Integrated Photonics

The Next Wave in Photonics Growth

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What is Photonics?

The technology of generation / transmission / detection of photons through light and other forms of radiant energy

What are Indium Phosphide (InP) and Gallium Arsenide (GaAs)?

Two materials that emit photons when charged with electrons

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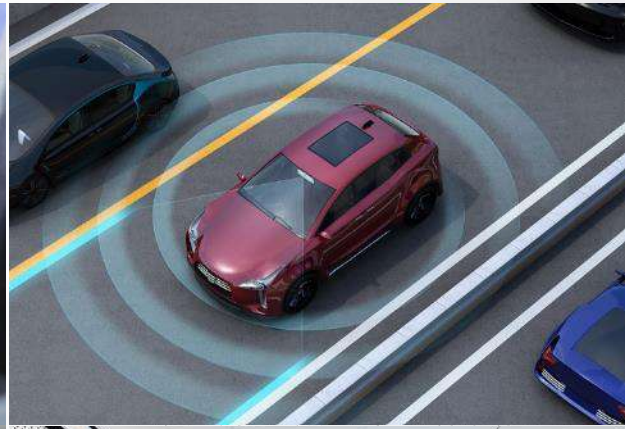
Photonics is a part of everyone's life today

Photonic Sensing

Guidance & Navigation
Test & Measurements
LIDAR systems
Medical & Healthcare
Oil & Gas

Data Communications

Telecommunications
Optical communications
Server to server
Rack to rack
Data center to metro

Who is POET?

We make photonic products smaller, faster and less expensive for the sensing and datacom markets through disruptive innovation in chip design, integration and packaging

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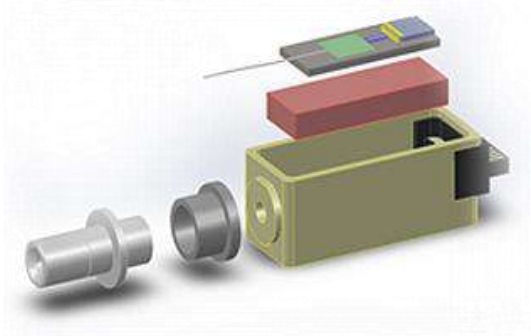

We are an **Integrated Photonics** device manufacturer

67 Employees

58 Patents

03 Technology Platforms

- **Indium Phosphide (InP)**
  - DenseLight Semiconductor, Pte., acquired in May 2016
  - Lasers, SLEDs, ELEDs, modules for optical sensing
  - Hybrid Integrated Photonics Packaging (HiPP)
- **Dielectric Photonics**
  - BB Photonics, acquired in June 2016
  - Passive Dielectric Waveguides
- **Gallium Arsenide (GaAs)**

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Publicly Traded – TSX Venture (Canada) – PTK.V

Investment Highlights

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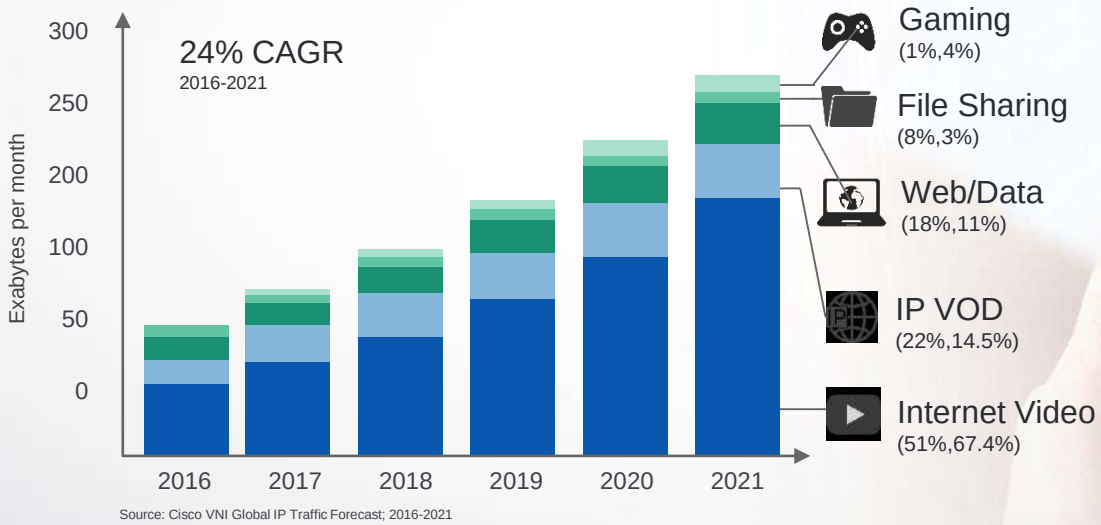
Photonics market fueled by growth of the Internet



Source: Cisco VNI Global IP Traffic Forecast; 2016-2021

Old phone Kbps	Kilo=10^3
Home Mbps	Mega = 10^6
Datacenter Gbps	Giga = 10^9
Front plates Tbps	Tera = 10^{12}
Traffic	Peta = 10^{15}
Traffic Today	Exa = 10^{18}
Traffic Tomorrow	Zetta = 10^{21} | Yotta = 10^{24}

Mega data centers require new technology

Need smaller, faster, cheaper and lower power integrated photonic transceivers

Mega Data Centers built by

amazon Google facebook Others

A single Mega data center (500,00 sq. ft.) is estimated to require ~700,000 100G long reach transceivers @ $250 ASP = $175M

Source: Needham & Co., Research Note on AAOI, May 22, 2017

Integrated photonic transceivers meet critical requirements of next-generation data centers

Goal	Today	Future
More bandwidth	MM with parallel >10w/port	SM fiber and WDM
Faster speed	Now 25G	100/400G*
Denser geometries	Discrete	Integrated
Greener Power	>10W/port	<2W/port
More Economical	>$10/Gbps	<$1/Gbps

*Conversion to 100G already underway

Current conventional photonics design and packaging

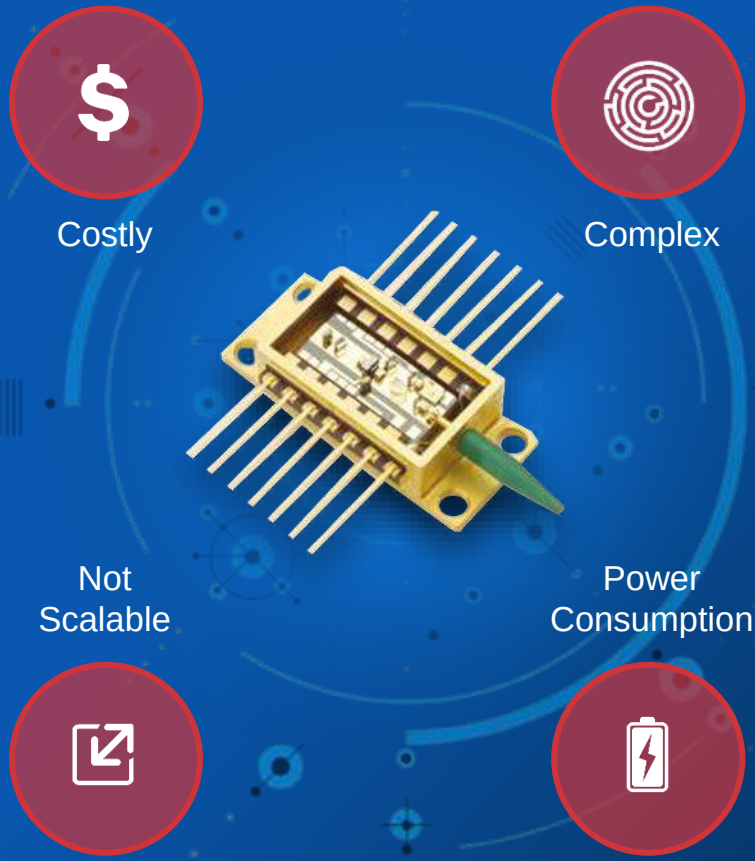
Conventional

Optical Engine

High labor, testing and assembly costs

“Active” precision alignment of discrete optical components

Expensive, hermetically sealed packaging – “gold box”



POET's **Integrated Photonic** Engine

Proprietary technology enables the integration of dielectric waveguides, filters, spot size converters on both active and passive device components

Dielectric Photonics Drive Down Costs of Optical Engine

Ultra-low loss dielectric reduces power consumption and improves thermals

No "Active" precision alignment

Eliminates costly components, including gold boxes, lenses and Thin Film Filters

Wafer-scale packaging

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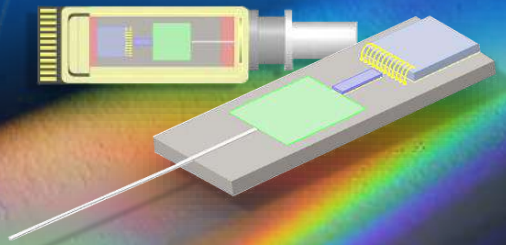
50%*

Reduction in BOM cost for POET Optical Engine



Scalable | Inexpensive | Low-power Consumption | Simple

*Compared to conventional optics

Integrated photonic transceivers will dominate the market

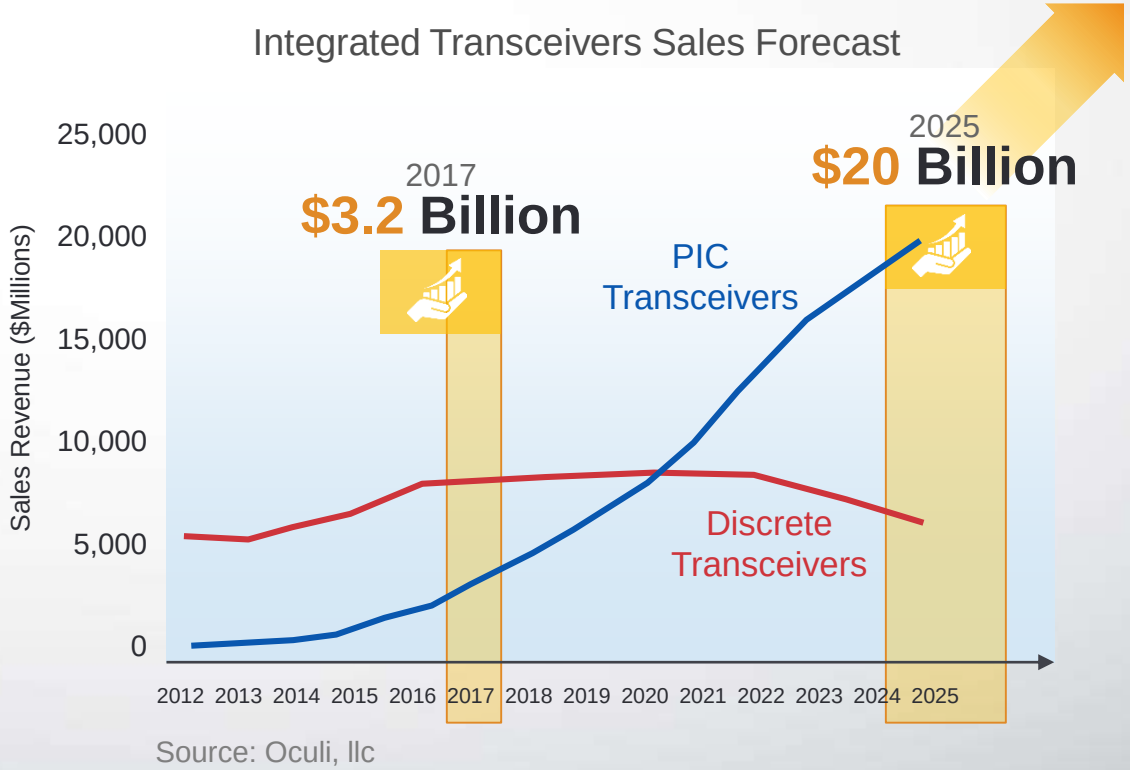
Integrated transceivers forecast to

$20 Billion by 2025

from

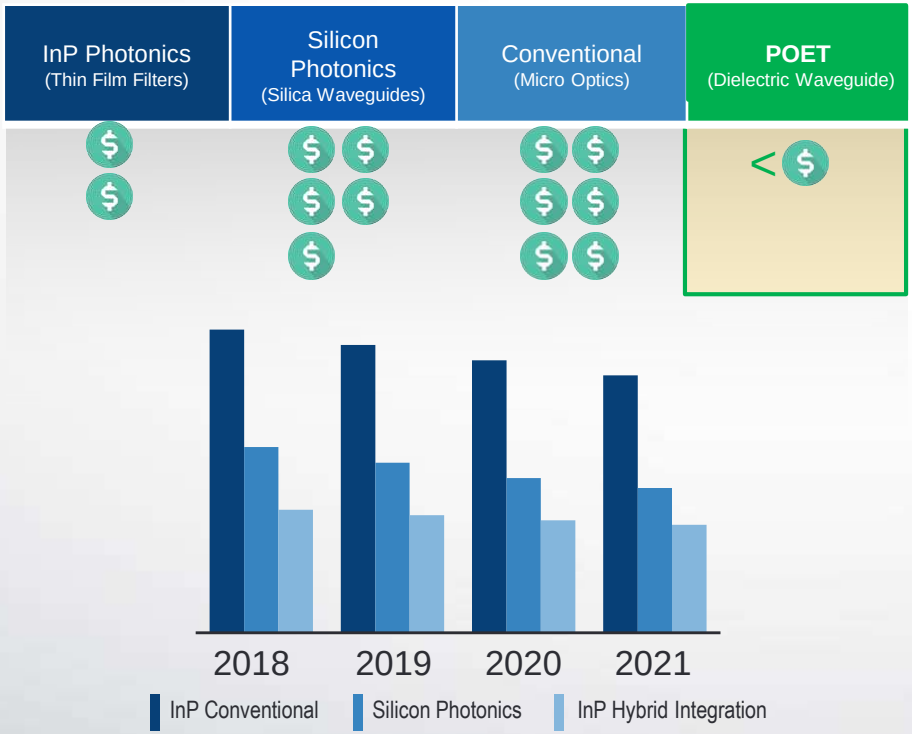
$3.2 Billion today

surpassing current discrete-based devices in 2021



Source: Oculi, llc

Dielectric Photonics is a distinct competitive advantage for POET



Sustainable cost advantage
over other solutions

Dielectric waveguides can be integrated or embedded into several components of the optical engine, dramatically **lowering cost** and **increasing performance**

Transceivers built with POET Dielectric Photonics devices have BOM costs **~40% lower than competitive products**

POET Integrated Photonic Engine Solution

The next wave of innovation

Integration at every possible level to create the lowest cost optical engine for a range of transceivers targeted at the datacom market

100Gbps
Supports QUAD 25Gbs channels

200Gbps
Supports EIGHT 25Gbps channels

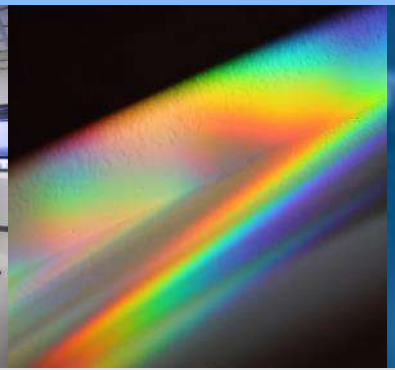
400Gbps
Supports EIGHT 50Gbps channels

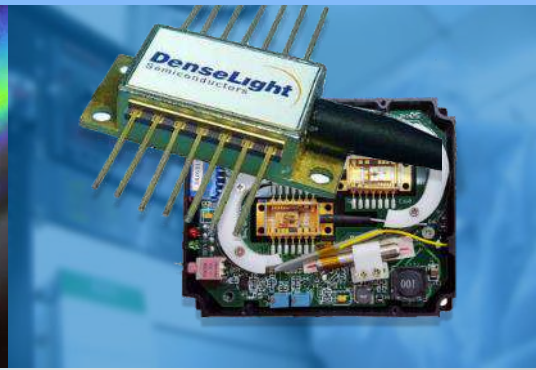
Light Sources and Detectors

In-house source of lasers, detectors and based on Indium Phosphide platform technology

4 inch “state of the art” InP manufacturing capabilities

Developing suites of laser products for 100/200/400G transceiver optical engines





Proprietary Dielectric Waveguide Technology

Waveguides function as mux-demux and spot size converters

Eliminates need for “active” optical alignment

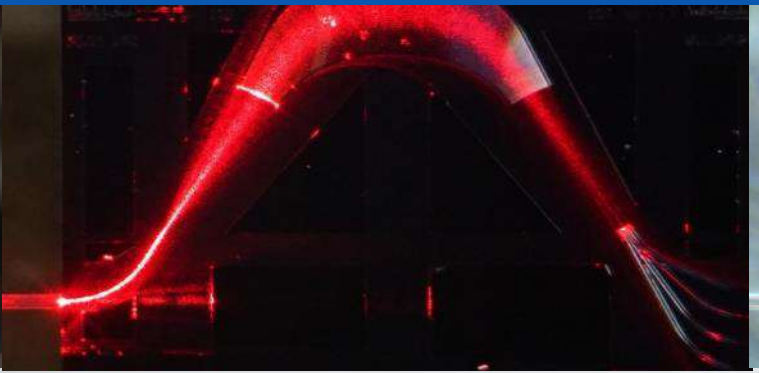
Allows coupling of devices inside transceiver without lenses, prisms and mirrors

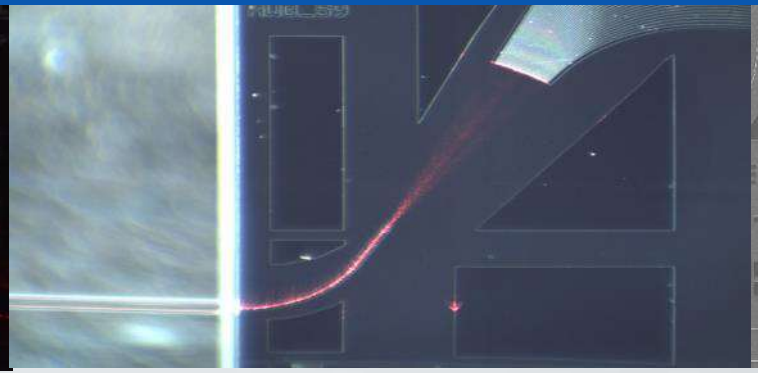
Passive devices fabricated and tested at wafer scale

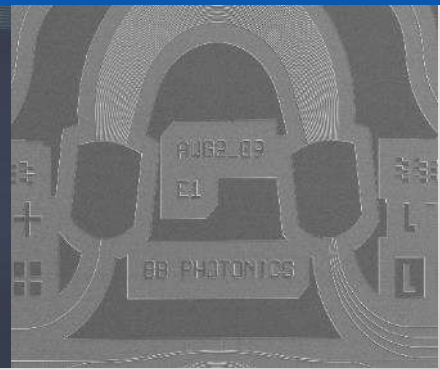
Lowest cost compared to incumbent technologies

Embedded Dielectrics

Integration into optical bench for even lower cost and higher performance





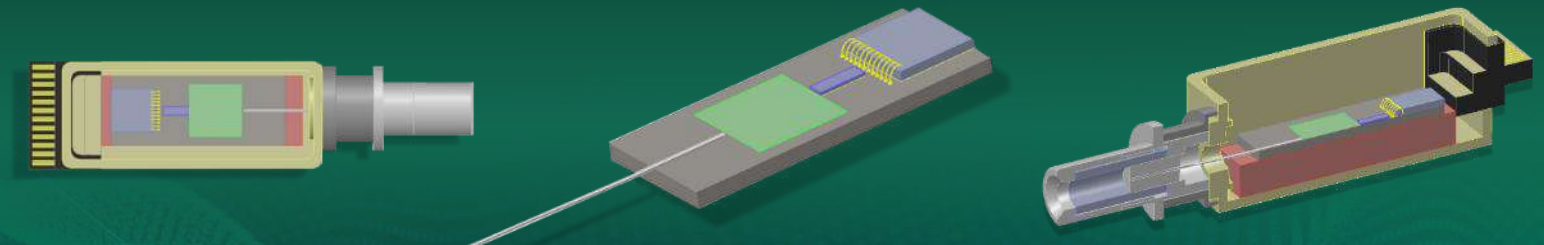


Hybrid Integrated Photonics Packaging (HiPP)

Packaging represents 70% of BOM cost of conventional optical engine

HiPP offers

- ✓ Higher power
- ✓ Higher coupling efficiency
- ✓ Better light performance
- ✓ Better thermal management
- ✓ Dramatically lower BOM cost
- ✓ Lower fabrication cost
- ✓ Lower testing cost
- ✓ Scalability



POET WDM Optical Engine in Transceiver Assembly

100G LAN WDM4 Transceiver Optical Engine

Scalable to 400Gbps

Single Mode Fiber (SMF) with Wavelength Division Multiplexing (WDM)

Eliminates costly fibers using WDM

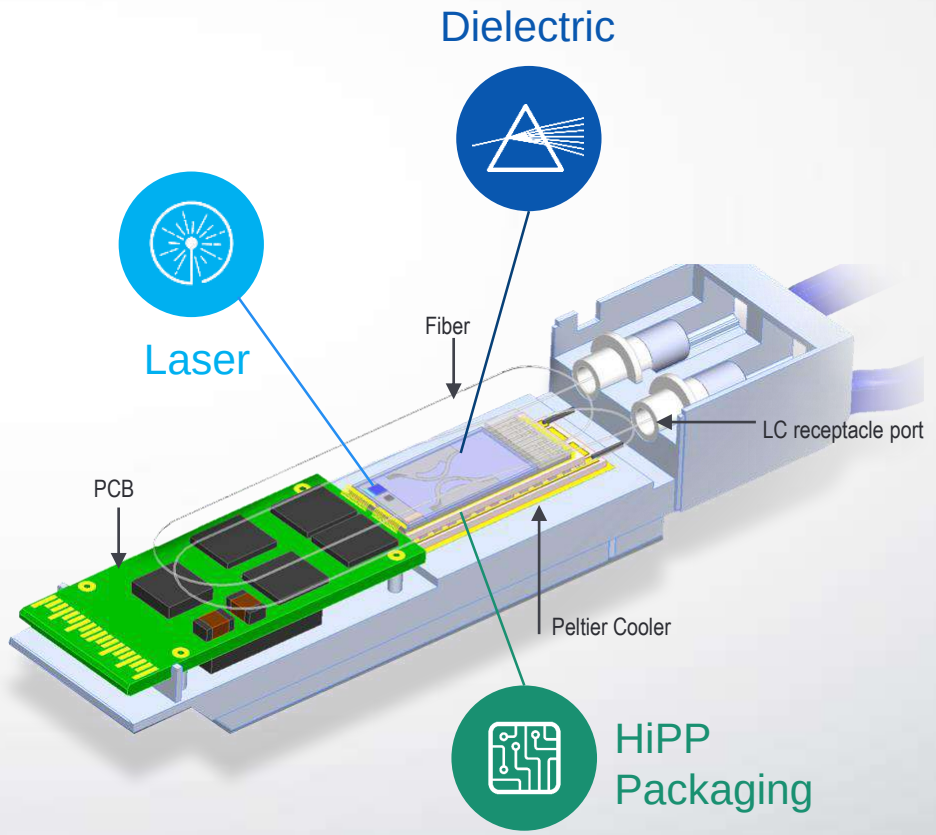
Longer reach (10m – 2km) than PSM4

Integrated with proprietary dielectric photonic technology for lowest-cost integration and packaging

Sustainable cost advantage compared to all incumbent technologies

Low Loss, Low Power

Potential to reach economic goal of **$1/Gbps cost**



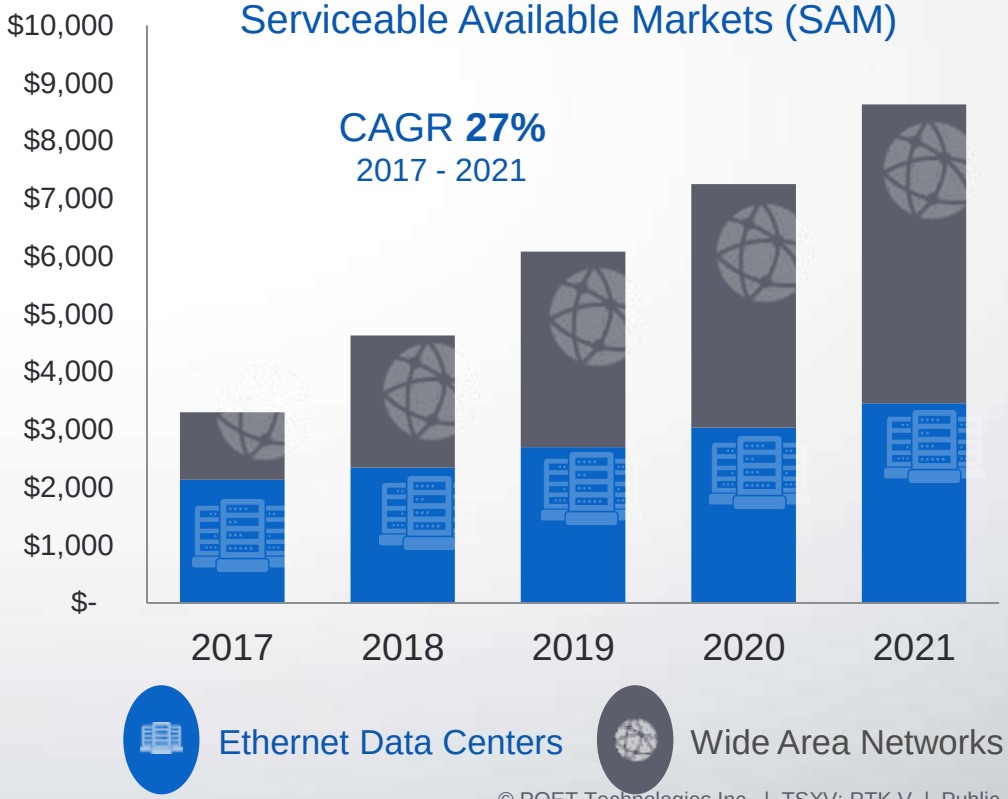
POET Optical Engines address top two transceiver market segments

Ethernet Data Centers

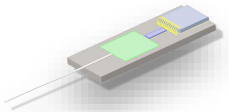
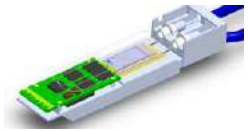
<1km reach both within and between data centers

Wide Area Networks

(Metro – intermediate) served by 1km - 10km links



Product Roadmap

Products	2017	2018	2019
Discrete Devices for Merchant Market and Internal Use for Optical Engines			
CW DFB Lasers (1310, 1550, 1650)	⊙		
Monitor PD, 10G APD	⊙		
Discrete Laser Components		Lasers	
Sub-assemblies & Optical Engines			
Receive Optical Engines (ROSA)			
Transmit / Receive Optical Engines (TXRX)			

September ‘17 Product Announcements

POET capitalization and key statistics

Total common shares outstanding	259,923,853
Warrants Outstanding ($0.52 CAD)	34,800,000
Share price	$0.26 CAD*
Market cap	$66.5M CAD*
TTM revenue (9/30/17)	$2.5M USD
TTM gross margin (9/30/17)	48%
Cash and short-term investment (9/30/17)	$7.5M USD

TMX PTK.V

OTCQX POETF

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*As of 12/1/17

Management Team

Dr. Suresh Venkatesan
CEO

25 years semiconductor industry experience Motorola, Freescale & GLOBALFOUNDRIES

Technology Development & Commercialization

Thomas R. Mika
CFO

25 years semiconductor industry experience, Tegal Corporation (NASDAQ: TGAL)

CEO and CFO leading IPO, several follow-on financings and restructurings

Rajan Rajgopal
GM and President, DenseLight

Over 28 years of industry experience

Former VP at Global Foundries and Micron

David E. Lazovsky
Executive Chairman

Founder, CEO and Director of Intermolecular (NASDAQ: IMI)

20 years of semiconductor industry experience - IMI and Applied Materials

Dr. William “Bill” Ring
SVP

20 years semiconductor industry experience: HP, Tyco, BB Photonics

Optical technology, product and business development

Dr. Yee-Loy Lam
CTO DenseLight

Co-founder of DenseLight Semiconductors

Professor Nanyang Technological University

Specialist in optoelectronics, fiber-optics sensors and photonics systems applications

Board of Directors

David E. Lazovsky
Executive Chairman

Founder, CEO and Director of Intermolecular (NASDAQ: IMI)

20 years of semiconductor industry experience - IMI and Applied Materials

John F. O'Donnell
Director

Counsel to Stikeman Keeley Spiegel Pasternack LLP

Canadian attorney with 43 years of experience specializing in corporate and securities law

Chris Tsiofas
Director

Partner at Toronto Chartered Professional Accountancy firm Myers Tsiofas Norheim LLP

25 years of experience on both financial and operational issues

Jean-Louis Melinge
Director

Partner with ARCH Venture Partners
Managing Director, YADAIS
Former CEO, Kotura

Leading expert in silicon photonics and optical components

Todd A. DeBonis
Director

CEO of Pixelworks (NASDAQ:PXLW)

Semiconductor veteran with over 27 years of expertise in sales, marketing and corporate development

Mohandas Warrior
Director

President & CEO of Alfalight, 2004-2016

15 years at Motorola Semiconductors (Freescale) leading test and assembly operations

Commercialization Strategy

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- Engage with a commercial partner to accelerate the introduction of dielectric optical engine to the datacom transceiver market
- Continue to leverage and invest in Singapore-based DenseLight manufacturing facility to effectively manage all aspects of production for optical engine and sensing products
- Employ integration and packaging know-how across an expanded sensing product line
- Pursue complementary ecosystem alliances and/or acquisition opportunities
- Secure strategic partner to complete development of breakthrough monolithic devices
  - *first ever combination of a laser, detector and electronic circuit on a single GaAs chip*


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