless earlier terminated in accordance with the terms of this letter agreement.

The undersigned is aware that by signing this letter agreement, he or she may suffer adverse consequences, including without limitation, an inability to sell Subject Securities during a time in which the stock of Luna Innovations is trading at a high price and an inability to sell Subject Securities to cover a tax liability that the undersigned may incur as a result of the exercise of vested options. Luna Innovations encourages you speak with your personal financial, legal and/or tax advisors before signing this letter agreement and also prior to any sale of shares of Common Stock or the exercise of stock options that are Subject Securities.

The undersigned understands that Luna Innovations and its underwriters will proceed with the Public Offering in reliance on this letter agreement. This letter agreement may be amended only with the written consent of Luna Innovations and the undersigned Holder; *provided, however*, that the Company may, in its sole discretion, terminate your restrictions under this agreement or amend this letter agreement from time to time to allow you to sell additional shares by increasing the Annual Limit.

Should you have questions about this letter agreement, please do not hesitate to contact your supervisor or any member of the Luna Innovations senior management team.

I thank you for your past contributions to Luna Innovations' success and look forward to your continued service to our Company.

*[Signature page follows]*

---

Sincerely,

Luna Innovations Incorporated

By: \_\_\_\_\_  
Kent A. Murphy, Ph.D.  
Chief Executive Officer and Chairman

The undersigned Holder hereby represents and warrants that the undersigned has full power and authority to enter into this Stock Sale Restriction Letter Agreement and that, upon request, the undersigned will execute any additional documents necessary in connection with the enforcement hereof. Any obligations of the undersigned shall be binding upon the heirs, personal representatives, successors and assigns of the undersigned Holder.

Acknowledged and Agreed:

By: \_\_\_\_\_

Dated: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Luna Innovations Incorporated  
2851 Commerce Street  
Blacksburg, Virginia 24060

February 1, 2006

Dear Common Stockholder and/or Optionee of Luna Innovations Incorporated:

This letter agreement is being sent to you because you are either a holder of outstanding shares of common stock (the “**Common Stock**”), par value \$0.001 per share, of Luna Innovations Incorporated (“**Luna Innovations**” or the “**Company**”) or a holder of options to purchase Common Stock (each, a “**Holder**”).

As part of our strategy to grow our business and build a successful company, we are preparing to offer shares of our Common Stock to the public in the near future (the “**Public Offering**”). As a result of the Public Offering and the creation of a public market for our Common Stock, however, we risk losing our eligibility to apply for Small Business Innovation Research (“**SBIR**”) grants if too many shares of our Common Stock end up being held by stockholders who are not individuals. To be eligible for SBIR grants, greater than fifty percent of our capital stock (including outstanding stock options) must be owned by individuals and not, for example, by corporations, mutual funds or other institutional investors. We believe that we can reduce the risk of losing SBIR eligibility in the near term by reducing the number of shares that Holders are able to sell to the public.

In order to achieve this objective, and after careful consideration of different scenarios and potential solutions, we are asking each employee and director to agree to certain restrictions on the sale and transfer of (i) any outstanding shares of Common Stock (excluding shares that were received upon exercise of options prior to December 31, 2005) and (ii) any shares of Common Stock to be received upon exercise of options to purchase Common Stock, whether vested or unvested, that he or she currently holds and that he or she acquires from the Company prior to the Public Offering (collectively, the “**Subject Securities**”). Please note that this letter agreement applies only to the Subject Securities and not to any option grants or other securities of Luna Innovations that you may receive after the Public Offering.

#### AGREEMENT

In consideration of the execution of the underwriting agreement by the underwriters in connection with the Public Offering, and for other good and valuable consideration, by signing this letter agreement, the undersigned hereby irrevocably agrees that in any calendar year he or she will not, directly or indirectly, (i) offer for sale, sell, pledge, or otherwise dispose of greater than fifteen percent (15%) of the undersigned’s Subject Securities (such number of shares, the “**Annual Limit**”) or (ii) enter into any swap or

---

other derivatives transaction that transfers to another, in whole or in part, any of the economic benefits or risks of ownership of greater than the Annual Limit of the undersigned's Subject Securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash or otherwise. Notwithstanding anything herein to the contrary, if the undersigned does not sell or transfer the full Annual Limit of the undersigned's Subject Securities in any year, the unsold portion of the Annual Limit (the "**Carryover Amount**") shall be carried over to the following year such that Annual Limit for the following year shall be increased by the Carryover Amount.

This letter agreement and the restrictions contained herein will terminate upon the five (5) year anniversary of our Public Offering, unless earlier terminated in accordance with the terms of this letter agreement.

**The undersigned is aware that by signing this letter agreement, he or she may suffer adverse consequences, including without limitation, an inability to sell Subject Securities during a time in which the stock of Luna Innovations is trading at a high price and an inability to sell Subject Securities to cover a tax liability that the undersigned may incur as a result of the exercise of vested options. Luna Innovations encourages you speak with your personal financial, legal and/or tax advisors before signing this letter agreement and also prior to any sale of shares of Common Stock or the exercise of stock options that are Subject Securities.**

The undersigned understands that Luna Innovations and its underwriters will proceed with the Public Offering in reliance on this letter agreement. This letter agreement may be amended only with the written consent of Luna Innovations and the undersigned Holder; *provided, however*, that the Company may, in its sole discretion, terminate your restrictions under this agreement or amend this letter agreement from time to time to allow you to sell additional shares by increasing the Annual Limit.

Should you have questions about this letter agreement, please do not hesitate to contact your supervisor or any member of the Luna Innovations senior management team.

I thank you for your past contributions to Luna Innovations' success and look forward to your continued service to our Company.

*[Signature page follows]*

---

Sincerely,

Luna Innovations Incorporated

By: \_\_\_\_\_  
Kent A. Murphy, Ph.D.  
Chief Executive Officer and Chairman

The undersigned Holder hereby represents and warrants that the undersigned has full power and authority to enter into this Stock Sale Restriction Letter Agreement and that, upon request, the undersigned will execute any additional documents necessary in connection with the enforcement hereof. Any obligations of the undersigned shall be binding upon the heirs, personal representatives, successors and assigns of the undersigned Holder.

Acknowledged and Agreed:

By: \_\_\_\_\_

Dated: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**JOINT COOPERATION AGREEMENT**

This Joint Cooperation Agreement (the or this "Agreement") is made and entered into as of the 6 day of June, 2005 (the "Effective Date") by and between Luna Energy LLC, 309 North Knollwood Drive, Blacksburg Virginia, and its Affiliates ("LE"), and Luna Technologies, Inc., 2020 Kraft Drive, Blacksburg, Virginia ("LT").

**I. RECITALS**

**A.** LE is a limited liability company owned by Baker Hughes Oilfield Operations, Inc., a California Corporation, that develops, manufactures, sells, and installs sensing systems for the oil and gas industry.

**B.** LE has developed and owns certain distributed sensing technology referred to by LE as distributed discrete sensing ("DDxS").

**C.** LE intends to further develop DDxS for use in the oil and gas industry.

**D.** LT is a company that develops, manufacturers, and sells fiber optic instrumentation systems for use in the fiber optic telecommunications industry.

**E.** LT possess technology that is used for fiber optic telecommunication industry products, and has recently developed new fiber optic instrumentation technology that is applicable to both fiber optic telecommunication instrumentation and fiber optic sensing systems, all of which are applicable to both fiber Bragg grating-based ("FBG-based") and Rayleigh backscatter-based distributed sensing applications ("RB-based").

**F.** LE and LT desire to work together in order to develop and/or improve LT instrumentation products, new LT sensing products, and new LE DDxS products (the "Project").

**NOW THEREFORE**, in consideration of the premises and the mutual covenants and promises hereinafter set forth, LE and LT (referred to herein at times singularly as "Party" or collectively as the "Parties") hereby agree as follows:

**II. DEVELOPMENT**

**A. OBJECTIVE.** The Parties, through this Agreement, will work together to:

**1.** Complete a DDxS instrument (optical frequency domain reflectometer ("OFDR")-based) FBG sensing system that is insensitive to vibrations along the sensing fiber, has immunity to polarization fading, and can be successfully demonstrated at both 1 km and 6 km sensing lengths;

**2.** Develop methods to reduce data set sizes and signal processing algorithms;

**PRIVILEGED AND CONFIDENTIAL**

- 
3. Investigate the use of low cost scanning lasers in the completed DDxS instrument;
  4. Complete a prototype commercial DDxS instrument suitable for oil and gas industry sensing application and for LT test and measurement and sensing applications.
  5. Develop the necessary related hardware and software associated with the foregoing; and
  6. Investigate the use of the developed hardware and software to RB-based sensing.

**B. LENGTH.** The development phase under this Agreement shall commence on the Effective Date and shall end twelve (12) months thereafter, unless extended by mutual agreement of the Parties (“Development Term”). To guide the Parties through the Development Term, there are seven distinct milestones (singularly “Milestone” and collectively “Milestones”) that must be reached, each of which is described below. Certain payments (as described below) will be made by LE to LT when LE determines, in its sole reasonable discretion, that a Milestone has been met. In order for the Parties to move from one milestone to the next all earlier Milestones must be met (i.e., in order to move from Milestone two, all requirement of Milestone one must be met, and in order to move on to Milestone three, all requirements of Milestones one and two must be met, and so forth).

**C. MILESTONE LENGTHS.** Each Milestone will have a time limit set for completion, which may be extended up to two (2) months upon mutual agreement (except for Milestone 1), provided, however, the entire Development Term may not, without the express written permission of LE, be extended beyond fifteen (15) months. Should it be anticipated that a time limit for a Milestone may not be met, notice of such must be given by LT to LE as soon as practicable. The Milestone time limits are as follows:

1. Milestone 1: Within five (5) business days following the Effective Date (this milestone may not be extended);
2. Milestone 2: Within two (2) months after the Effective Date;
3. Milestone 3: Within one (1) month after the completion of Milestone 2;
4. Milestone 4: Within one (1) month after the completion of Milestone 3;
5. Milestone 5: Within two (2) months after the completion of Milestone 4;
6. Milestone 6: Within three (3) months after the completion of Milestone 5; and
7. Milestone 7: Within three (3) months after the completion of Milestone 6.

**PRIVILEGED AND CONFIDENTIAL**

---

**D. MILESTONE PAYMENTS.** Once LE reasonably determines that a Milestone has been completed, LE will pay a non-recurring engineering fee to LT under the following schedule (no other payments shall be due from LE unless otherwise agreed in writing):

1. Milestone 1: \$50,000;
2. Milestone 2: \$30,000
3. Milestone 3: \$75,000;
4. Milestone 4: \$100,000;
5. Milestone 5: \$50,000;
6. Milestone 6: \$30,000; and
7. Milestone 7: \$90,000

**E. MILESTONES REQUIREMENTS.** Each Milestone will have distinct requirements that must be met and as are described as follows:

1. Milestone 1 (access to applicable software code and knowledge transfer): LT will provide to LE access, support, and use of software previously developed and related to polarization diverse and vibration tolerant sensing instruments. This will include, but will not be limited to, code relating to correction of polarization effects and polarization alignment techniques, calibration techniques, algorithms for correcting non-ideal properties of system components, efficient use of Fourier transform algorithms, handling and display of large data sets, and algorithms to account for laser jitter.
2. Milestone 2 (FPGA pinout): An FPGA design will be completed to the point of having a stable pinout configuration. A document specifying the point configuration will be delivered to LE. LE will begin specific board design and layout based upon the provided pinout configuration.
3. Milestone 3 (demonstration of one (1) km sensing length and delivery of prototype system): A system based on the then current LT hardware platform capable of polarization diverse and vibration tolerant measurements over one (1) km lengths will be demonstrated. The delivered system will be used in a test (to be specified by LE at a later time) at a facility designated by LE to quantify vibration tolerance capability. The subject system will be delivered by LT to LE and will have a form factor such that it will be convenient to transport and use off site.
4. Milestone 4 (demonstration of vibration tolerant six (6) km sensing length): A system based upon any convenient hardware platform (e.g. Gage A/D boards) capable of polarization diverse and vibration tolerant measurements over six (6) km lengths will be demonstrated. The system will be used in a test (to be specified by LE at a later time) at a facility designated by LE to quantify vibration tolerance capability. Evaluation of low cost scanning laser(s) will also be performed.

**PRIVILEGED AND CONFIDENTIAL**

---

**5. Milestone 5 (delivery of FPGA design):** The final FPGA design, which is anticipated to include delay registers, numerically controlled oscillators (“NCO’s”), hardware multipliers, digital low-pass filters (“LPF’s”), and interferometer based sampling will be delivered to LE by LT along with all relevant design drawings, specifications, calculations and descriptions.

**6. Milestone 6 (design/system prototype review):** LT will participate with LE in a detailed review of the performance systems built, suggest changes to the systems, and participate with LE (or its designate(s)) in any redesign that may be necessary as a result of the detailed review.

**7. Milestone 7 (delivery of all developed algorithms):** LT will deliver to LE signal processing algorithms and data set reduction techniques that will facilitate a commercially viable system design. Moreover, all algorithms developed to implement the polarization insensitive and vibration tolerant six (6) km sensing instrument will be delivered to LE along with any descriptions required for proper use. This will include all software executables, source code, dated documentation and Gerber files associated with all Milestones not already provided.

**F. CONTRIBUTIONS OF LT.** During the Development Term LT will make the following contributions toward meeting the Milestones:

**1. Hardware and Software:**

**a.** Existing LT OFDR hardware and software for use in the demonstrations required in Milestones 3 and 4; and

**b.** LT grants to LE a royalty-free, sub-licensable, non-transferable (except to a purchaser of all or substantially all of the business or assets of LE), non-exclusive license, during the Development Term, to use the schematics, Gerber files, mechanical drawings, and software used in the final instrumentation prototype design referenced in Section II.G.

**2. Designs and Know-How:** LT OFDR designs and know-how existing as of the Effective Date will be used to reduce to practice the vibration and polarization improvements in the demonstrations required in Milestones 3 and 4 and to develop the hardware and software requirements for the system design.

**3. Personnel:** The following individuals employed by LT will devote the following amounts of time to the project (provided, however, any replacements to the listed individuals must be approved in writing by LE, which approval shall not be unreasonably withheld):

**a.** Mark Froggatt will devote during the Development Term at least fifty percent (50%) of his work time at LT toward completing the Milestones;

**PRIVILEGED AND CONFIDENTIAL**

---

**b.** Dawn Gifford will devote during the Development Term at least thirty percent (30%) of her work time at LT on: (i) technical oversight of work performed to complete the Milestones; and (ii) direct participation in the work necessary to complete Milestones 2, 4, and 6;

**c.** Brian Soller will devote during the Development Term at least thirty percent (30%) of his work time at LT on: (i) technical oversight of work performed to complete the Milestones; and (ii) direct participation in the work necessary to complete Milestones 2, 4, and 6;

**d.** Matt Wolfe will devote during the Development Term at least fifty percent (50%) of his work time at LT on software customization, development of hardware and software requirements, and FPGA design necessary to complete the Milestones; and

**e.** Ryan Jones will devote during the Development Term at least ten-fifteen percent (10-15%) of his work time at LT providing technician support necessary to complete the Milestones.

**G. CONTRIBUTIONS OF LE.** During the Development Term LE will make the following contributions which shall be reasonably appropriate for the completion of the Milestones:

**1. Materials:** Upon approval of LE (in its sole discretion), LE will purchase all materials external to LT and LE necessary for completion of the Milestones.

**2. Hardware:** Necessary amplifier and optical detector hardware, the data acquisition hardware (for Milestone 2), low cost lasers from Iolon (custom-modified for use with the low cost laser study).

**3. Designs:** Existing LE amplifier and optical detector designs, previously and newly developed frequency analysis (“FFT”) accelerator hardware designs and associated know-how.

**4. Test Facilities:** Access to test facilities necessary to perform development and Milestone testing. In addition LE will provide thermal chambers, environmental monitoring instrumentation and data acquisition systems adequate in scope to complete all necessary testing.

**5. Prototype:** At the end of the Development Term (should all Milestones be met), LE will provide to LT the prototype electronics for two instrumentation units. More specifically, LE will provide two prototype electronic assemblies which will be in the form of populated printed circuit boards with software loaded into them at the request of LT (the “LE Prototypes”).

**6. Engineering Resources:** Analog and digital electronics design, software development/programming, and mechanical design engineering, including the majority of the required engineering design tools required for the Project. It is contemplated that LE shall contribute approximately one (1) man-year of technical support to the Project.

**PRIVILEGED AND CONFIDENTIAL**

7. Personnel: It is anticipated that LE will provide technical support during the Development Term through the following individuals employed by LE (provided, however, any replacements to the listed individuals will be at the reasonable discretion of LE):

- a. Brooks Childers will devote during the Development Term up to seventy-five percent (75%) of his work time at LE toward completing the Milestones;
- b. Monte Doherty will devote during the Development Term up to ninety percent (90%) of his work time at LE toward completing the Milestones;
- c. Prasad Ramakrishna will devote during the Development Term up to sixty percent (60%) of his work time at LE toward completing the Milestones; and
- d. Sam Zerwekh will devote during the Development Term up to ten percent (10%) of his work time at LE toward completing the Milestones.

### **III. COMMERCIALIZATION**

**A. POST DEVELOPMENT TERM.** At the conclusion of the Development Term, and if all Milestones have been met to the satisfaction of LE, each Party will be responsible for its own actions in regard to optimizing the resulting designs, hardware, and software for incorporation into commercial products and the manufacture of those products

#### **B. LT OBLIGATIONS.**

1. LT shall automatically grant to LE at the conclusion of the Development Term, and if all Milestones have been met to the reasonable satisfaction of LE:

a. A perpetual, royalty-bearing, non-sublicensable (except as set forth in the following sentence), non-transferable (except to a purchaser of all or substantially all of the business or assets of LE), non-exclusive license in the Downstream Field to Existing LT IP, Recently Developed LT IP, and Newly Developed LT IP to manufacture, have manufactured, use, sell, offer for sale or import Licensed Products ("Non-Exclusive License"). LE may sublicense its rights hereunder only with the prior written consent of LT, and only upon terms reasonably satisfactory to LT, including terms that are at least as protective of the Existing LT IP, Recently Developed LT IP, and Newly Developed LT IP as are set forth in this Agreement; and

b. A perpetual, royalty-bearing, non-sub-licensable (except as set forth in the following sentence), non-transferable (except to a purchaser of all or substantially all of the business or assets of LE), exclusive license, convertible to non-exclusive as per Section III.C.2. below, in the Upstream Field to Existing LT IP, Recently Developed LT IP, and Newly Developed LT IP to manufacture, have manufactured, use, sell, offer for sale or import Licensed Products ("Exclusive License"). LE may sublicense its rights hereunder only with the prior written consent of LT, and only upon terms reasonably satisfactory to LT, including terms that are at least as protective of the Existing LT IP, Recently Developed LT IP and Newly Developed LT IP as are set forth in this Agreement.

### **PRIVILEGED AND CONFIDENTIAL**

---

2. In conjunction with the license grant provided in Section III.B.1 above, LT will provide LE with copies of applicable schematics, Gerber files, mechanical drawings, and software used in the LE DDxS instrumentation prototype, which materials shall be used only within the scope of the licenses granted in such section or of other licenses mutually agreeable to the parties.

### **C. LE OBLIGATIONS.**

1. In regard to both the Exclusive and Non-Exclusive Licenses, LE will pay to LT a royalty of two and one half percent (2.5%) of Net Revenue (as defined in Section VI.P) through the calendar year 2017 (“Royalty Payments”). The Exclusive License shall remain exclusive only if (a) LE pays the following amounts to LT regardless of the actual amount of Royalty Payments (“Guaranteed Payments”), and (b) LE has not breached the term of this Agreement, including the payment provisions:

- a. \$20,000 for the calendar year 2007;
- b. \$40,000 for the calendar year 2008;
- c. \$60,000 for the calendar year 2009;
- d. \$80,000 for the calendar year 2010;
- e. \$100,000 for the calendar year 2011; and
- f. \$120,000 for each calendar year 2012 through 2017.

2. Notwithstanding the provisions in C.1. above, LE reserves the right to terminate the exclusivity of the Exclusive License, converting it instead to non-exclusive, upon six (6) months notice to LT, which will have the effect of terminating LE’s obligation to make to LT all not yet earned Guaranteed Payments. Moreover, should the aggregate amount of Royalty Payments in any calendar year exceed the Guaranteed Payment for the same year, all of the excess amount over the Guaranteed Payment will be credited toward the Guaranteed Payment for the following (and subsequent, as necessary) calendar year. For example, should the total amount of Royalty Payments for the calendar year 2008 be \$50,000, LT will receive the entire \$50,000, but the \$10,000 over the \$40,000 Guaranteed Payment for 2008 will be used to meet the Guaranteed Payment amount for 2009 (which, therefore, would be reduced from \$60,000, to \$50,000 (i.e., reduced \$10,000)). The foregoing shall not relieve LE of the obligation to make Royalty Payments on sales or license of Licensed Products (i) under the Exclusive License through the effective date of such termination, and (ii) under the Non-Exclusive License so long as such license remains in effect.

3. LE hereby grants to LT a royalty-free, non-sublicensable (except as set forth in the following sentence), non-transferable (except to a purchaser of all or substantially all of the business or assets of LT), non-exclusive license to Newly Developed LE IP to manufacture, have manufactured, use, sell, offer for sale or import Licensed Products outside the Upstream Field. LT may sublicense its rights hereunder only with the prior written consent of LE, and only upon terms reasonably satisfactory to LE, including terms that are at least as protective of the Newly Developed LE IP as are set forth in this Agreement,

**PRIVILEGED AND CONFIDENTIAL**

---

4. LE grants to LT a royalty-free, perpetual, sub-licensable, non-transferable (except to a purchaser of all or substantially all of the business or assets of LT), non-exclusive license (i) to use the schematics, Gerber files, mechanical drawings, and software used in the LE DDxS instrumentation prototype, and (ii) to use the LE Prototype delivered pursuant to Section II.G.5.

5. With respect to any royalty payments hereunder, LE agrees to pay to LT for each and every Licensed Product sold by LE calculated at a royalty rate described above.

6. All payments of royalties under this Agreement shall be made in United States dollars to LT at the address designated in Section VI.I. The amounts payable pursuant hereto shall be converted to United States dollars at the official foreign exchange rate in effect on the last day of the calendar semester (6 months) for which the payments are made.

7. LE shall furnish LICENSOR, within forty-five (45) days following the last day of each calendar quarter during the continuance of this Agreement, a report in writing, indicating for the quarter in question a listing of the number of Licensed Products sold by LE, indicating: the number of Licensed Products sold; the applicable Net Revenue; and the royalty due therefor, calculated in accordance with the provisions herein.

8. Each such report shall be accompanied by payment in full of the royalties due to LT.

9. LE shall keep records for up to three (3) years from the date of any reports issued or payments made hereunder in sufficient detail to verify all such reports and payments due LT under this Agreement. LE agrees to allow an independent third party, acceptable to both Parties hereto, to have access to and to audit such records upon seven (7) days prior written notice, and to investigate relevant directly related records. Such access shall be allowed no more than once per year. In the event such third party determines that LE has underpaid the royalties, LE shall promptly make payment for such deficiency. If such underpayment is greater than five percent (5%) of the amount owed, then the costs and expenses of such audit shall be borne by LE. In the event of an overpayment of royalties, such overpayment shall be credited toward the next royalty payment due from LE.

#### **IV. INTELLECTUAL PROPERTY**

##### **A. OWNERSHIP OF INTELLECTUAL PROPERTY.**

1. All right, title and interest in and to Existing LT IP, Recently Developed LT IP and Newly Developed LT IP shall be owned by LT, except for the licenses granted under Section III.B and Section IV.B.

#### **PRIVILEGED AND CONFIDENTIAL**

---

2. All right, title and interest in and to Existing LE IP and Newly Developed LE IP shall be owned by LE, except for the licenses granted under Section III.C.3 and III.C.4 and under Section IV.B. below.

**B. PROSECUTION OF PATENTS.**

1. If LT determines not to file any patent application related to the Newly Developed LT IP that pertains: to the DDxS instrument, it shall notify LE within sixty (60) days of any patent office deadline. In such case, LE shall have the right to file such application for such Newly Developed LT IP that pertains to the DDxS instrument. In such event, LE shall grant back to LT a non-exclusive, perpetual, royalty free, sub-licensable, transferable license outside the Upstream Field for such Newly Developed LT IP under LE' s Patent Rights thereto to manufacture, have manufactured, use, sell, offer for sale or import Licensed Products.

2. If LE determines not to file any patent application related to the Newly Developed LE IP that pertains to OFDR-based instrumentation, it shall notify LT within sixty (60) days of any patent office deadline. In such case, LT shall have the right to file such application for such Newly Developed LE IP that pertains to the OFDR-based instrumentation. In such event, LT shall grant back to LE a non-exclusive, perpetual, royalty free, sublicensable, transferable license in the Upstream Field and the Downstream Field for such Newly Developed LE IP under LT's Patent Rights thereto to manufacture, have manufactured, use, sell, offer for sale or import Licensed Products.

**C. JOINT INVENTIONS.** In the event the Newly Developed LT IP or the Newly Developed LE IP are deemed to be joint inventions under applicable patent law principles (the "Jointly-Developed IP"), LE shall assign, transfer and convey its Patent Rights in and to such Jointly Developed IP to LT, and LT shall grant to LE a perpetual, royalty-bearing (pursuant to Section III.C), non-sub-licensable (except as set forth in the following sentence), non-transferable (except to a purchaser of all or substantially all of the business or assets of LE), exclusive license in the Upstream Field, and non-exclusive in the Downstream Field, to such Jointly-Developed IP to manufacture, have manufactured, use, sell, offer for sale or import Licensed Products. LE may sublicense its rights to such Jointly-Developed IP only with the prior written consent of LT, and only upon terms reasonably satisfactory to LT, including terms that are at least as protective of the Jointly-Developed IP as are set forth in this Agreement.

**V. COLLABORATION MANAGEMENT**

**A. REPRESENTATIVES OF THE PARTIES.** During the Development Term, LT and LE shall each designate a primary contact ("Representative") to support the Project development plan.

**B. PROJECT REVIEW MEETINGS.** LE and LT management shall conduct a combined Project review meeting at least once a calendar quarter. In the Project review meetings, technical staff shall summarize accomplishments and future plans, and assess risks. In addition, at such review meetings each Party shall disclose to the other Party the Newly Developed IP that has been developed since the previous review meeting.

**PRIVILEGED AND CONFIDENTIAL**

---

## **VI. GENERAL PROVISIONS**

**A. USE OF NAMES AND PUBLIC DISCLOSURES.** Without the express written permission of the other Party, a Party may not use the other Party's name, logos, or trademarks. LT will not publish any information relating to the use of OFDR-based technology in relation to FBG-based or RB-based sensing during the Development Term without the written consent of LE, which consent shall not be unreasonably withheld.

**B. TRADE SECRETS/CONFIDENTIALITY.** Each Party acknowledges that, in connection with, and as a direct result of, this Agreement, the Parties may from time to time disclose to each other, in confidence, certain of the Company's established trade secrets, proprietary information, production and sales methods, and manufacturing techniques. All such confidential shall be marked as such or reduced to summary content and said summary marked "Confidential" within thirty (30) days of disclosure. All such conveyed information shall at all times be maintained by the receiving Party in strict confidence and utilized by that Party only in connection with the objectives of this Agreement or a properly granted license. The receiving Party will not utilize, directly or indirectly, any of such trade secrets or other confidential information in any business or activity whatsoever (other than pursuant to this Agreement or a properly granted license). The receiving Party acknowledges that all such trade secrets and confidential information are valuable, unique, and special assets of the other Party and the receiving Party will not disclose any of the same to any person, firm, corporation, or other entity, for any reason or purpose, without the prior written consent of the other Party. For the purposes of this Agreement, the term, 'Confidential Information,' or any references thereto shall not include any information that (a) which is at any the in the public domain not as a result of a violation hereof by the receiving; (b) which is known to receiving Party prior to conveyance thereof by Company; (c) which is received by the receiving Party from a third party without any violation of confidentiality owed to the other Party; (d) which is developed or known to the receiving Party wholly without the use or knowledge of or reference to the confidential information disclosed by the other Party and/or (e) which is required to be disclosed by the receiving Party pursuant to legal process. Upon the termination or expiration of this Agreement, the confidentiality obligations set forth in this Section IV.B. will survive for a period of ten (10) years.

**C. RELATIONSHIP.** The Parties intend by this Agreement to establish an independent contractor relationship. It is not their intention to create a joint venture or partnership between LE and LT or to make the employees, agents, or affiliates of one Party in any sense an agent, employee or affiliate of the other Party. It is further agreed that one Party (including any of its employees, agents, or affiliates), has any authority to create or assume in the other Party's name or on the other Party's behalf any obligation, express or implied, or to act, or purport to act, as the other Party's agent or representative for any purpose whatsoever.

### **D. ARBITRATION.**

**1.** Any claim, action, dispute, or controversy of any kind arising under or relating to this Agreement or concerning any aspect of performance by any Party under this Agreement shall be resolved by mandatory and binding arbitration administered by the American Arbitration Association ("AAA"). The arbitration shall be to a panel of three arbitrators

**PRIVILEGED AND CONFIDENTIAL**

---

knowledgeable in the area of commerce represented by the Licensed Products contemplated by this Agreement, and shall be in accordance with the terms of this Agreement and the rules and procedures established by the AAA for submission of disputes for arbitration. In the event of a conflict between this Agreement and the AAA rules, this Agreement will control.

2. In the event a claim is submitted to the AAA for arbitration, the prevailing Party is entitled to recover from the other party all of its costs involved in the arbitration, including, but not limited to, all costs and fees imposed by the AAA for the arbitration, all fees and expenses charged by the arbitrators, all expenses incurred in prosecution or defense of the arbitration, including without limitation reasonable attorney fees to be established by the arbitrators. All costs of recovery provided for in this Section VI.D. shall be included in any award or other order set out by the arbitrators. Notwithstanding anything to the contrary, the parties hereby agree to forego any claim for, and the arbitrator(s) shall have no power to award, damages for consequential loss or punitive damages.

3. Any attorney-client privilege and other protection against disclosure of privileged or confidential information, including without limitation any protection afforded by the work-product immunity from discovery, that could otherwise be claimed by any Party shall be available to, and may be claimed by, any such party in any arbitration proceeding. No Party waives any attorney-client privilege or any other protection against disclosure by reason of anything contained in, or done pursuant to, the arbitration provisions of this Agreement. Moreover, the Parties agree to keep confidential among them the fact that an arbitration request has been filed or that an arbitration is being, or has been, conducted.

4. The Parties hereby agree that no appeal or other judicial proceeding may be initiated as a result of an arbitration award or denial of claim, except as hereinafter provided. Either Party to an arbitration action may bring an action in either the state courts located in Blacksburg, Virginia or the United States District Courts located in the state of Virginia (and only within these courts) (the "Applicable Courts") to confirm the arbitration award and for the entry of judgment thereon pursuant to the Federal Arbitration Act. For the purpose of such a proceeding to confirm and entry of judgment, LE and LT consent to the personal jurisdiction of the Applicable Courts.

5. This Agreement shall be governed, construed and enforced in any arbitration proceeding in accordance with the laws of the State of Virginia. Unless otherwise expressly agreed between the Parties, any arbitration action brought under this Agreement will be brought and heard in Blacksburg, Virginia.

#### **E. COMPLIANCE WITH LAW AND POLICIES.**

1. In carrying out its obligations under this Agreement each Party will comply with all laws applicable to it and its business.
2. Each Party will indemnify, defend, and hold the other Party harmless from and against any and all claims, demands, liabilities, damages, and costs which may arise from the Party's failure to comply with the provisions of this Section VI.E.
3. Each Party shall comply with applicable written policies and rules of the other Party when at that Party's facility.

#### **PRIVILEGED AND CONFIDENTIAL**

---

**F. ENTIRE AGREEMENT.** This Agreement contains the entire agreement between the Parties, and supersedes all prior agreements and understandings, relating to the subject matter hereof. No officer, employee, agent or representative of either Party has any authority to make any representation or promise not contained in this Agreement, and the Parties have executed this Agreement without relying upon any such representation or promise.

**G. BINDING EFFECT.** This Agreement is binding upon and shall inure to the benefit of the Parties and their respective successors and assigns, provided, however, this Agreement and the interest of either Party under this Agreement may not be assigned or transferred without the prior written consent of the other, with such consent not to be unreasonably denied.

**H. SEVERABILITY.** Nothing contained in this Agreement shall be construed as requiring the commission of any act contrary to law. If for any reason any provision of this Agreement shall be determined by a court of competent jurisdiction to be legally invalid or unenforceable in any jurisdiction: (i) the validity of the remainder of this Agreement shall not be affected; (ii) that provision shall be deemed modified to the minimum extent necessary to make that provision consistent with applicable law; and (iii) in its modified form, that provision shall then be enforceable and enforced.

**I. NOTICES.** All notices required or permitted under this Agreement shall be delivered either in person, by courier, by overnight delivery service (i.e., Federal Express, Airborne Express, etc.), or sent by certified mail, postage prepaid, addressed to the ether Party's Representative as follows:

To LE:       Attention:   Steve Poland  
                                  Luna Energy  
                                  309 North Knollwood Drive  
                                  Blacksburg, VA 24060

With Copy to:       Deputy General Counsel, IP  
                                  Baker Hughes Incorporated  
                                  3900 Essex Lane, Suite 1200  
                                  Houston, Texas, 77027

To LT:       Attention:   John Goehrke  
                                  Luna Technologies  
                                  2020 Kraft Drive  
                                  Blacksburg, VA 24060  
                                  Email: goehrkej@lunatechnologies.com

All notices shall be deemed to have been given on the date of receipt. Either Party may change its address or the Representative to whom the notice is to be delivered at any time by written notice given to the other Party.

**PRIVILEGED AND CONFIDENTIAL**

---

**J. AMENDMENTS/WAIVERS.** This Agreement may not be amended except in writing, signed by both of the Parties. The failure of either Party to enforce at any time any of the provisions of this Agreement shall not be construed to be a waiver of those provisions or of the right of that Party thereafter to enforce those provisions. No waiver of any provision hereof shall be effective unless in writing, signed by the Party against whom such waiver is sought to be enforced. No waiver shall be a continuing waiver.

**K. CONSEQUENTIAL DAMAGES WAIVER.** Neither party shall be liable to the other Party for, and each Party hereby releases the other Party from and against, any indirect, special, punitive, exemplary, incidental or consequential damages or losses, whether foreseeable or not at the date of this Agreement, suffered or incurred by the releasing Party, including, but not limited to, damages or losses for lost production, lost revenue, lost product, lost profits, lost business or business interruptions arising in connection herewith, in any way relating to either Party's performance, due to the termination of this Agreement, or however caused, on any theory of liability, regardless of whether such Party was aware of the possibility of such damages. In no event shall either Party's aggregate liability under this Agreement exceed the amount of payments and royalties received by LT from LE under this Agreement. The foregoing limitations and caps shall not apply to breaches of license rights granted under this Agreement, violations by a Party of the other Party's intellectual property rights, breaches of Section VI.B, and intentional and willful misconduct of a Party.

**L. INDEMNIFICATION.**

**1.** NEITHER PARTY ASSUMES LIABILITY FOR THE ACTS OF THE OTHER PARTY IN THE PERFORMANCE OF OBLIGATIONS UNDER THIS AGREEMENT.

**2.** EACH PARTY SHALL DEFEND, INDEMNIFY, AND HOLD THE OTHER PARTY, ITS RESPECTIVE PARENT, AFFILIATES, RELATED AND SUBSIDIARY COMPANIES, AND ALL OF THEIR RESPECTIVE OFFICERS, DIRECTORS, AND EMPLOYEES (THE "INDEMNIFIED GROUP") HARMLESS FROM AND AGAINST ANY AND ALL CLAIMS, DEMANDS, CAUSES OF ACTION, LIABILITIES, DAMAGES, JUDGMENTS, AWARDS, LOSSES, COSTS AND EXPENSES (INCLUDING REASONABLE ATTORNEYS' FEES AND COSTS OF LITIGATION) OF ANY KIND OR CHARACTER (A) FOR PERSONAL OR BODILY INJURY, SICKNESS, DISEASE, OR DEATH OF ANY PERSON, OR (B) FOR DAMAGE, LOSS, OR DESTRUCTION OF PROPERTY OWNED, LEASED OR OTHERWISE USED BY OR BELONGING TO THE INDEMNIFIED GROUP ARISING OUT OF OR PROXIMATELY CAUSED BY THE NEGLIGENT ACTS OR OMISSIONS OF THE INDEMNIFYING PARTY WHILE PERFORMING THIS AGREEMENT, EXCEPT THAT SHOULD SUCH HARM OR DAMAGE BE CAUSED BY THE JOINT OR CONCURRENT NEGLIGENCE OR WILLFUL MISCONDUCT OF THE INDEMNIFIED GROUP, THE PARTIES SHALL BE RESPONSIBLE FOR SUCH HARM OR DAMAGE IN PROPORTION TO THEIR FAULT.

**3.** Notwithstanding the above, the Party to be indemnified shall use its best efforts to notify the indemnifying Party within twenty-four (24) hours or as soon as reasonable possible of any accident or event which may cause any claim for damages of any nature to arise while the indemnified is performing its duties pursuant to this Agreement.

**PRIVILEGED AND CONFIDENTIAL**

---

**M. HEADINGS.** Headings used herein are for illustrative purposes only, and are not to be considered to be a part of the terms and conditions of the Agreement or used in any way in the enforcement or interpretation of the Agreement.

**N. FORCE MAJEURE.** Neither Party will be liable to the other Party or any other person for delay or other failure of performance due to any cause or causes beyond its reasonable control, including without limitation acts of God, acts or failures to act of suppliers, acts of military or civil authorities, fire or other casualty, strikes, lockouts, weather, epidemic, war, riots, delays in transportation or car shortages, or inability to obtain necessary labor, materials, components, equipment, services, energy or utilities through that Party's usual and regular sources at posted or published prices. In any such event, the Party claiming an event of Force Majeure under this Section VI.N. may, at any time, without further liability to the other Party:

1. Postpone performance under this Agreement;
2. Make partial performance or cancel all or any portion of this Agreement.

**O. TERM; TERMINATION.** This Agreement shall commence on the Effective Date and shall continue in effect until August 1, 2006, unless earlier terminated in accordance with this Section VI.O. At any time during the Development Term, either Party may terminate this Agreement upon ninety (90) days prior written notice to the other Party. Either Party may also terminate this Agreement (including the licenses granted hereunder) if the other Party breaches this Agreement, which breach is not cured within thirty (30) days of written notice thereof. Provided, however:

1. If LT terminates the Agreement during the Development Term for convenience or fails to meet Milestones 1, 2, or 3 (other than on account of technical infeasibility which is reasonably verifiable by LE), LT will grant to LE a perpetual, non-transferable, non-royalty-bearing license, exclusive in the Upstream Field and non-exclusive in the Downstream Field, to the Existing LT IP, Recently Developed LT IP and Newly Developed LT IP required for LE to continue the Project through Milestone 7 and thereafter. If LT terminates the Agreement during the Development Term for convenience or fails to meet Milestones 4,5,6, or 7 (other than on account of technical infeasibility which is reasonably verifiable by LE), LT will grant to LE a perpetual, non-transferable, royalty-bearing license, exclusive in the Upstream Field and non-exclusive in the Downstream Field, to the Existing LT IP, LT Recently Developed IP and LT Newly Developed IP required for LE to continue the Project through Milestone 7 and thereafter, with the royalty rates set forth in Section III.C.1 adjusted as follows:

- (i) if such termination is after Milestone 3 is met but before Milestone 4, the royalty rate shall be 0.5%,
- (ii) if such termination is after Milestone 4 is met but before Milestone 5, the royalty rate shall be 1.0%,

**PRIVILEGED AND CONFIDENTIAL**

---

(iii) if such termination is after Milestone 5 is met but before Milestone 6, the royalty rate shall be 1.5%, and

(iv) if such termination is after Milestone 6 is met but before Milestone 7, the royalty rate shall be 2.0%.

2. If LE terminates the Agreement during the Development Term for convenience, LE will:

a. Grant to LT a non-exclusive, perpetual, non-transferable, non-royalty-bearing license to Newly Developed LE IP to manufacture, have manufactured, use, sell, offer for sale and import Licensed Products outside the Upstream Field;

b. Reimburse LT for all committed LT expenses related to completing of the Milestones; and

c. Pay LT for the Milestone then currently under development.

3. If LT and LE jointly agree to terminate the Agreement both Parties will retain all ownership and ownership rights that are associated with its respective Existing IP and Newly Developed IP, and LT will retain all ownership and ownership rights associated with the Recently Developed LT IP.

**P. FURTHER DEFINITIONS.** For purposes of this Agreement, the following definitions will have the meanings indicated:

1. "Affiliates" of a party shall mean any company controlling, controlled by or under common control with such party.

2. "Downstream Field" shall mean sensor applications for oil and gas refining and subsequent activities in the distribution chain, such as sale to wholesale and retail oil and gas markets.

3. "Existing LE IP" shall mean LE IP that exists as of the Effective Date and, unless otherwise provided herein, or otherwise agreed in writing between the Parties, will remain the property of LE.

4. "Existing LT IP" shall mean LT IP that exists as of the Effective Date.

5. "Gross Revenue" shall mean revenue received by LE from all sources for the sale or licensing of Licensed Products.

6. "Licensed Product" shall, mean any product or part thereof of a Party (which, in the case of LE, shall include products based on the prototypes developed during the Development Term) whose manufacture, use, sale, offering for sale or importation, but for the licenses granted herein, would infringe the Existing LT IP or Newly Developed LT IP, in the case of an LE product, or Existing LE IP or Newly Developed LE IP, in the case of an LT product.

**PRIVILEGED AND CONFIDENTIAL**

---

7. "LE IP" shall mean all patents, patent applications, copyrights, trade secrets, and know-how that is related to DDxS instrumentation for oil and gas applications.

8. "LT IP" shall mean patents, patent applications, copyrights, trade secrets, know-how, and all related software code, drawings, schematics, specification sheets, and the like that relate to OFDR-based fiber optic sensing.

9. "Net Revenue" shall mean Gross Revenue minus a) sales, tariff duties and/or taxes, b) outbound transportation costs and expenses charged to customers, and c) credits on returns to LE that results from sales of Licensed Products.

10. "Newly Developed LE IP" shall mean LE IP developed during the Development Term.

11. "Newly Developed LT IP" shall mean LT IP developed during the Development Term.

12. "Patent Rights" shall mean patent rights of a Party associated with patents and patent applications, together with all divisions, continuations, continuations-in-part, re-examinations, reissues, substitutions, or extensions thereof, and patents issuing therefrom in the United States and non-U.S. jurisdictions, for the life of such patent rights.

13. "Recently Developed LT IP" shall mean LT IP developed for concepts for reducing vibration sensitivity and providing immunity to polarization facing in system designs.

14. "Upstream Field" shall mean sensor applications for oil and gas exploration and production, including transportation to the refinery for refining but excluding subsequent activities in the distribution chain, such as refining and sale to wholesale and retail oil and gas markets.

**Q. SURVIVAL.** Except as provided in Section VI.O, in the event of the termination or expiration of this Agreement, the following sections shall survive in accordance with their terms: Section II.D, Section III.B, Section III.C, Section IV and this Section VI.

**PRIVILEGED AND CONFIDENTIAL**

---

**IN WITNESS WHEREOF**, the Parties have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

**LUNA ENERGY, LLC**

**LUNA TECHNOLOGIES, INC.**

By: /s/ Stephen E. Hester

(signature)

Name: Stephen E. Hester

(please print)

Title: COO/GM

Date: June 6, 2005

By: /s/ John Goehrke

(signature)

Name: John Goehrke

(please print)

Title: CEO

Date: 6/7/05

**PRIVILEGED AND CONFIDENTIAL**

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We have issued our report dated March 21, 2006, accompanying the consolidated financial statements of Luna Innovations, Incorporated, contained in the Registration Statement (Form S-1 No. 333-131764) and Prospectus. We consent to the use of the aforementioned reports in Amendment No. 2 to the Registration Statement and Prospectus, and to the use of our name as it appears under the caption "Experts."

*/S/ Grant Thornton LLP*

Vienna, Virginia  
March 21, 2006

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the use in this Registration Statement on Form S-1 (Registration No. 333-131764) of Luna Innovations Incorporated of our report dated September 22, 2005 relating to the financial statements of Luna Technologies, Inc. as of December 31, 2004 and for the year then ended appearing in the Prospectus, which is part of this Registration Statement. We also consent to the reference to us under the heading "Experts" in such Prospectus.

*/s/ Brown, Edwards & Company, L.L.P.*

CERTIFIED PUBLIC ACCOUNTANTS

Christiansburg, Virginia  
February 8, 2006