# Diamond SA

Connectors for Advanced Fiber Systems

Losone, 26.06.2014

Dr. Sc. Matteo Castiglioni

SWISS PHOTONICS

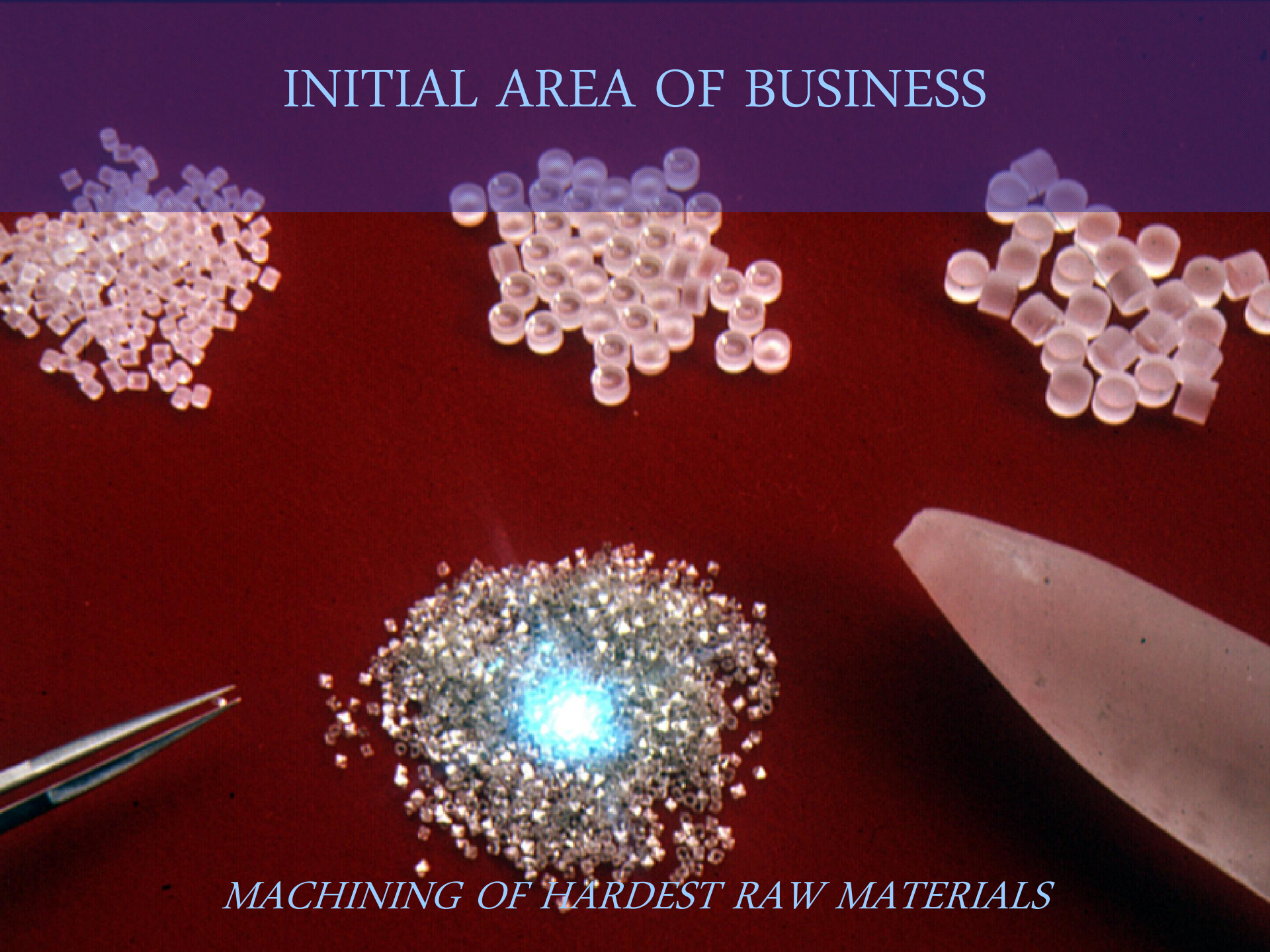
DIAMOND
the fiber meeting

DIAMOND

# 1958

# COMPANY FOUNDATION IN LOCARNO

# INITIAL AREA OF BUSINESS



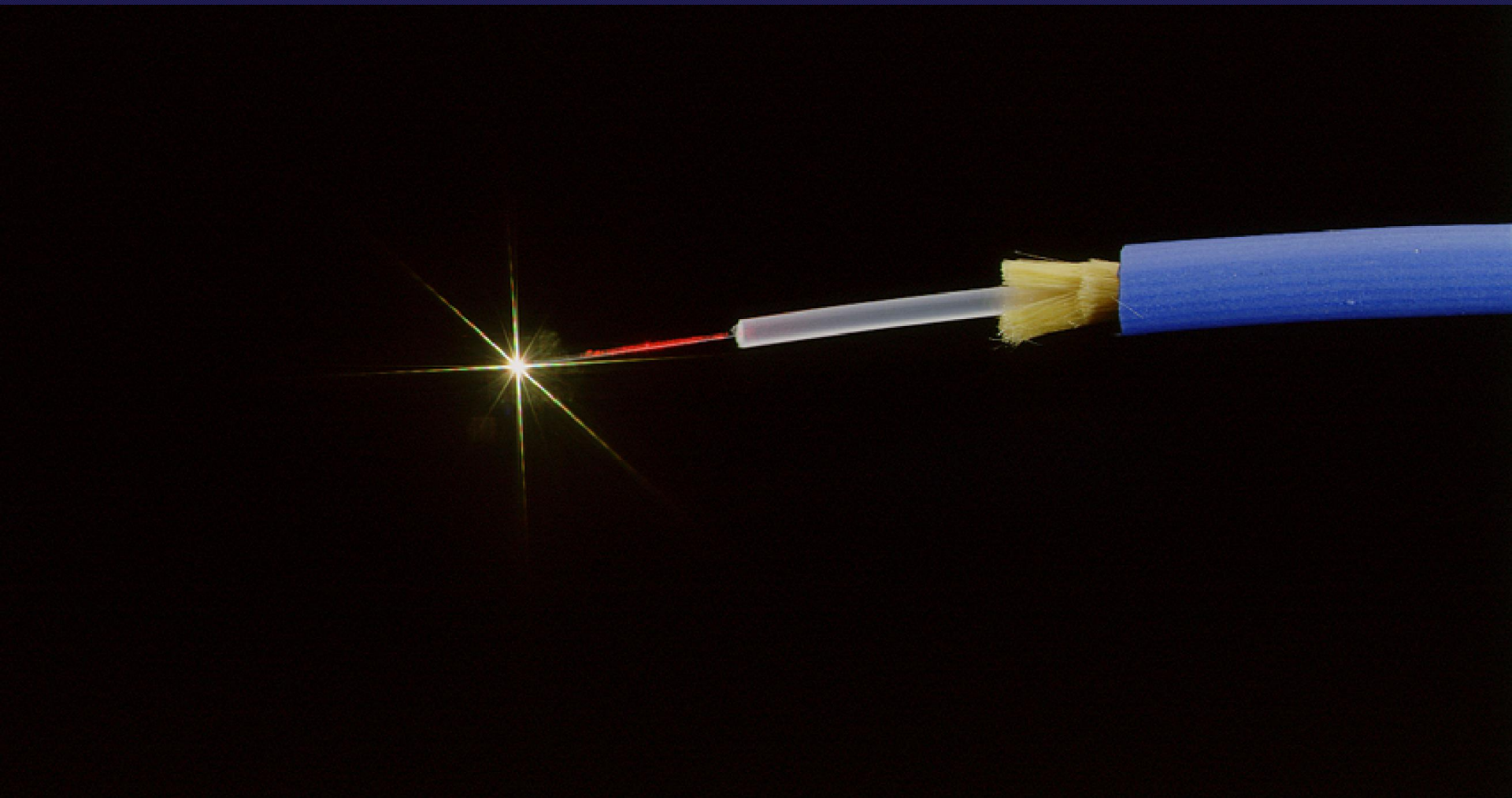
*MACHINING OF HARDEST RAW MATERIALS*

# MANUFACTURE OF DIAMOND TIPS FOR SOUND REPRODUCTION


ESTABLISHING A NEW STANDARD
DIGITAL REPRODUCTION TECHNOLOGY

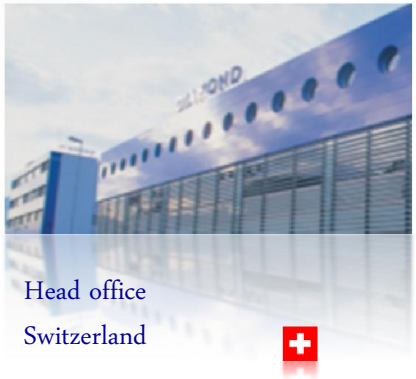
1980

# FIBER OPTIC PROVIDED A BEACON INTO THE FUTURE



# Diamond worldwide

Worldwide we cooperate with 5 subsidiaries and 30 partners




Head office
Switzerland

Germany


USA

Netherlands

Brazil

Argentina

# Diamond Headquarters



- Established in 1958
- Main production facility in Losone
- ~ 300 employees at DIAMOND Switzerland
- Vertically integrated factory
- Plastic and ceramic production
- High precision fine mechanics
- Fiber optic assembly
- R&D and administration
- Accredited test laboratory
- ISO 9001 and 14001 certified
- Owner of ~ 70 Patents

# Diamond in Switzerland

# DIAMOND worldwide presence

DIAMOND GERMANY

- Locations: **Echterdingen** (Stuttgart), Erfurt, Frankfurt, Hamburg
- Employees: 48
- Foundation: 1987

DIAMOND BENELUX

- Locations: **Almere** (Amsterdam)
- Employees: 4
- Foundation: 1993

# DIAMOND worldwide presence

DIAMOND USA


- Locations: **Chelmsford** (Boston), San Diego (CA), Danville (CA), Prosper (TX), Philadelphia (PA)
- Employees: 27
- Foundation: 1993

DIAMOND ARGENTINA

- Locations: **Buenos Aires**
- Employees: 8
- Foundation: 2006

DIAMOND BRASIL


- Locations: **Rio de Janeiro**, São Paulo
- Employees: 24
- Foundation: 1988

# Diamond Market segments presence

The main markets in which Diamond is strongly represented

## Telecommunications

FTTX, Networking...

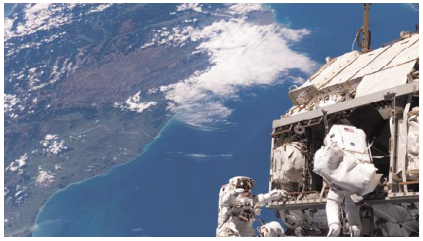
## Photonics

Measuring instr., lasers,

light sources...

## Harsh environment

Industry, Energy, Transport...



## Aerospace

Optical data links

## Medicine

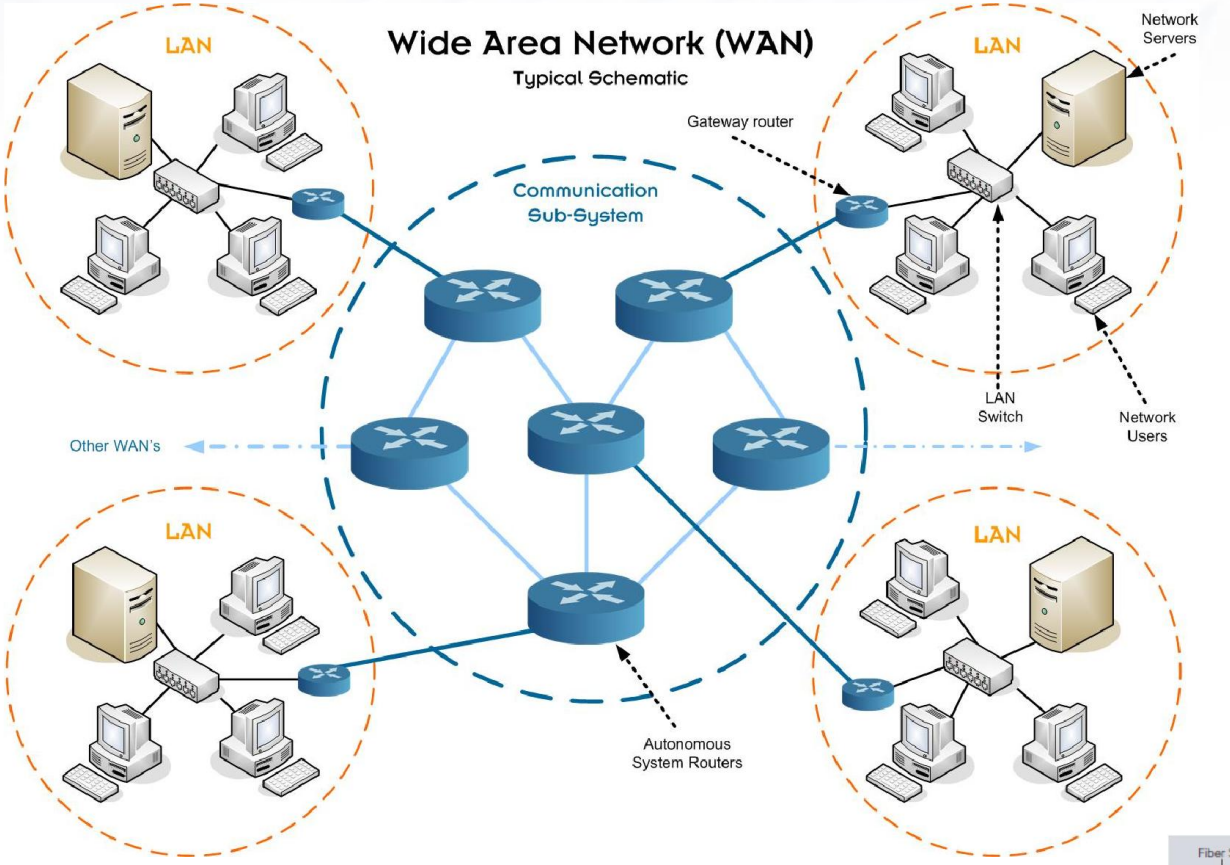
Optical catheters for OCT , PDT

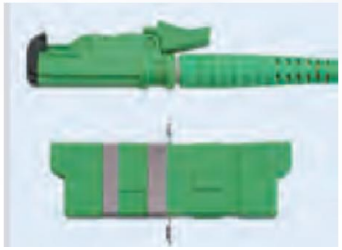
## Military and defence

Fixed and tactical links,

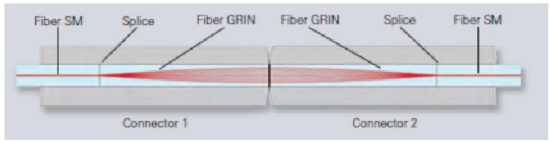
laser systems

# Telecom, long haul and WAN:



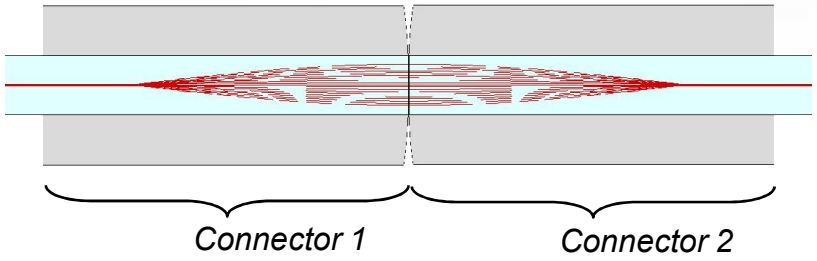


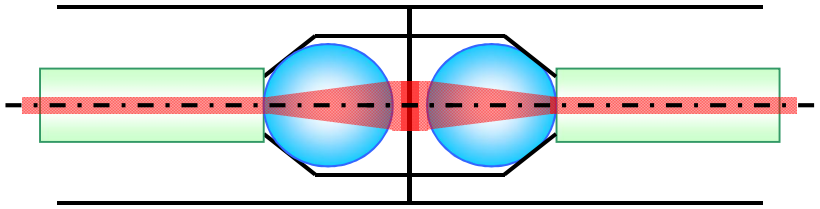


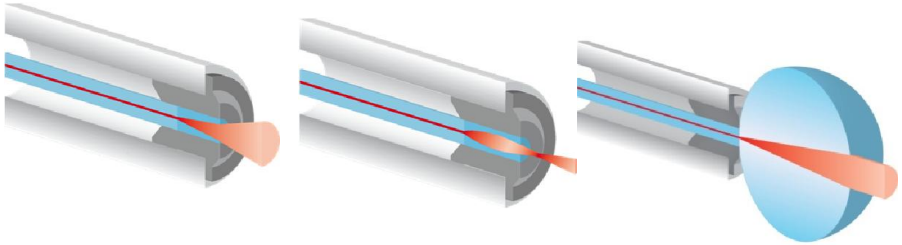
# Technologies – A mix of competences

## AT MECHANICAL LEVEL

## AT OPTICAL LEVEL





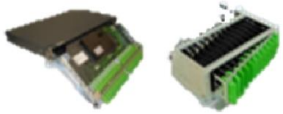
# Product overview

Diamond's product range is divided into following groups:

Assemblies and adapters, Fan-Out, Break-Out, Outdoor

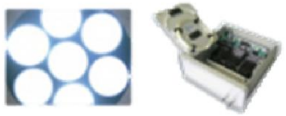
Switches,
SFP-moduls,
Media converters

Attenuators,
Transition adapters,
Couplers



Patch Panels
Outlets,
Wall distributors

Field termination,
Test equipment,
Assembly tools

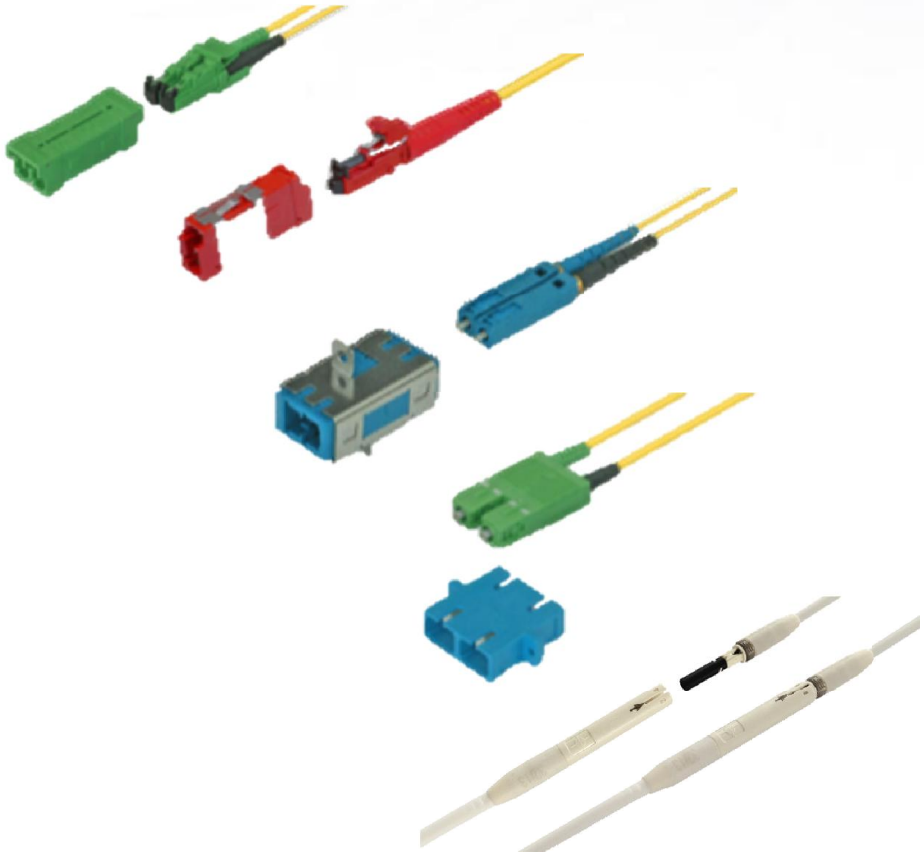


Special solutions,
OLID Intelligent components

# Connectors with plastic housing

We offer all standard connectors types in different versions:

- E-2000™ automatic laser protection cap
- F-3000™ LC standard compatible
- MU high packaging density
- SC LAN cabling
- DiaLink round design, retractable into tubes



# Connector with metal housing

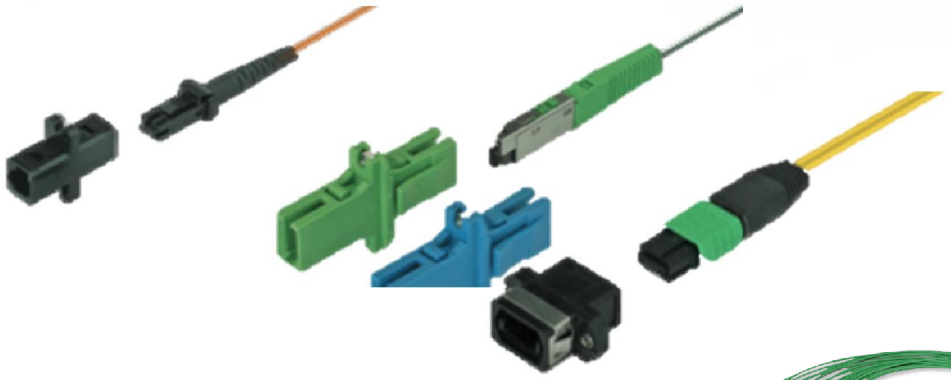
We offer all standard connectors types in different versions :

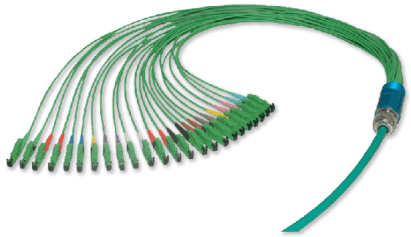
- LSA (DIN)
- AVIM
- Mini-AVIM
- FC
- ST
- ADT-UNI
- FSMA (SMA 905)
- DMI

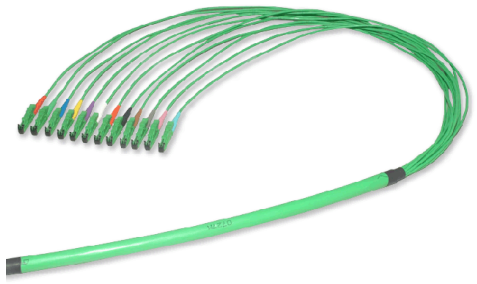
# Multifiber Products

Connections from 2 to 48 channels

- MT-RJ
- MFS
- MPO
- Fan-Out
- Break-Out



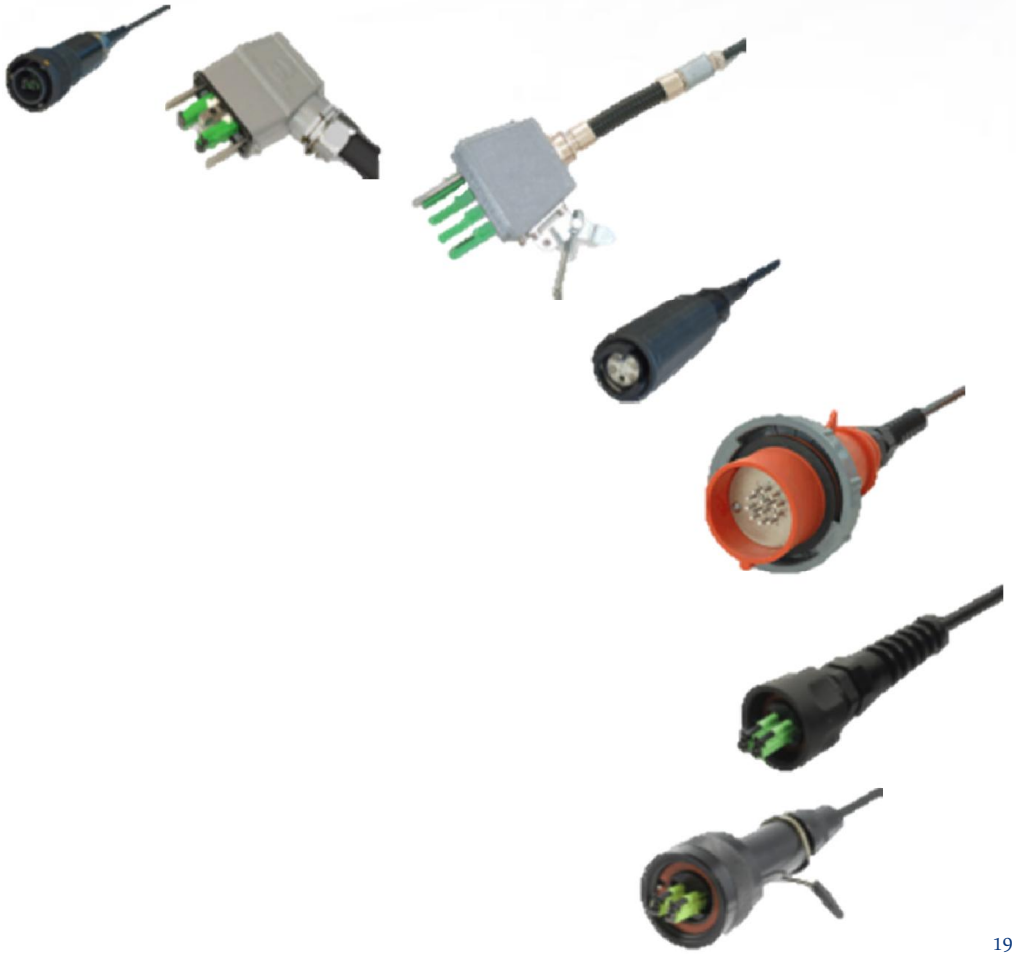




# Industrial and Outdoor connectors

Connections with increased mechanical protection from 2 up to 24 channels

- F-3000™ CRB
- E-2000™ RHA
- E-2000™ RHB
- X-BEAM
- Alberino CRA
- F-3000™ ODVA
- OD3



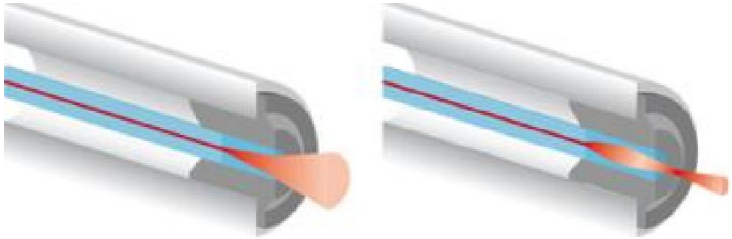
# Customized solutions

- Environmental considerations, technical/optical performance, high reliability, short time delivery and much more.
- Solutions for connections from 1 to 888 fiber optic channels
- Solutions which are not easy to find on the world market
- Solutions which guarantee your success

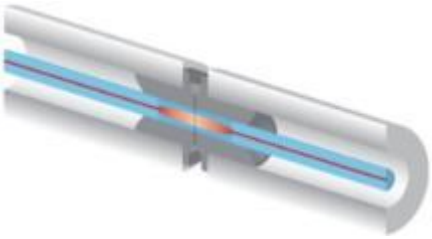
# Optical technologies

## Expanded Beam

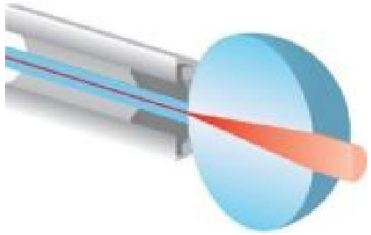
- Spliced glass rod or endcap (PSf technology)



- Spliced GRIN lens (PS technology)

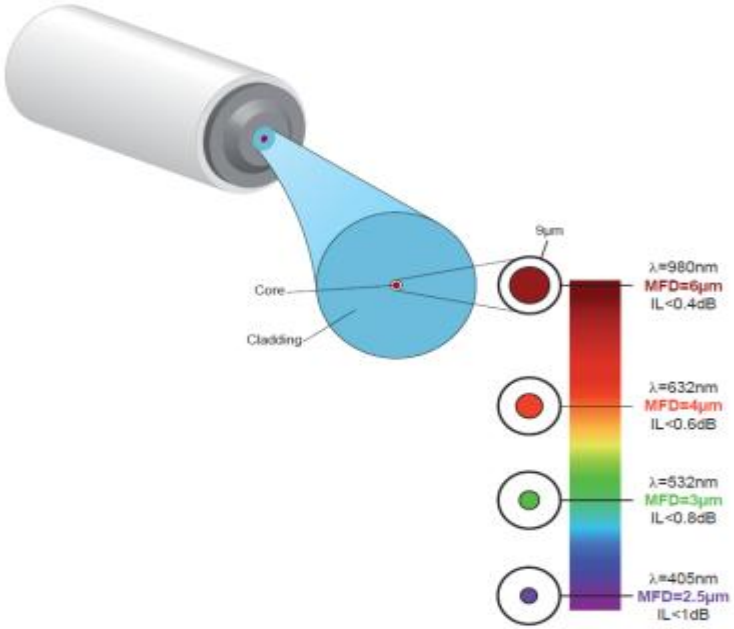


- Ball lens (PSb technology)



## VIS/NIR Low Wavelengths

- Extremely low lateral offset for Low insertion loss
- Ultra high polish for high return loss



Source: Photonics21: «Photonics: Branchenreport 2013» (http://www.photonics21.org)

# Photonics: Fiber optic related applications

1. Spectrometers
2. OTDR & Power Meters
3. Interferometers
4. Optical measuring systems
5. …

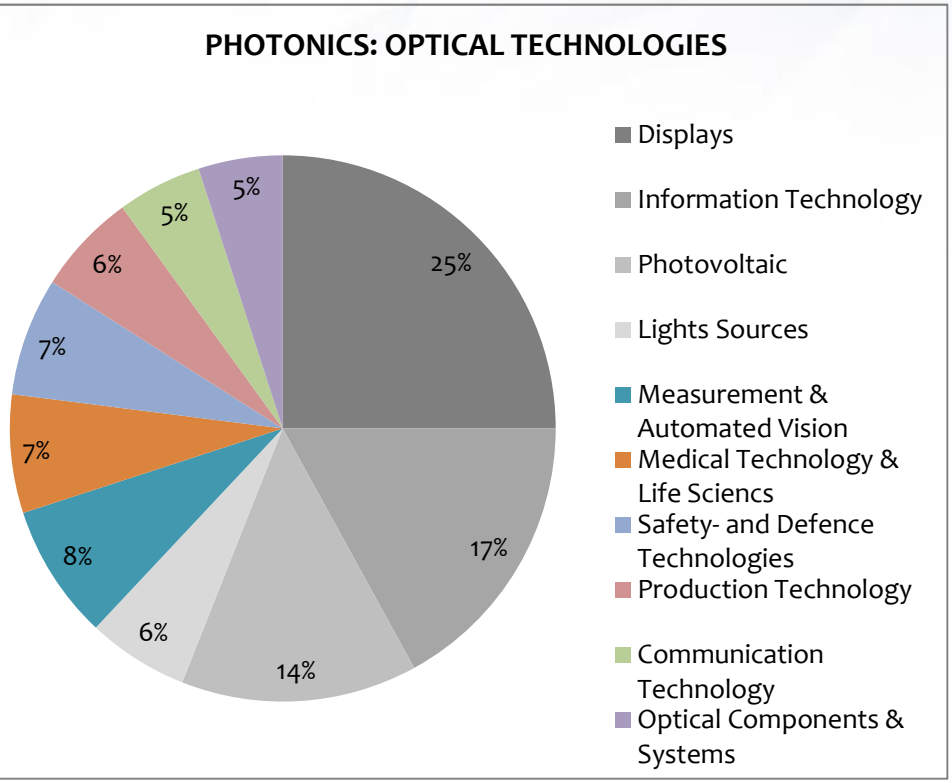
1. Endoscopes
2. Medical Imaging and diagnostic systems
3. Microscopes
4. Therapeutic Laser Systems
5. …

1. Gyroscopes
2. Range finders
3. …

1. Fiber lasers for cutting
2. Glass lasers for marking
3. Laser lithography
4. …

1. Optical transmitters & Receivers
2. Fiber optics connectors
3. Optical couplers
4. …

1. Fiber optics connectors and cables (not Telecom)
2. Optical systems (not Telecom)
3. …




→ 10 optical technologies for a production volume of EUR 350 billion

→ 6 relevant technologies for a production volume of EUR 133 billion (= 38%)*

Sources:
1. www.photonics21.org
2. Photonics Spectra, January 2013, page 58.

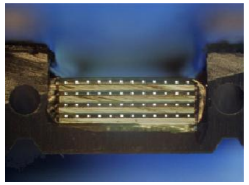
# Photonics: Technological trends

TRENDS → TECHNOLOGICAL IMPACTS → FIBER OPTICS APPLICATIONS

## OPTICAL COMMUNICATION

- ❑Supercomputing power
- ❑Internet traffic increase
- ❑Lower power consumption

- ❑Reduction in device size
- ❑Silicon photonic super-integrated circuits
- ❑Transmission of higher optical power



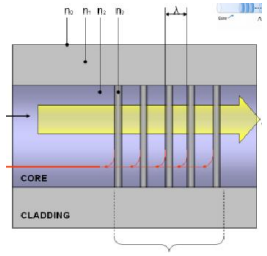
Photonic super integrated circuits

Amplifiers / DWDM

## OPTICAL MEASUREMENT

- ❑Real time safety control
- ❑Infrastructure control
- ❑Manufacturing optimization and automation

- ❑Longer distances and real-time sensing
- ❑Distributed sensing
- ❑Minimized energy consumptions




FBG monitoring & Sensing

Sources:
1. www.photonics21.org
2. Photonics Spectra, January 2013, page 58.

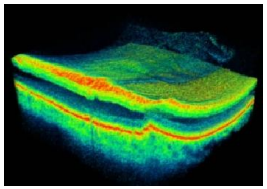
# Photonics: Technological trends

TRENDS → TECHNOLOGICAL IMPACTS → FIBER OPTICS APPLICATIONS

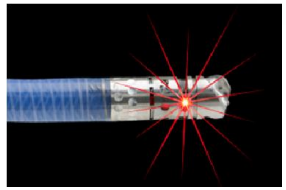
## BIOPHOTONICS

- More older and richer people
- More age related deseases

- Biophotonics technologies for diagnostics and treatments.



Optical diagnostic systems

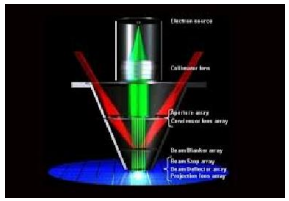


Laser therapy & surgery

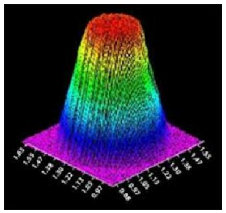
## PRODUCTION TECHNOLOGY

- Moore's law (smaller transistors)
- "Green" manufacturing

- Shorter wavelengthes for lithography
- More fiber based lasers



Laser lithography



Fiber lasers