
LUNA
DEFYING IMPOSSIBLE.

## Safe Harbor Statement Under the Private Securities Litigation Reform Act of 1995

Safe Harbor Statement for Purposes of the “Safe Harbor” Provisions of the Private Securities Litigation Reform Act of 1995: This presentation contains “forward-looking” statements, which are not historical facts, but are forward looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements relate to analyses and other information based on forecasts of future results and estimates of amounts not yet determinable. These statements also relate to our future prospects and proposed new products, services, developments or business strategies. These forward-looking statements are identified by their use of terms and phrases such as “anticipate”, “believe”, “could”, “estimate”, “expect”, “intend”, “may”, “plan”, “predict”, “project”, “will”, “continue” and other similar terms and phrases, including references to assumptions. Although we believe that the expectations reflected in any of our forward-looking statements are reasonable, actual results could differ materially from those projected or assumed. Our future financial condition and results of operations, as well as any forward-looking statements, are subject to changes and to inherent known and unknown risks and uncertainties. Such risks and uncertainties include those set forth in our SEC filings. We do not intend, and undertake no obligation, to update our forward-looking statements to reflect future events or circumstances.

# About Luna

| | |
|---|---|
| Symbol | LUNA |
| Exchange | NASDAQ |
| Market Capitalization | $20.9M* |
| 52 Week Range | $3.36 - $1.15* |
| Current Cash | $14.4M* |
| Common Shares Outstanding | 15.0M |
| Auditor | Grant Thornton |
| Corporate Headquarters | Roanoke, VA |
| Employees | 116* |
| Founded | 1990 |
| Facilities | 4 |
| Patents & Patent Applications | 185* |

*as of September 30, 2014

We're a leader in fiber optic technology with unique capabilities and products for fiber optic sensing and telecom test and measurement.

We have been successful in taking innovative technologies from applied research to product development, and ultimately to the commercial market; driving breakthroughs in fields such as aerospace, automotive, energy, defense, and telecommunications.

# Corporate Focus

**2011**
- My Chung hired as President/CEO
- Focused on three strategic initiatives
  - Secure Computing
    - DARPA's Trust in FPGAs program
  - Fiber Optic Shape Sensing
    - Intuitive Surgical and Hansen Medical
  - Fiber Optic Strain & Temperature Sensing
    - ODiSI Platform

**2012**
- Partnership with Philips Healthcare

**2013**
- Sold Secure Computing technology and other assets to MacB, Inc.

**2014**
- Sold Medical Shape Sensing technology to Intuitive Surgical, Inc.
- Single focus on Strain & Temperature Sensing

## Successful restructuring and focus

- Divestment of Secure Computing technology
  - March 2013, sold SCC (technology and other assets) to MacAulay-Brown for $6.1 million, last payment of $125K due on Aug 31, 2014
  - Technology development fully funded by DARPA ($27.5 M)
- Divestment of Medical Shape Sensing
  - January 2014, sold Shape Sensing technology for medical applications to Intuitive Surgical for up to $30.0 million
    - $12 million received to-date
    - Up to an additional $18 million in the future upon achievement of certain technical milestones and commercial measures
  - Technology development fully funded by Intuitive Surgical, Hansen Medical, and Philips Medical ($17.0M)
- Healthy, Strong Balance Sheet
  - As of September 30, 2014, $13.4 million net cash ($14.4M cash & $1.0M debt)
- Focus on growth through penetration into the Fiber Optic Strain and Temperature Sensing markets
  - Investments in Engineering and Sales & Marketing in direct support of strategic initiative

# Business Overview

## Objective:

Build and operate a profitable company that researches, develops, and commercializes innovative technologies


### Technology Development Division (TDD):

Conduct applied research in primary areas of focus, with an eye toward commercialization

- Strong research engineering staff with history of developing IP with commercialization potential
- Self-sustaining division with stable revenues of $10M-$12M per year
- Focused groups within TDD include:
  - Materials Technology
  - Optical Systems
  - Biomedical Technology
  - Intelligent Systems
  - NanoWorks

### Lightwave Division:

Develop and commercialize breakthrough technologies for targeted growth industries

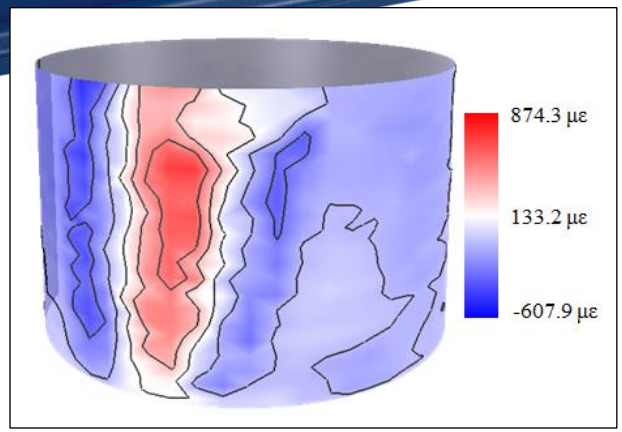
- Well positioned in high growth sensing and test & measurement markets
  - Lightwave offerings include:
    - Strain, stress & temperature fiber optics sensing products: High-resolution, high density
    - Patented, optical test & measurement solutions
  - Large, addressable, highly-targeted end markets
    - Aerospace, automotive, energy, and telecommunications markets

LUNA | Lightwave Division - Strain & Temperature Sensing

# Our Breakthrough Technology

## Allows materials, structures and systems to be seen like never before

Delivers fully distributed strain & temperature measurements with sub-centimeter spatial resolution


- The industry's only fully-distributed, high-definition strain/temperature sensor
- Fiber optic sensors are small, almost weightless and can go where no electrical sensor can go
- Our solution provides a breakthrough level of visibility into what's happening within composite and other novel material systems

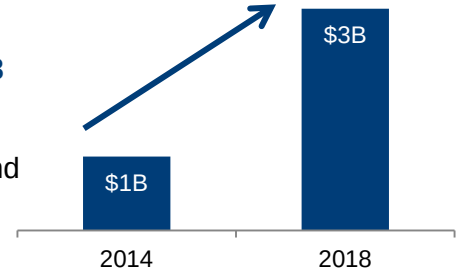
Example of strain data mapped to a composite overwrapped pressure vessel (COPV) following a drop test.

# Fiber Optic Strain & Temperature Sensing

**Globally, fiber optic sensing is an emerging technology that is in a rapid growth phase**

- Total market is over **$1B today** and expected to grow to over **$3B by 2018**
- Addressable market is estimated at **$325M** today and expected to grow to **$460M by 2018**

- The market need is based on a shift toward the use of composite materials
  - Specifically in aerospace, automotive, and wind energy because composites are lighter and stronger
- Use of composites is **growing at 20% per year**
  - Today, the highest percentage of composites is in aerospace
  - However, automotive is significantly increasing its share (projected to be 25% by 2022)
  - Luna is aggressively pursuing both the aerospace and automotive markets
- Additional examples of market opportunities are based on a need for better strain sensing solutions for civil structures such as bridges and tunnels, as well as nuclear cooling towers




Source; ElectroniCast “Fiber Optic Sensors Global Market Forecast & Analysis”, 2014





# Addressable Market Drivers

## Applications

- Structural / Fatigue Testing
- FEA Validation
- Component Testing
- Distributed Temperature sensing

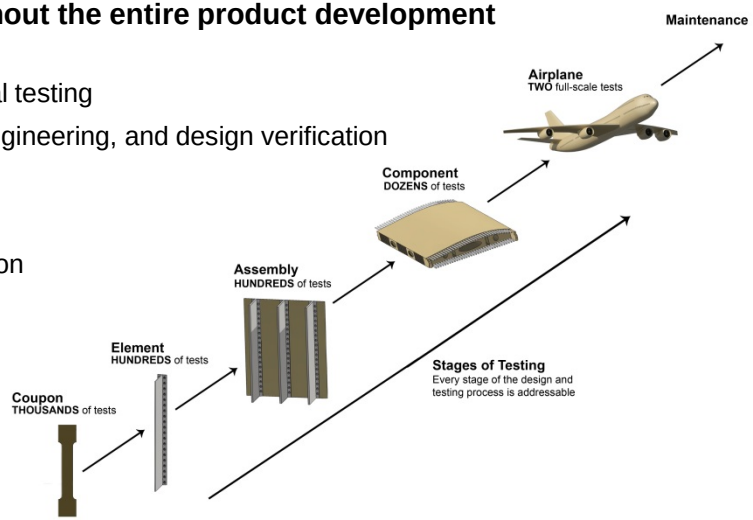
## Market segments

- Aerospace
- Automotive / Transportation
- Energy
- Universities / Research institutions

## Market Driver

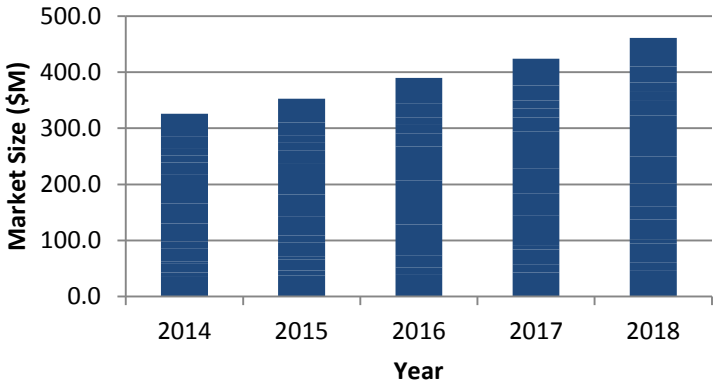
**Opportunities exist throughout the entire product development testing cycle.**

- Load, fatigue, and mechanical testing
- Composite manufacturing, engineering, and design verification
- Embedded sensing
- Structural health monitoring
- Model and simulation validation




## Addressable Market

Estimated at ~$325M in 2014, growing to ~$460M by 2018




Source: Photonic Consortium Report 2012; Luna market data; ElectroniCast's Fiber Optic Sensors Global Market Forecast & Analysis 2014; Frost & Sullivan's World Stress/Strain Measurement Equipment Market Report 2007

# Attractive Industry Dynamics

## The Market is Changing

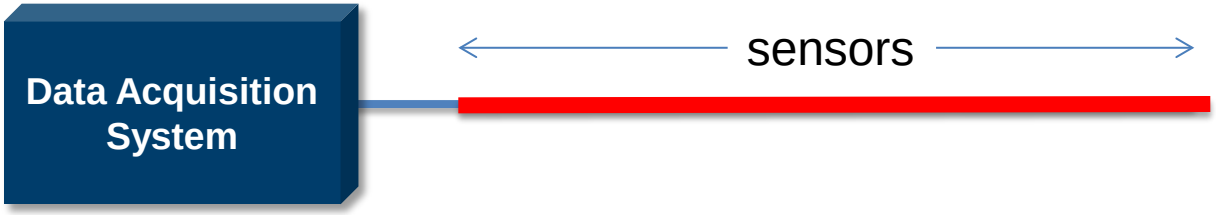
**Composite materials, unlike metals, are non-uniform. As a result they need better, more cost-effective test techniques than conventional electrical strain gages**

- Demand for high performance composites is projected to **increase 20%** each year
- By 2017, the composite materials industry is expected to reach **$29.9B**

- **Aerospace**
  - Aerospace demand for composites is **$2.3B** today and is expected to double, or even triple, over the next decade
    - Example: Boeing 787 Dreamliner and Airbus A350 are constructed largely of composites instead of traditional aluminum
- **Automotive**
  - Automotive demand for composite materials is growing at a CAGR of 7%, projected to reach **$4.3B** by 2017
    - Example: BMW i3 (new electric vehicle in development) contains a significant amount of composites to reduce weight and enhance driving dynamics

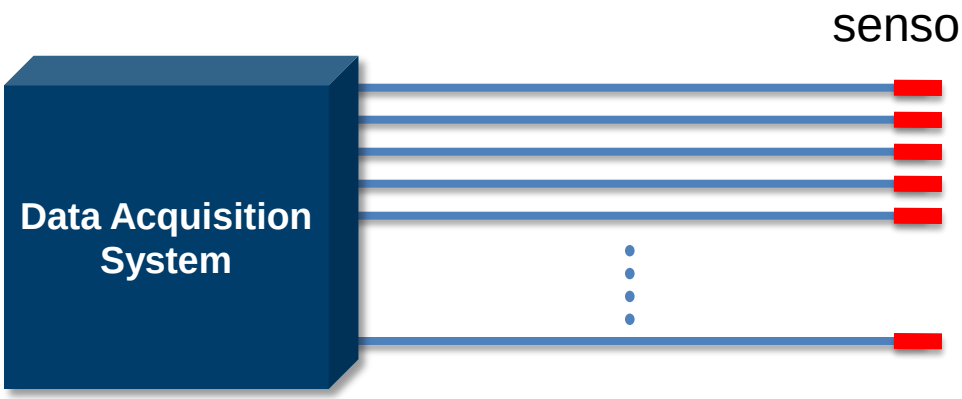
# Luna's Unique Approach

## Luna's Solution




- Single optical fiber
- 1000's of sensors
- Laser-based DAQ system
- Ultra-high spatial resolution
- Highly scalable
- Easy to install

## Standard, Electrical Approach




- Three wires per sensor
- Multiple DAQs
- Low resolution
- Not Scalable
- Difficult to install

# Comparing Optical Techniques

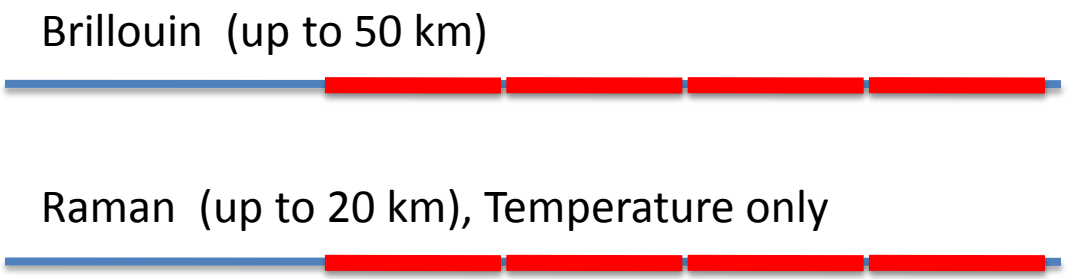
## Rayleigh Sensing (Luna ODiSI)


- Sensor is continuous
- Uses COTS optical fiber
- Thousands of sensors per fiber
- Very high resolution (mm)

## Fiber Bragg Sensing (FBG)


- Sensors are discrete
- FBGs must be manufactured
- 10's of sensors per fiber
- Low resolution

## Distributed Sensing




- OTDR-based
- Low resolution (meters)
- Long range (km)

# Competitive Advantages

## Strain &Temperature Sensing

**Our solution is more cost-effective, easier to install, and provides more accurate results than conventional methods**

- Offers compelling advantages to the aerospace, automotive, and energy markets
- Can replace thousands of individually-wired sensors and expensive readout electronics with a single optical fiber and interrogator
- Provides nearly continuous measurement of strain or temperature
- Detects defects during design and testing
- Provides greater insight into the condition of composites

**Fiber-optic sensing is a better solution than conventional technologies**

- More cost effective
  - Uses low-cost optical fiber as the sensor
  - Offers a single channel vs. multiple channels for strain gages
- Easy to install
  - Fiber applies with a standard epoxy; does not require soldering of leads
- Provides higher resolution
  - Hundreds of sensing points per meter of fiber
- More accurate results
  - Can see details that point sensors would miss

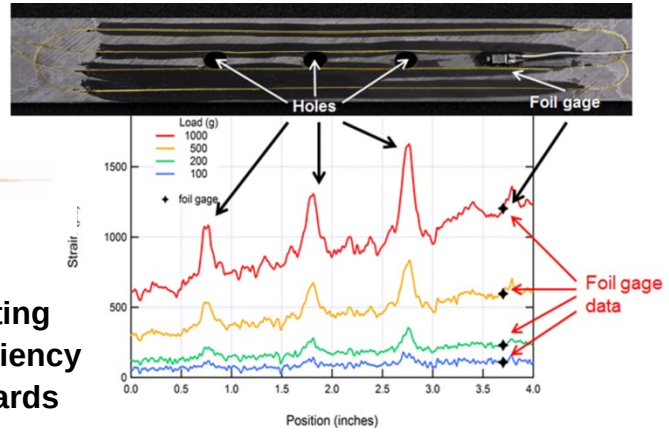
# Impact on Key Markets

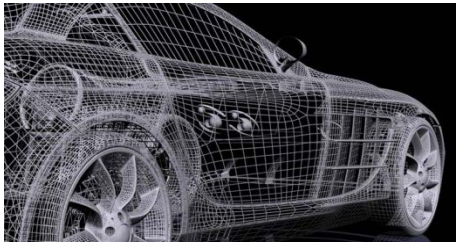
## Impact on Aerospace

**Aircraft wing testing requires thousands of strain gage measurements**

- **Conventional solution**: thousands of strain gages individually wired to a data acquisition system
  - Example: 2000 strain gages = 2000 sensing points
    - 3 hours to install each strain gage
    - 6000 hours of installation time
    - $200-$300 per point
- **Our solution**: continuous optical fiber, single connection
  - Example: 2000 sensing points
    - 12 hours installation time
    - < $20 per point

Catch defects conventional strain gages can easily miss



## Impact on Automotive

**Automotive manufacturers are incorporating composite materials to increase fuel efficiency and meet carbon dioxide emission standards**

Our technology allows them to meet those objectives:

- Enables composite structure design and analysis
- Monitors chassis flex (deformation)
- Can be embedded inside composite body panel for (crash simulation) analysis

LUNA | Lightwave Division - Test & Measurement

# Test & Measurement Products

## Component Analyzers

- Enables full characterization of optical components, assemblies and short-haul networks (IL, RL, PDL, GD, CD, PMD, etc.)


## Reflectometers

- High resolution reflectometry for optical component, assembly, module and short network manufacturers
- Unprecedented visibility into optical networks


## Swept Laser Sources

- Highly accurate, phase continuous swept lasers for R&D and development systems

# Test & Measurement Opportunity

**Continued demand for high-speed communication solutions**

Telecommunications

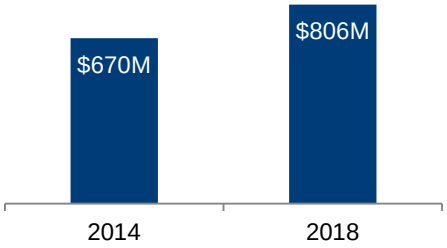
- "Bandwidth hungry" end-user applications and pervasive cloud computing driving 100 GB networks
- Triple play services and large-scale passive optical network (FTTH) deployments

Defense/Aviation

- Fiber optic installations up 70% on next-generation commercial aircraft
- Extensive deployment of fiber systems in military vehicles

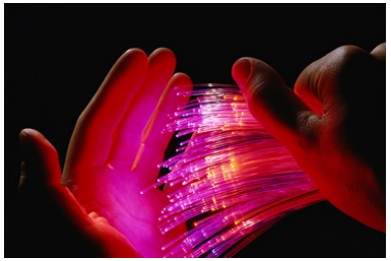
General spread of fiber optic networks

- Fiber optic telemetry and data center solutions
- Hybrid and integrated architectures in telecom, sensing, biological, instrumentation

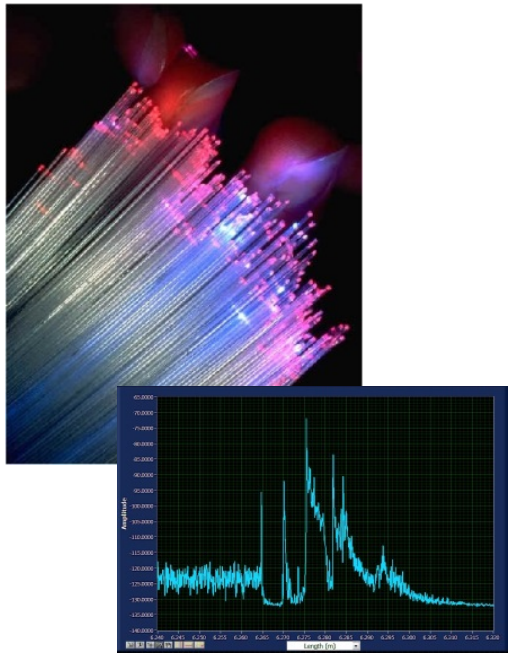



Source; Frost & Sullivan "Increasing Opportunities for Fiber Optic Test Equipment Globally", January 2013

- Market opportunity is over **$670M today**, growing to **$806M by 2018**



# Competitive Advantages




**We are well established as an industry leader, providing best-in-class resolution, speed, and accuracy**

- 10+ year track record of success with major, blue-chip OEMs in the telecommunications industry
- Building relationships with key Manufacturers and Aviation/Defense contractors

**Advantages vs. alternative technologies:**

Our products enable full characterization of passive optical components, assemblies, and short-haul networks

- Deliver the most comprehensive, sensitive, and accurate component test available on the market today
- Provide substantial cost and time savings
- Offer the only “zero dead-zone” OTDR capability available
- Replace the need to employ multiple test products by addressing all stages of the end-users’ test and measurement needs in a single sweep

LUNA | Technology Development Division

# Technology Development Overview

## Areas of Focus

### Materials Technology
- Protective / Responsive Coatings
- Conductive / EM Materials
- Functional Textiles

### Intelligent Systems
- Online Monitoring Systems
- Corrosion Sensors
- Hardware/Firmware/Software

### Optical Systems
- Long Distance Shape
- Harsh Environment Single Point Sensors

### Nanoworks
- Nanomaterials Production
- Nanomedicine
- Energy Technology

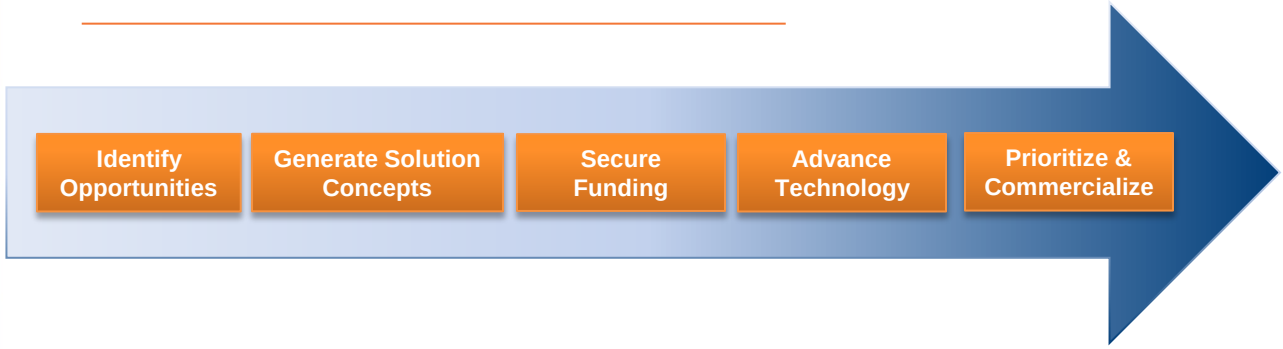
### Biomedical Technology
- Wound Healing
- Blood Simulant
- BioComposites

## Overview

**Self-sustaining division with stable revenues of $10M-$12M per year**

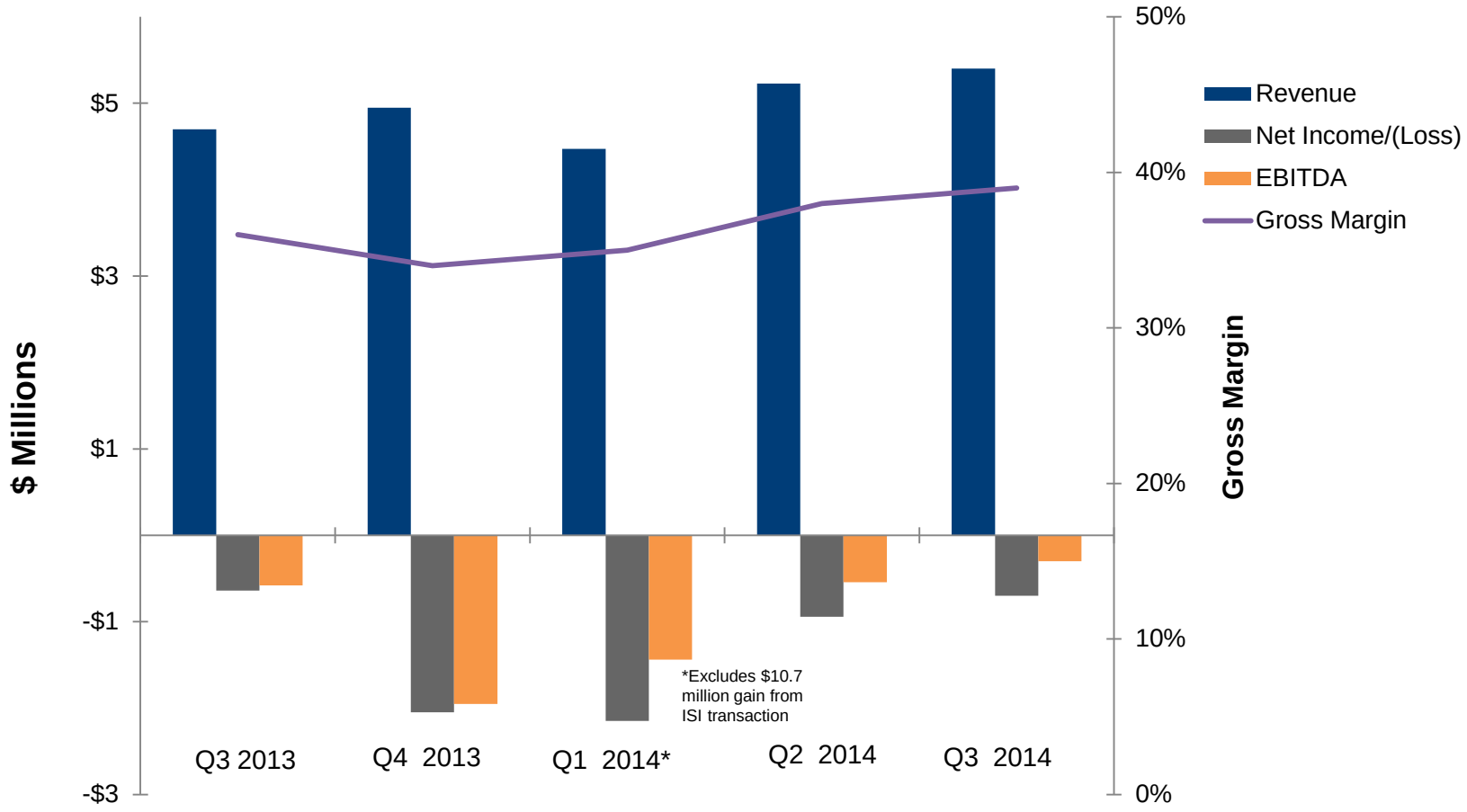
- Over $190M in contract wins over the past 10 years
- Backlog as of September 30, 2014 is $15.3M
- Conduct research on a fee-for-service basis for 3rd parties, generally retaining rights to the technology and patents developed under those contracts
- Pursue opportunities where we can develop intellectual property rights in areas that we believe have commercialization potential

## Process



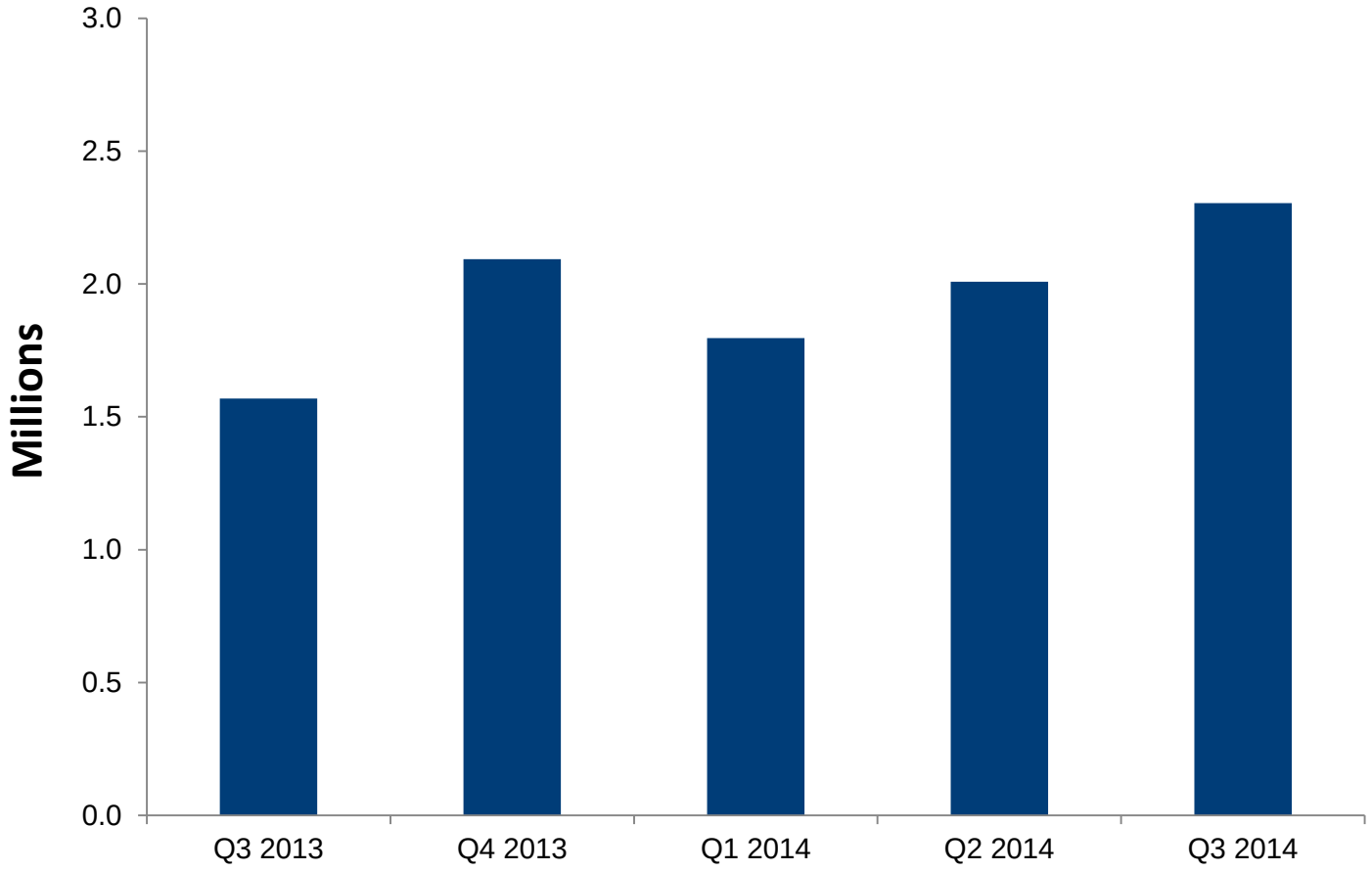
# Company Operating Results

# Return to Growth, Strong Balance Sheet




| | Q3 2013 | Q4 2013 | Q1 2014* | Q2 2014 | Q3 2014 |
|---|---|---|---|---|---|
| **Net Cash:** | **$5.7M** | **$5.7M** | **$9.1M** | **$13.3M** | **$12.8M** |

# Product & Licensing Revenue



# Executive Team

**My Chung, President and Chief Executive Officer**

- Former Senior Vice President of Sunrise Telecom
- Former President and CEO of Circadiant Systems, Inc
- Former President of Spirent Communications and Group Executive of Spirent PLC
- Bachelor's degree in Electrical Engineering, from the New Jersey Institute of Technology

**James Garrett, Ph.D., VP of Technology Development**

- Joined Luna in 2005, and was promoted to VP in July 2012
- Prior to joining Luna, worked for Bayer Material Science and conducted research at the Naval Research Laboratory
- Bachelor's degree in Chemistry from the College of William and Mary, and a doctoral degree in Material Science and Engineering from Penn State University

**Scott Graeff, Chief Strategy Officer and Treasurer**

- Has held titles including COO, EVP, Corp Dev, Chief Commercialization Officer and member of the Board of Directors at Luna
- Previous roles in venture capital and investment banking
- Bachelor's degree in Commerce from University of Virginia

**Fourd Kemper, VP & General Counsel**

- Joined Luna in 2008
- Was an equity principal with the law firm Woods Rogers PLC, focused on securities law, venture capital financing, mergers & acquisitions, and intellectual property and licensing
- Bachelor's degree in economics from Duke University and a juris doctor degree from the University of Virginia School of Law

**Dale Messick, Chief Financial Officer**

- Joined Luna in 2006
- Has more than 20 years of experience in accounting and financial reporting, pre-initial public offering and IPO activities, and management
- Bachelor's degree in Business Administration from the College of William and Mary and is a certified public accountant

**Geoff McCarty, VP of Marketing**

- Joined Luna in 2012
- Has led marketing and advertising at Advance Auto Parts, a Fortune 500 company, Hechinger, Home Quarters, and Pep Boys
- Bachelor's degree in Fine Arts, and has spent more than 25 years in marketing, business development, brand transformation, and market positioning

**Brian Soller, Ph.D., VP & GM, Lightwave Division**

- Former VP of Marketing for Micron Optics & VP of global sales and business development for Lightpath Technologies
- Originally spent ten years in fiber optics with Luna as a Scientist ultimately as General Manager of the Products Division
- Co-developed instrumentation for fiber optic devices
- Bachelor's and master's degree in mathematics and physics from University of Wisconsin, and a doctoral degree from the Institute of Optics, University of Rochester

## Why Luna

- Successfully reorganized around a single strategic focus
  - Penetration into the high-growth sensing market
  - Solutions that offer compelling cost and time savings
  - Proven track record with success in key applications
- Strong balance sheet
  - As of September 30, 2014
    - Cash: $14.4 million
    - Working Capital: $17.6 million
    - Debt: $1.0 million
  - Up to $18M of future payments from Intuitive Surgical, Inc.
- Trading close to value of cash on hand
  - September 30, 2014 closing price was $1.39
  - Cash per common share outstanding as of September 30, 2014 was $0.96

# Contact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