Corporate Overview
For the Defense Industry
OZ Optics Limited
June 2019
Agenda

- Company Profile
- OZ Optics Canada
- OZ Optics Turkey
- OZ Optics China
- Manufacturing Strategy
- Industry Standards
- Commonly Sold Products to the Defense Industry
Company Profile

- Company founded in 1985;
- Corporate headquarters located in Ottawa, Canada;
- Manufacturing facility in Ottawa/Canada, Izmir/Turkey, and Jiaxing/China
- Seven Product Groups: Laser-to-Fiber Delivery Systems, High Power Fiber Optic Components, Polarization Maintaining Products, Attenuators, Opto-Electronic Packaging, Test Equipment, Fiber Optic Sensor Systems
- Sales offices in Canada, USA, Europe, Turkey and China
Company Profile

- Three Product Groups:
  - Fiber Optic Components 70%
  - Optical Test Equipment 25%
  - Fiber Optic Sensors 5%

- Over 1,000 products
- Leading Edge R&D
OZ Optics Products

Global Leader in Fiber Optic Products since 1995

Polarization Maintaining
Fiber Optic Components
Patent Numbers: USA 7058775, 7095931, 7295731, China 1672673

- Polarization Maintaining Connectors / Patchcords
- Polarization Maintaining and Polarizing Splitters / Combiners / Fused Couplers / Switches
- All Fiber Manual and Electrically Driven Polarization Controllers / Scramblers
- PM Fiber Directional Taps / Power Monitors
- Manual / Electrically Controlled PM Fiber Pigtailed Variable Attenuators
- Fiber Pigtailed Polarizers

High Power
Fiber Optic Components
Patent Numbers: Canada 2494633, USA 7058775, 7095931, 7295731, China 1672673

- High Power/Temperature Connectors & Patchcords
- High Power Isolators
- High Power Laser to Fiber Couplers / Collimators / Focusers
- High Power Mode Field Adapters
- High Power Optical Taps / Power Monitors
- CO₂ Cleaning for High Power Components
- High Power Splitters / WDM’s
- Shutters / Detectors / Sleeve Turn Adapters with Sensors

www.ozoptics.com
OZ Optics Products

Global Leader in Fiber Optic Products since 1995

Fiber Optic Components for Optoelectronic Packaging
Hermetically Sealable Patchcords with Glass or Metal Solder

Single Channel
Multi Channel

Metalized Fibers
PM/SM/MM Fiber Pigtailed V-Groove Arrays
Polarization Measurement System for V-Grooves

Tapered/Lasered Fiber Polished/Laser Stripped
Glass Solder Patches
Fiber Optic Ferrules

Fiber Optic Test Equipment

Polarization Extinction Ratio Measurement Systems
Power Motors with Smart Detector Heads
Broadband Digital Variable Attenuators

Optical Fiber Length Motors
High Power Visual Fault Locators Fiber Optic Stable Sources
Inline Optical Power Monitors/Meters

Laser Diode Sources Single/Multimode
Fiber Optic Smart Patchcords
Fiber Optic Fault Finders

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PRIVATE AND CONFIDENTIAL
Product Innovation

Fiber Optic Distributed Strain and Temperature Sensors

- BOTDA only, BOTDR only, or both BOTDA and BOTDR modules in one unit
- Fast, dynamic measurement of strain and/or temperature up to 100 km sensing range
- Simultaneous measurement of strain and temperature
- Uses standard telecommunication fiber to minimize costs

Fiber Optic Fault Finder for Optical Network Safeguard™

- Monitors and reports network health status in real time, 24 hours/day, 365 days/year
- Reduces revenue loss due to fiber plant outages
- Reports fault location, giving GPS coordinates with time stamp
- Lowers network operating and maintenance expenses
- User friendly interface via various wireless interfaces (Wi-Fi, GPRS, 3G, or RS-232)
- Early alert and outage reports via cellular phone, email, IM, SMS, or text messaging

OZ Optics

Global Leader in Fiber Optic Products since 1985

www.ozoptics.com

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OZ Guard Automated Test Solution
Remote Monitoring a WDM Network
Remotely Accessible Wireless Fault Finders
GPS Locator
Product Innovation

2 micron Fiber Optic Components for PM and SM Fibers

Fiber Optic Patchcords
Fused Couplers / Taps / Beam Splitters / Combiners
Fiber Pigtailed Laser Diode Sources
Pigtail / Receptacle Style Collimators / Focusers
Polarizers
Manual / Electrically Controlled Variable Attenuators
Manual / Electrically Controlled Fiber Optic Delay Lines
Isolators
Manual / Electrically Controlled Polarization Controllers
OCT Modules
Manual / Electrically Controlled Broadband Variable Attenuators
Fiber Pigtailed Broadband LED Sources

Fiber Optics Limited

Global Leader in Fiber Optic Products since 1965

OzOptics shop.ozoptics.com
www.ozoptics.com
Product Innovation

New Products, OCT Products, 2 Micron Products

Optical Signal to Noise Ratio Generator
Broadband Polarization-Entangled Photon Source
OCT Modules
2 Micron Fused Couplers / Taps / Splitters / Combiners
Modulator Bias Controller
Broadband Variable Attenuators for OCT Applications
2 Micron Fiber Pigtailed Laser Diode Sources

Global Leader in Fiber Optic Components since 1985

OZ Optics
shop.ozoptics.com
www.ozoptics.com
Company Profile

Over 498 employees worldwide:

- 277 in Ottawa and US
- 71 in Turkey
- 150 in China
Company Profile

OZ Optics is lead by an experienced team:

- Ömür Sezerman, Chairman, President & CEO
  - Founder and CEO since inception (34 years)
- Zahide Sezerman, VP of Human Resources
  - With OZ Optics since inception (34 years)
- Garland Best, VP of Components Division
  - 27 years at OZ Optics
- Gordon Youle, VP of Test Equipment Division
  - 20 years at OZ Optics
- Martin Powell, Operation Manager
  - 15 years at OZ Optics
- Metin Sezerman, General Manager of OZ Turkey
  - 18 years at OZ Optics
- Bing Li, General Manager of OZ Optics China
  - 15 years at OZ Optics
Company Profile

- ISO 9001:2015 certified
- Broad patent portfolio
- Advanced proprietary processing technology
Company Profile

- Using our strong direct sales and distributors, we address the following markets:
OZ Optics has resellers and distributors in over 30 Countries & Regions and over 10,000 customers globally:

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<th>Australia</th>
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<th>Belgium</th>
<th>Brazil</th>
<th>Canada</th>
<th>China</th>
<th>Czech Rep.</th>
<th>Denmark</th>
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In-House Production Capabilities

- Experienced and well-trained staff in following fields: optical, mechanical, electronics & software

CNC Machine Shop
AR Coating
Femtosecond Laser Lab
Clean Room
Laser Conditioning/Cleaving
Branch Network

OZ OPTICS CANADA
(Headquarters)

OZ OPTICS TR
(Turkey Factory)

OZ OPTICS CHINA
(Jiaxing Factory)
Facility – Ottawa Headquarters

- 60,000 sq ft. – Manufacturing and R&D Facilities
- 15,000 sq ft. – Admin, Sales and Marketing
- 15,000 sq ft. – Training and Fitness Facility
- R&D, Product Design, Engineering, Final Assembly & QA
Facility – Ottawa Headquarters

- Production Area
- Training Centre Building
- Meeting Room
- Swimming Pool
OZ Optics – Turkey Factory

- Operational since 2000
- 33,000 sq ft. Manufacturing Facility
- Located in Free Trade Zone
- Low Tax Rates
- Sub Component Parts Manufacturing
- Cost Effective Manufacturing
- High Quality Labor
OZ Optics China

- Operational since 2009
- Wholly Foreign Owned Enterprise
- Subcomponent Parts Manufacturing
- Cost Effective Manufacturing
- High Quality Labor
- Extensive Training
  (3-6 months in OZ Canada)
OZ China Facility

Jiaxing, China

- Located in Economic Development Zone
- 500 sq meters – Admin, Sales and Marketing
- 1500 sq meters – Manufacturing Area
  - 100 sq meters – Class 10,000 Clean Room
  - 100 sq meters – ESD Working Area
Manufacturing Strategy

OZ Canada
R&D Design Engineering

Sub-Components

Made-in China
Made-in Turkey

Sub-Components

World-Wide Sourcing

Customer

✓ OZ CND Qualification
✓ Customer Qualification

OZ Canada
Final Assembly Quality Assurance

Customer

✓ OZ CND Qualification
✓ Customer Qualification
Industry Standards

All products manufactured are in strict accordance with international industry standards:

- Qualified for F35 JSF and F18 Program
- Telecordia Compliance
- CE Compliance
- RoHS Compliance
- ISO 9001:2015 Certified (Canada, China and Turkey)
- Controlled Goods Directorate Registered
Core Competencies

- Pioneer in Polarization Maintaining (PM) Components
- Leader in Wavelength Flattened, High Power & Low PDL Components
- Leader in High Power Fiber Optic Delivery Systems
- Custom Test Equipment, Including Polarization Test Equipment and FTTH Equipment
- Widest Range in Attenuator Product Offering
- Fiber Optic Distributed Strain and Temperature Sensors
- Complete product line for OCT applications & 2 Micron
- Now available: Bias Controllers, Spectrometers, Optical Noise Generators and Broadband Polarization-Entangled Photon Source
Leading Technology

- **High Power Isolators**
  - power handling > 50W
  - low loss, low cost
turnkey solution

- **Pioneer in Polarization Maintaining (PM) Components**
  - wavelength flattened
  - high power & low PDL
  - PM test equipment

- **Leader in High Power Fiber Optic Delivery Systems**
  - specializes in custom design

- **Fiber Optic Sensor**
  - fast and simultaneous measurement of strain & temp
  - large structure health monitoring

High Power Free Space and Pigtailed Isolators
Polarization Maintaining Patchcords
Distributed Stain and Temperature Sensors
High Power Collimators/Focusers
OUR VISION
• Be the preferred Supplier of choice
• Capture and expand market share
• Maximize shareholder value

OUR MISSION
• To become the leading provider of innovative optical products to telecom and non-telecom sectors

OUR CORE VALUES
• Leadership
• Teamwork
• Boldness
• Commitment
• Innovation
• Rewards

OUR QUALITY POLICY
• Provide our Customers with a competitive advantage, leveraging performance, price and delivery, through a continuous process of Quality advancement in all areas of our Company
• Communicate effectively to our Customers, Suppliers and Shareholders our commitment to Quality, continuous improvement and to abide by any applicable requirements
• Promote opportunities of professional development for all members of our Company through education, training and personal challenge

Ömür Sezerman
President
Competitive Advantage

- Superior Technology
- Innovative Engineering
- Exceptional Quality & Service
- Competitive Pricing
- Extensive Experience In Fiber Optics Manufacturing
- Global Presence

Success
Distributed Temperature and Strain Sensor

- Sophisticated sensor systems using stimulated Brillouin scattering in optical fibers to measure changes in both strain and temperature along the length of an optical fiber.
- Uses standard telecom single mode fibers for strain and / or temperature measurement.
Distributed Temperature and Strain Sensor

- Real-time measurement of strain and temperature
- High spatial resolution, strain, and temperature resolution and accuracy
- DLL available for system integrator
- As low as 0.1 m spatial resolution
- Max. 100 km sensing range with max. 160 km fiber length
- Available configurations: BODTA, BODTR and Combo (BODTA & BODTR)
Pigtail Style Collimators / Focusers

DTS0060: Collimators/Focusers – Pigtail Style
LPC-03-1550-8/125-P-0.44-2AS-40-3A-3-2 and LPF-01-1550-8/125-P-3-19.4-5AS-60-3A-3-1

- As Small as 2µm Spot Sizes, Up to 5W Power
- Up to -60dB Backreflection SMF, PMF & MMF
- 1.6mm, 2.5mm, 4mm, 8mm, 11mm, 12mm & 25.4 mm OD Housing
- 240 nm – 2200 nm
Fiber Pigtailed V-Groove Arrays

- Up to 48 Fibers in a Single Array
- 127, 250, 400 & 500 Micron Spacings
- SMF, MMF & PMF
Hermetically Sealable Patchcords with Metal Solder

- Meets Telcordia Specifications
- SMF, MMF & PMF Versions
- Fibers can be finished with ferrules, laser cleaved ends or tapered fiber tips.
- Customer Specific OEM Designs
Hermetically Sealable Patchcords with Glass Solder

• No Metalization Required, For Lower Costs
• Meets Telcordia Specifications SMF, MMF & PMF
• Fibers can be finished with ferrules, laser cleaved ends or tapered fiber tips.
• Customer Specific OEM Designs
Metalized Fibers

- SMF, MMF & PMF Versions
- Ideal for Hermetic Component Packaging
- Cleaved Fiber Endfaces, Masked Regions
- Midspan Metalization
Tapered/Lensed Fibers

• As Small As 2.5 Micron Spot Sizes
• Circular And Oval Spot Profiles
• Custom OEM Designs, Metalized Versions
Fused Fiber Optic Couplers

DTS0033: Fused Couplers – Fiber Optic
FUSED-14-532-3.5/125-25/25/25/25-3A3A3A3A3A-1-0.5-SP

- 1x2, 2x2 & 1xN Couplers Available
- 0.5dB Typical Insertion Losses, SMF & MMF
- 488nm to 2050nm Wavelengths
Polarization Maintaining Patchcords

- Up to 30dB Polarization Extinction Ratios
- <0.3dB Insertion Loss, Up to 60dB Backreflection
- Super, Ultra, Angled FC/PC, SC, AT&T-ST, LC, MU, E2000, DMI and Custom connectors
Polarization Maintaining Splitters

- Splits Polarized Light into 2 PM or SM Fibers
- 0.6dB IL, -40, -50, -60dB Backreflection
- 1x2 & 2x2 Versions Available
- 350-2050 nm Versions
PM Fiber Optic Circulators

- 0.7dB Typical Insertion Loss
- 532 - 1550nm Wavelength Versions
- Up to 30dB Extinction Ratios
Penetrating Vacuum Feedthroughs

DTS0023: Vacuum Pressure Feedthrough – Fiber Optic
VAC-01-V-SMJ-3A3A-1300/1550-9/125-1-1.5

• No Intrinsic Insertion Loss or Backreflection
• Low Cost, Rugged & Compact Size
• Gas Leak Rate $10^{-6}$ scc/sec
Vacuum Feedthroughs – Receptacle Style

DTS0023: Vacuum Pressure Feedthrough – Fiber Optic
VAC-3S3S-IRVIS-105/125-M

- Singlemode & Multimode Versions
- Easy to Install & Use. Compact & Rugged
- Gas Leak Rate $10^{-6}$ scc/sec
High Power Fiber Patchcords

DTS0037: High Power Fiber Optic Patchcords
QMMJ-5HP5HP-UVVIS-200/240-3AS-4
QSMJ-A3HP,3S-320-2/125-3A-2
QPMJ-A3HPM,3S-488-3.5/125-3-5-1

• MMF, SMF & PMF Versions
• Armored Cable Available for Safety
• UV to Far Infrared Wavelengths
• Adjustable connector combination for extra flexibility
High Power Fiber Patchcords

Versions Offered:

• HP: High Power Polish, Air Gap connector
• HPM: High Power Mechanical Cleave, Air Gap connector
• HPC: High Power Coreless Fiber End Cap, Air Gap connector
• HPL: High Power Laser Treated Endface, Air Gap connector

DTS0037: High Power Fiber Optic Patchcords
QMMJ-A3AHP,2F-UVVIS-100/140-3-10
QMMJ-A3AHPM,3AF-IRVIS-50/125-3-2
QMMJ-A3AHPC,X-IRVIS-20/125-5AS-1-AR-CSP
QMMJ-A5HPL,5HPL-UVVIS-200/240-5AS-5
High Power Fiber Pigtailed Isolators

- Low Insertion Loss, Up to 100 Watts
- Available From 400 - 2000nm
- Polarization Independent, High Isolation
Digital Variable Attenuators

- 0.01dB Resolution, Fast Response Time
- 0.6dB to 60dB Attenuation Range
- Available from 350 nm – 2000 nm wavelengths for SM, PM and MM fibers.
- USB Interface
- Up to four calibrated wavelengths
Multichannel Electrically Controlled Variable Attenuator (Rack Mount)

• Your choice of up to 32 attenuators per unit
• Choose between broad and narrow wavelength
• Optional integrated power monitoring for precise output power control
• USB Interface
• 0.6dB to 60dB Attenuation Range
• Available from 350 nm – 2000 nm wavelengths for SM, PM and MM fibers.
• Calibrated for dual wavelengths,
• Maintains Attenuation with Power Off.
Benchtop Digital Multichannel Attenuator

- Your choice of up to 4 attenuators per unit
- Choose between broad and narrow wavelengths
- Optional integrated power monitoring for precise output power control
- USB Interface
- 0.6dB to 60dB Attenuation Range
- Available from 350 nm – 2000 nm wavelengths for SM, PM and MM fibers.
- Calibrated for dual wavelengths, (1300–1550 nm) or calibrated for C and L bands. It can also be calibrated for up to four individual wavelengths
Your solution provider for existing and next generation fiber optic components and test equipment.

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Thank You for Choosing OZ!