
Investor Presentation – NASDAQ: LUNA

November 2017

# Safe Harbor

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

This presentation includes information that constitutes “forward-looking statements” made pursuant to the safe harbor provision of the Private Securities Litigation Reform Act of 1995 that involve risks and uncertainties. These statements include the company's expectations regarding the company’s future financial performance and the potential demand for the company's products. Management cautions the reader that these forward-looking statements are only predictions and are subject to a number of both known and unknown risks and uncertainties, and actual results, performance, and/or achievements of the company may differ materially from the future results, performance, and/or achievements expressed or implied by these forward-looking statements as a result of a number of factors. These factors include, without limitation, failure of demand for the company’s products and services to meet expectations, technological challenges and those risks and uncertainties set forth in the company’s periodic reports and other filings with the Securities and Exchange Commission ("SEC"). Such filings are available on the SEC’s website at www.sec.gov and on the company’s website at www.lunainc.com. The statements made in this presentation are based on information available to Luna as of the date of this presentation and Luna undertakes no obligation to update any of the forward-looking statements after the date of this presentation, except as required by law.

## Non-GAAP Financial Measures

In addition to U.S. GAAP financial information, this presentation includes Adjusted EBITDA, a non-GAAP financial measures. This non-GAAP financial measures is in addition to, and not a substitute for or superior to, measures of financial performance prepared in accordance with U.S. GAAP. A reconciliation of Adjusted EBITDA to Loss from Continuing Operations is included in the appendix to this presentation.

# About Luna

| | |
|---|---|
| Symbol | LUNA |
| Exchange | NASDAQ |
| Market Capitalization | $46.5M* |
| 52 Week Range | $1.16 – $2.33* |
| June 30, 2017 Financial Info: | |
| Common Shares Outstanding | 27.7M |
| Pro Forma YTD Revenue | $21.4M |
| Pro Forma YTD Net Loss | $0.6M |
| Pro Forma Cash | $39.8M |
| Debt | $3.3M |
| Headquarters | Roanoke, VA |
| Employees | 190 |

*as of October 31, 2017

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.

# LUNA | Corporate Focus

**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

**2015**
- Merger with API for $16M in stock
- On road to profitability with over $50M in revenue

**2017**
- Sold High Speed Optical Receiver business to Macom Technologies for $33.5M in cash
- Scott Graeff appointed President & CEO

## Successful restructuring and focus

- **Divestment of Secure Computing technology**
  - March 2013, sold SCC (technology and other assets) to MacAulay-Brown for $6.1 million
- **Divestment of Medical Shape Sensing**
  - January 2014, sold Shape Sensing technology for medical applications to Intuitive Surgical for up to $21.0 million
    - $12 million up front
    - $9 million in December 2015
- **Merger with Advanced Photonix (API)**
  - May 2015 acquired API though a merger with stock worth $16M
  - Offices in California & Michigan
- **Divestment of High Speed Optical Receiver (HSOR) Division**
  - August 2017 sold the HSOR assets to Macom Technologies for $33.5 million
    - $29.5 million upfront
    - $4 million in December 2018
- **Healthy, Strong Balance Sheet**
  - Pro forma cash at June 30, 2017: $39.8M
  - Pro forma working capital at June 30, 2017: $44.5M
  - Debt at June 30, 2017: $3.3M

# Sale of High Speed Optical Receivers Business

- Sold to MACOM in August 2017
  - Sale price $33.5 million cash
    - $29.5 million received at closing; $4 million escrow until December 2018
  - Products primarily centered around 100G integrated coherent receivers for metro and long-haul communications networks and avalanche photo diodes for fiber to the premise market
  - Operations were previously part of Advanced Photonix Inc, which merged with Luna in May 2015
- Expect to utilize proceeds to enhance growth in our core fiber optic test and measurement business
  - Organic- Expand current sales and marketing capabilities
  - Inorganic- Seek opportunity to acquire strategic/complementary business

# Background

- My Chung, former CEO, Joined Luna in April 2011
  - Retired in October 2017
- Board appointed Scott A. Graeff as President & CEO
  - Began as a VC investor/Board Member of Luna Technologies in 2001; joined Luna in August 2003 as CFO
  - Held various positions over past 15 years including chief strategy officer, chief operating officer, chief financial officer and EVP of corporate development
  - Assumed lead role for numerous significant events in Luna's history, including its initial public offering, the sale Secured Computing technology to MacAulay-Brown, Inc., sale of the fiber optic shape sensing technology to Intuitive Surgical, Inc., the merger with Advanced Photonix, Inc., and most recently, as the acting general manager of the Picometrix Division, the sale of the high-speed optical receivers business to MACOM Technology Solutions Holdings, Inc.
  - Been working with Board and Chung on succession plan over past year

# Business Overview

## Objective:

Build and operate a profitable company that generates shareholder value through the development and commercialization of innovative technologies


### Technology Development:

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 $15M-$20M per year
- Focused groups within TDD include:
  - Materials Technology
  - Optical Systems
  - Biomedical Technology
  - Intelligent Systems
  - NanoWorks

### Products and Licensing:

Develop and commercialize breakthrough technologies for targeted growth industries

- Annual revenues of $25M-$30M
- Well positioned in high growth fiber optic test & measurement markets
  - Strain, stress & temperature fiber optics sensing products: High-resolution, high density
  - High speed, high resolution optical test & measurement instruments
- Custom optoelectronic components and subsystems
- Terahertz sensing for industrial process control

# Luna with Focus

**LEADER IN OPTICAL TECHNOLOGY**

We accelerate the process of bringing unique capabilities and revolutionary products to market to solve today's business challenges

## Optical Test & Measurement for Communications

We design and manufacture high performance fiber optic test instruments for the communications market

## Fiber Optic Sensing for Aerospace and Automotive

We deliver high-definition distributed strain & temperature sensing data not available using conventional measurement technologies

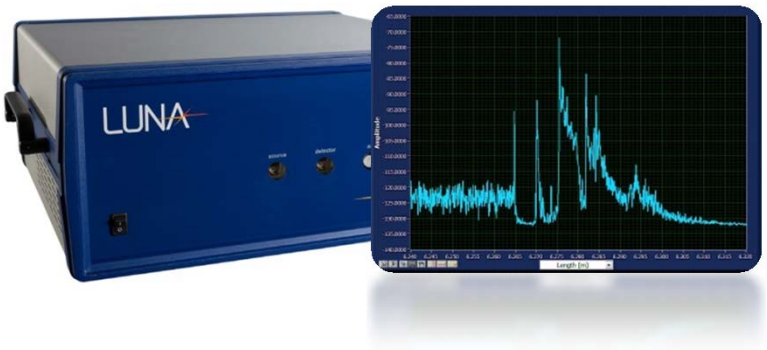
# Growth Areas

## Luna has developed a highly accurate, laser-based measurement technology that addresses multiple, growing markets

### Communications Test

Accelerating the development of advanced fiber optic components and networks

- Optical Vector Analyzer (OVA) and Optical Backscatter Reflectometer (OBR) products
- Fast and accurate characterization of high-speed fiber components and networks
- Enabling measurement technologies aimed at the growing silicon photonics market




### Structural & Material Test

Advanced measurement capability for composite materials

- ODiSI high definition fiber optic sensing for distributed strain and temperature
- Enabling next generation designs in the aerospace and automotive markets
- Focus on growth of new materials in aerospace and automotive markets

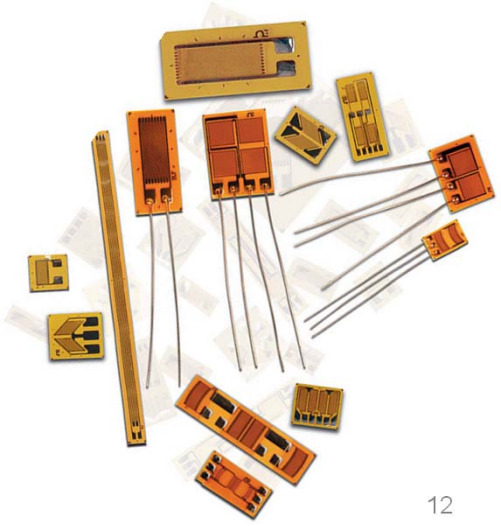
LUNA | Structural & Material Test

## Basics of strain

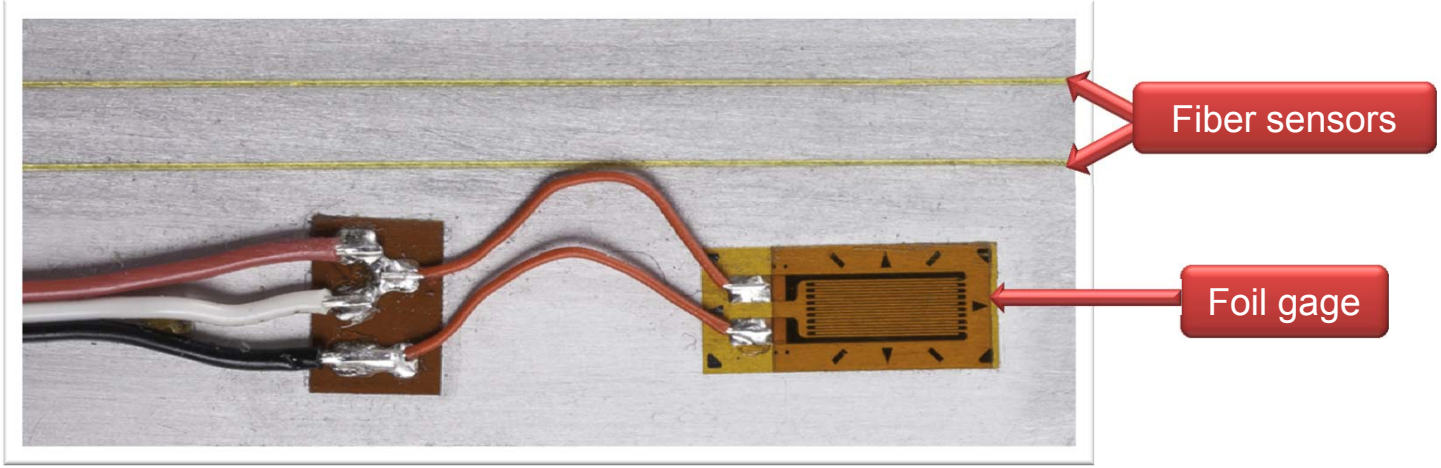
- What we're measuring and why it's important
  - When a force is applied to a material or structure, stress causes the material or structure to deform – the deformation is called strain
  - The complete stress-strain curve is important because it allows you to know not only the maximum stress and strain a material can handle, but also important properties such as stiffness and yield and ultimately, how a material or structure will behave in use
  - Measuring strain is critical to the design, manufacturing, and health monitoring of structures of all sizes, and the market for strain measurement equipment and sensors is ~$5B
  - Emphasis on product liability and energy efficiency in the aerospace and automotive industries requires designs to be lighter and stronger, often leading to the use of new composite materials

# Strain gages

- Conventional method to measure strain
  - The most common type of strain gage consists of an insulating flexible backing, which supports a metallic foil pattern (foil gage)
  - The gage is attached to an object and measures strain at the point of contact
  - As the object is deformed, the foil is deformed causing its electrical resistance to change (manifested as strain)
  - Disadvantages:
    - Expensive and time-consuming to install
    - Hard to distribute over a large physical structure
    - Difficult to gage on irregular surfaces (e.g. curves)
    - Cannot be embedded within material
    - Prone to failure over time



# Hundreds of Sensing Points per Meter




**ODiSI**

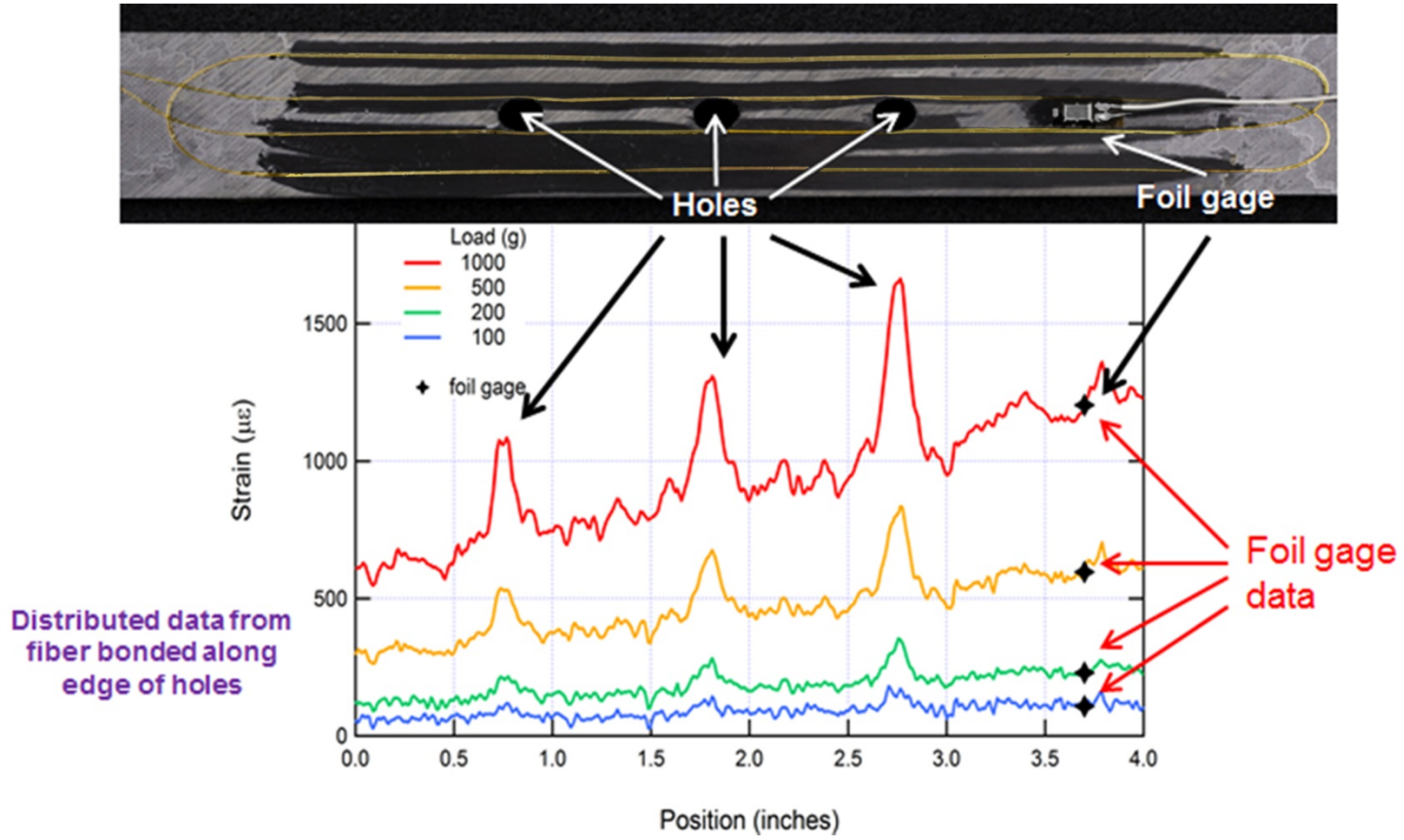
| Sensor Type | Connections | Data Points |
|---|---|---|
| Optical fiber | one optical | ≥ 800 per meter |

**Traditional Method (strain gages)**

| Sensor Type | Connections | Data Points |
|---|---|---|
| Foil strain gage | 2-3 copper | one |

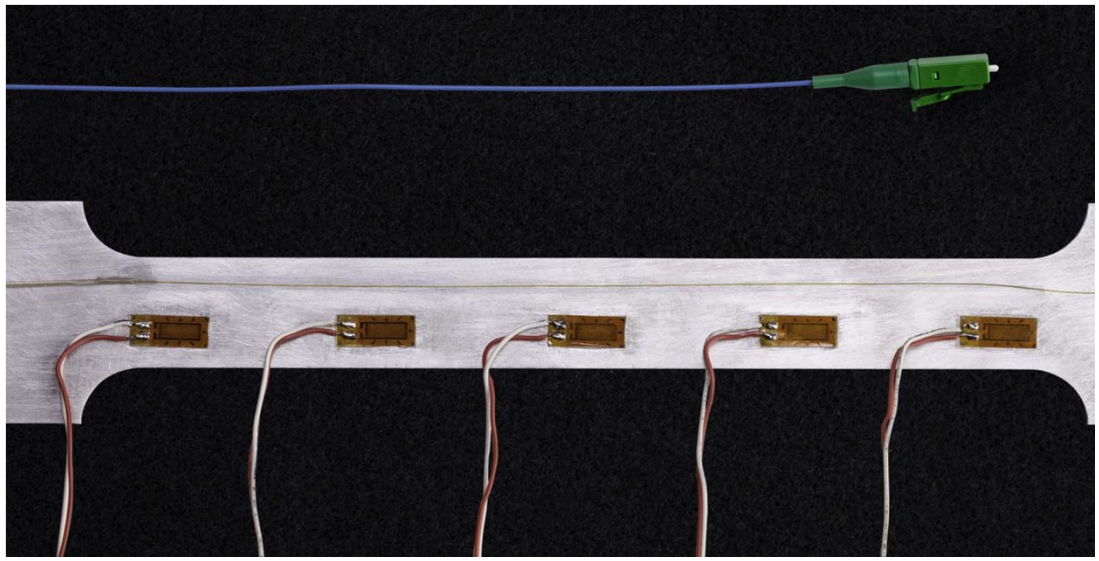
# What's Unique About our Technology

- Composite materials introduce challenges from a test perspective
- ODiSI identifies details and defects that foil gages would miss



# What's Unique About our Technology

- Hundreds of sensing points, yet just one connection
- Captures events along entire length of fiber…not just at a few key locations



| Sensor | Connections | Data Points | Installation time |
|---|---|---|---|
| 15 cm fiber | 1 | 30 | 15 min |
| Foil strain gages | 10 | 5 | 2.5 hours |

## Market Drivers for ODiSI Technology

**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
- Today the composite materials industry is **$60B** growing to **$105B** by 2021


- **Aerospace – Transition to composite materials**
  - Aerospace demand for composites is **$19B** 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 – Lightweighting, Electrification, High performance racing**
  - Automotive demand for composite materials is growing at a CAGR of 7%, projected to reach **$5B** by 2018
    - Example: BMW i3 and i8 contain a significant amount of composites to reduce weight and enhance driving dynamics
    - CAFE standards driving efficiency of global fleets

Market data source: *http://www.marketsandmarkets.com/PressReleases/composite.asp*

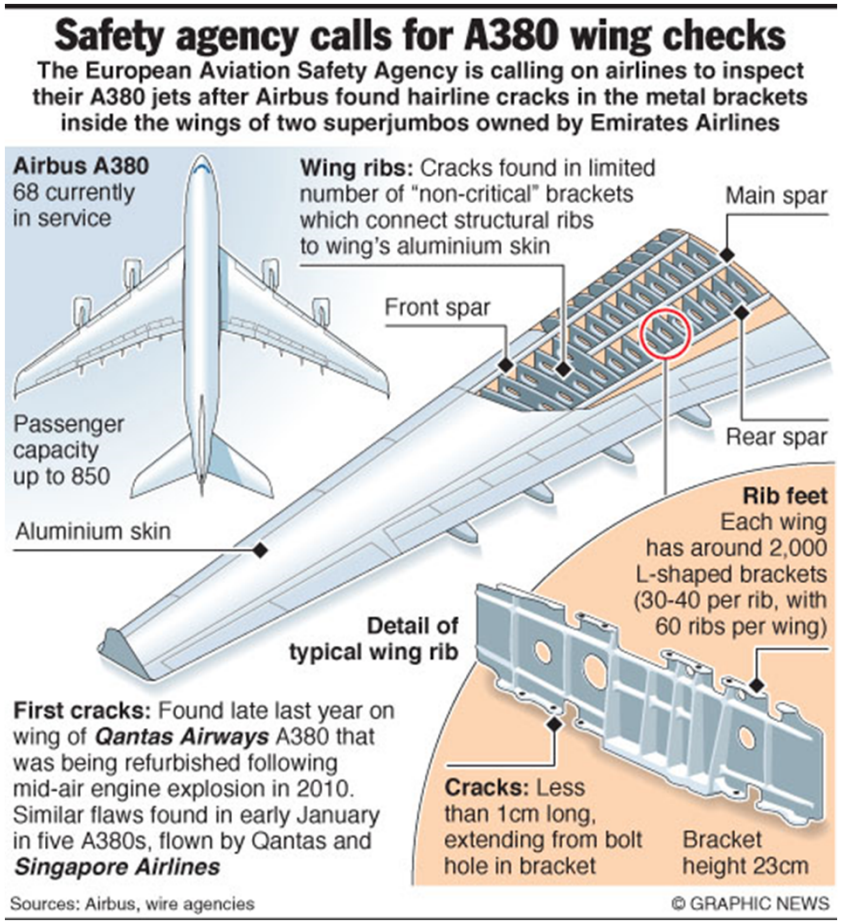
# Drivers in the Target Markets (continued)

## Challenges

- Instrumenting complex parts
- Performing fatigue testing in composites
- New materials have very large changes in strain over short distances
- Identifying small defects, eliminate false positives
- Mapping complex strain profiles

## Drivers

- Testing requirements changing drastically with the introduction of new materials and lighter-weight designs
- Strain and temperature measurements are fundamental to performance and safety in aerospace and automotive markets
- Incumbent technologies (strain gages, RTDs, etc.) do not scale well to meet the challenges of modern design



# ODiSI Value Proposition

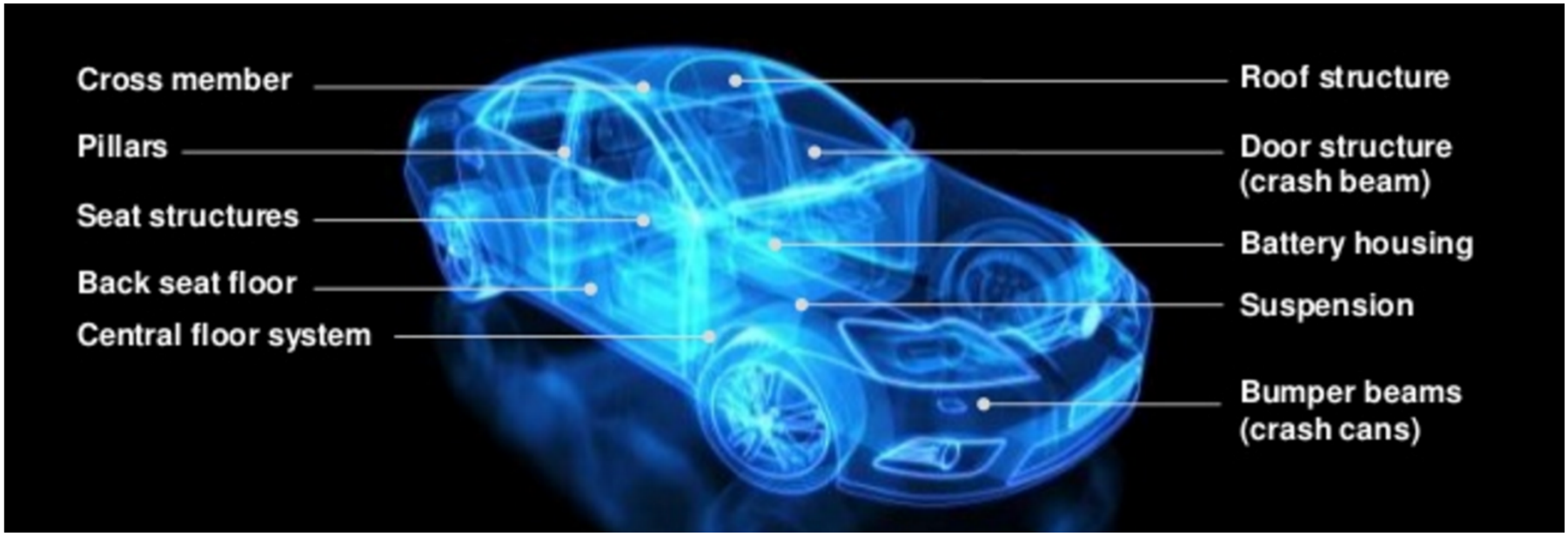
ODiSI provides a better, faster, and cost disruptive method to measure strain/temp that is scalable to meet the demands of today's test environment …

Example:

Install 500 strain gages on a 10m aircraft wing for long term structural tests

| | Traditional Method | ODiSI |
|---|---|---|
| Installation Time | 35 days | 1 day |
| Installation Cost | $42k | $1.2k |
| Data Acquisition Cost | $250k | $118k |

# Drivers in the Target Markets (continued)




- The need for lighter weight, more cost-effective fleets are driving the automotive OEMs to introduce composites and other lightweight materials at an accelerated rate
- ODiSI addresses test challenges associated with the introduction of new materials by helping engineers understand performance and mitigate flaws

# Summary of Benefits

- Measures both strain and temperature
- Captures continuous strain profiles (data point every millimeter)
- Can be embedded in composite materials or bonded to surface
- No drift or failure due to fatigue
- Sensors are low profile and lightweight
- Fiber is immune to electromagnetic interference

LUNA | Communications Test

# Communications Test - Markets and Customers

## Applications

- Optical component R&D
- Manufacturing & test
- Cable and connector testing

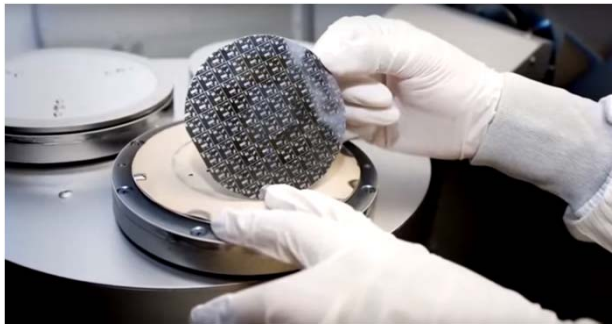
## Market segments and example customers

- High-speed Telecom/Datacom
- Aerospace & defense systems
- Universities / Research institutions

## Optical Component Development and Manufacturing

**Silicon photonics is creating demand for advanced test solutions**

- Luna products offer 30x faster device characterization compared to competition
- Accelerate time to market through reduced iteration of design, fab, test



## Fiber and Short Network Test

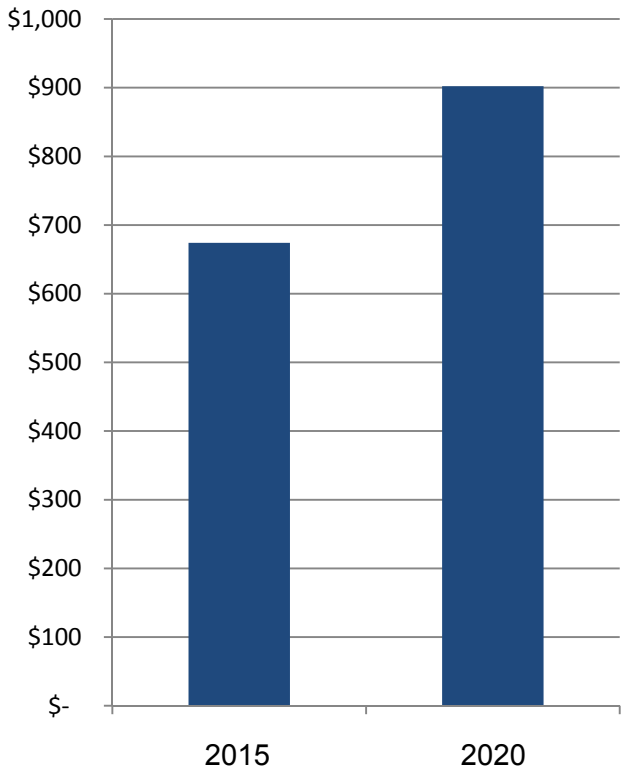
**Bandwidth demands continue to drive double digit connectivity growth**

- Luna products deliver unprecedented visibility into short-haul networks
- Increase quality and reduce time to market for new designs

# Communications Test - Market and Drivers

## Fiber Optics Test Equipment Market

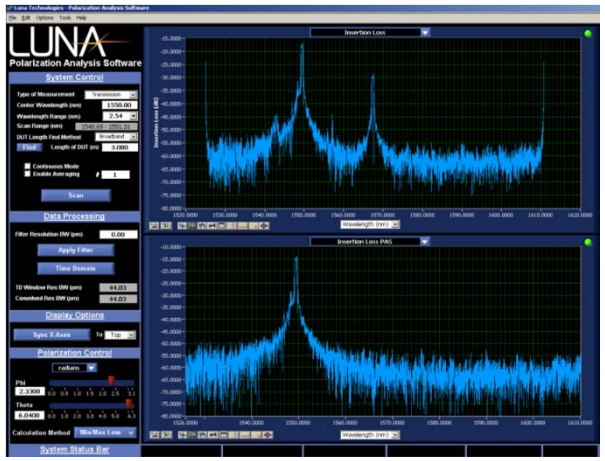
*Fiber optic test equipment market growing to $902M by 2020 (6.1% CAGR)*




Source: Markets and Markets

- High level drivers in this market is the transition over the last several years to pervasive, high-bandwidth demands from core network to end-user
  - Between 2012 and 2017, mobile data traffic up 13x and metro traffic up 560x
  - Mobile internet, 4k video on demand, cloud-based software and services, “Internet of things”
- Drives high-bandwidth telecommunications networks to be more flexible and dynamic
- Pushes very high bandwidth requirements out of the telecom networks in computer-to-computer or data-communications network architectures
- Optical components and network elements need to be more flexible, smaller, less power hungry and operate at higher bandwidth
  - Drives innovation and the requirement for fasters, more accurate and higher bandwidth optical test

# LUNA | Optical Vector Analyzer

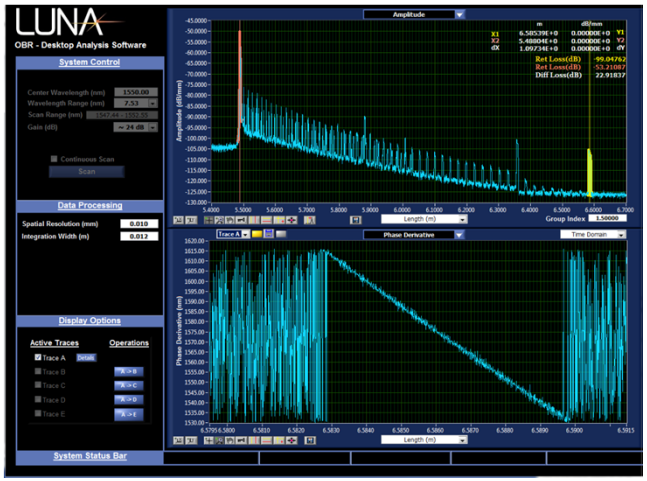

## Reduces time and cost associated with the development of high-speed optical components

- Combines the functionality of multiple test systems into one, integrated and fast platform
- Provides highest combination of accuracy, resolution and dynamic range available
- Eliminates the tedious and time consuming task of external polarization alignment
- Includes exclusive time domain capability, allows you to “look inside” your device
- Optical analog of the RF vector network analyzer, the OVA is used extensively in the development of silicon photonic and other high-speed optical devices

## A complete range of industry standard parameters in a single scan

- Insertion Loss (IL), Polarization Dependent Loss (PDL), Group Delay (GD), Chromatic Dispersion (CD), Polarization Mode Dispersion (PMD), Optical Time Domain Windowing, Jones Matrix elements, Optical Phase Response

# Reflectometers Overview


## The OBR industry's only "zero dead-zone" OTDR

- Unprecedented inspection and diagnostic capabilities for the fiber optics industry
- Pinpoint defects in fiber networks and devices during assembly and troubleshooting
- Used extensively by communications and defense OEMs

## High resolution detection of event location in fiber optic networks or components

- Insertion Loss (IL), Return Loss (RL), linear amplitude(dB/mm), polarization states or amplitude (dB), and phase derivative, group delay

Luna's OBR is specified support equipment for installation and maintenance of the fiber optics on the F-35 Joint Strike Fighter

# Luna Summary

- **Well positioned vs competition with core measurement technology**
  - Offers unprecedented combination of resolution, accuracy and speed
- **Emerging new applications driving growth in communications test market**
  - Silicon photonics and optical connectivity markets driving need for new measurement methods
- **Positioned for growth in material and structural test markets with ODiSI platform**
  - Compelling value proposition; only high resolution strain and temperature measurement system on the market
  - Significant market opportunities leveraging growth of new materials in aerospace and automotive markets
- **Adequately capitalized to fund growth**

# Executive Team

**Scott Graeff, President and CEO**

- Joined Luna in 2003
- Has a depth of experience in corporate development, strategic planning, commercialization, business development, capital market transactions, and financial management
- Previous roles in venture capital and investment banking
- Bachelor's degree in Commerce from University of Virginia

**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

**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; and then 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 - La Crosse, and a doctoral degree from the Institute of Optics, University of Rochester

**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

**Jean-Pierre Maufras, GM, Luna Optoelectronics**

- Joined Optoelectronics in January 2010
- Previously held General Management positions with ATK and Rexnord / PSI Bearing; spent 7 years with Danaher / Aerospace Group; spent 13 years with Zodiak Aerospace
- BS in Manufacturing Engineering from Pons University (France) 1984; Berkeley Advanced Management Program Certificate in 2001

LUNA | Questions?

# Contact


**Dale Messick**, Chief Financial Officer

301 1st Street, SW, Suite 200
Roanoke, VA 24011

Office: 540.769.8400
messickd@lunainc.com