

# Where are Fiber Optics Going Beyond Communications

September 14, 2011



## Overview of Coastal Connections

Business: Engineer fiber optic cables for laser, medical, military, and industrial applications

Founded: 2002

Revenue: \$1,400,000 in 2010  
\$1,700,000 Projected for 2011

Employees: 16

### Founder's Background:

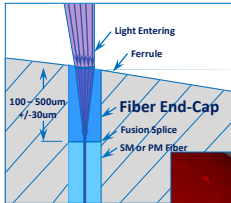
- Engineering degree from Cal Poly SLO
- Developed tools for subsea fiber optic cable installation
- Traveled the world for a year
- Trained subsea cable inspectors in Malaysia
- Developed telecom copper tools
- Qualified a fiber optic connector for space
- MBA from Pepperdine
- Lead a \$15 million fiber termination business
- Started Coastal Connections

### Startup Challenges:

- Mental aspect of spending money & time without pay
- Convincing customers we were better
- Understanding cash flow



## Coastal Connections Specialty Products



Fiber End-Caps



Vacuum Feedthroughs



Connector Probes



Laser Pigtail Cable



Vacuum Feedthrough



High Power Well Tip Connectors



Military Connectors



Multi-Fiber Medical Assemblies



Bundles, Glass Capillaries, etc

## Medical Fiber Optics

- LASIK Eye Surgery
- Skin Treatments
- Intravenous Plaque Detection and Removal
- Blood Analysis
- Medicine Process Monitoring
- Breath Diagnostics
- Photo-activate light-sensitive drugs
- Measure Skin Aging
- Detect Skin Cancer
- Glucose Monitoring
- Small (<1mm Dia) endoscopes



eyetechlasik.com



ambrosiamedspa.com

lasers



mtbeurope.info



medgadget.com

## Military Fiber Optics

Electronic Countermeasures  
*Infrared Countermeasures*  
 LIDAR (Light Detection and Ranging)  
     Surveying, Autonomous Obstacle Avoidance  
     Atmospheric Monitoring  
     Space Shuttle Docking  
 Subsea Acoustic Sensing  
 Gyroscope  
*Missile Ignition*  
*Explosive Ignition*  
*Chemical Agent Detection*



## Industrial+ Fiber Optics

Point Detection of Strain & Temperature  
 Distributed Sensing of Pressure & Flow  
 Precision Motion  
 Computer-to-Plate Imaging Systems  
 Laser Scanning Microscopes  
 High Voltage Power Sensing  
 Electro Magnetic Field Detection  
*Petrochemical Process Monitoring*

Connecting Antenna Arrays Together (SETI)



## Technical Challenges

### Precise Alignment:

- Aligning laser beams to small (3um) fiber cores
- Sub-micron XYZ, Pitch and Yaw stages
- Holding parts in place to submicron tolerances over time
- Weld Steel to Steel
- Glass Solder
- Mating small core fibers together
- Float very tight tolerance ferrules
- Tune a set offset

### Thermal:

-400°F to 400°F

### Mechanical:

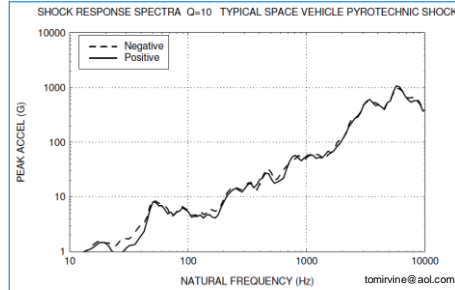
Pyrotechnic Shock Q=10  
Vibration: 23.3 Grms

### Very High Powers:

- 10,000+ watts bursts in 100um Diameter (1 Million Watts/ sq mm)
- 60 Watts continuous in 25um Diameter (122,000 Watts/ sq mm)
- 10 Watts continuous in 9um Diameter (160,000 Watts/ sq mm)

### Sealing:

- Vacuum sealing on stress sensitive glass fibers
- Hermetic sealing of glass fibers



## Inspection

