

iXblue

Specialty fibers



iXblue at a glance

iXBlue is a leading global provider of innovative solutions and services for navigation, positioning, and imaging, for Civil and defense market.



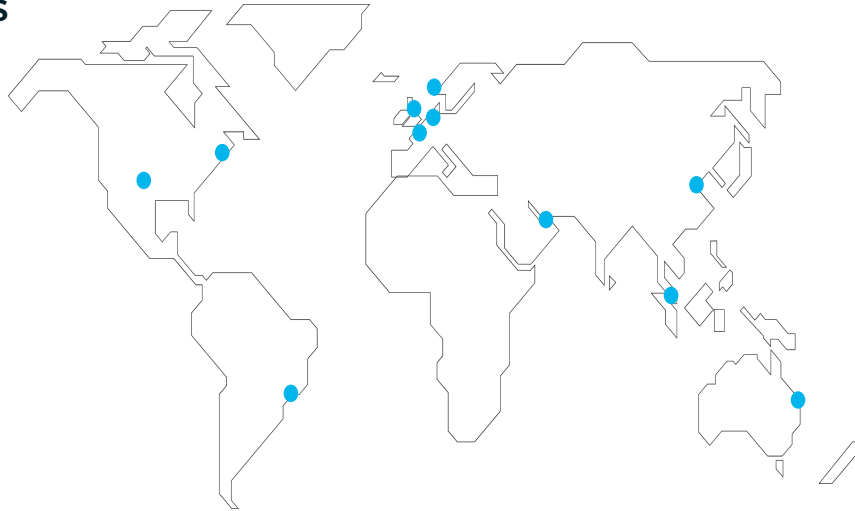
700+
employees



140+ M€
turnover



100% independent



8
**industrial
sites**



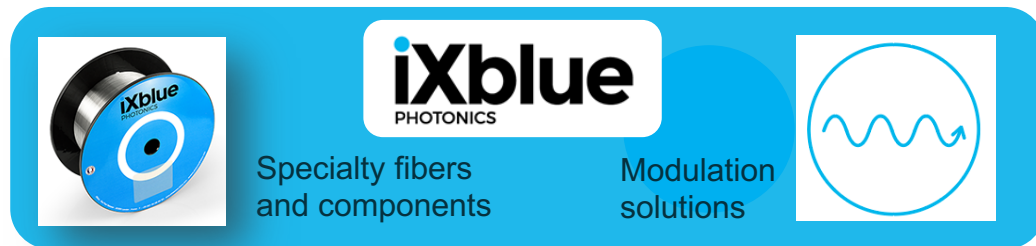
100% of R&D
and production
as well as
90% of suppliers
located in France



**Joint
Research
Laboratories**

Products & Services

10 divisions, all serving both external and internal customers



Specialty fibers
and components

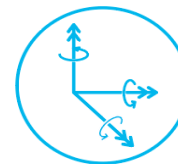
Modulation
solutions



Underwater acoustic
communication
and positioning



Motion simulators
and Pan & Tilt



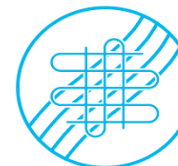
Navigation systems



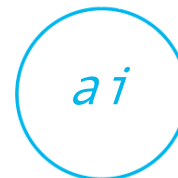
Sonars



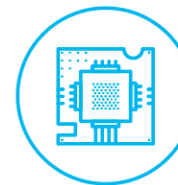
Ships and drones



Sea operations



Artificial intelligence



Inertial sensors

We offer a wide range of products and services from optical components to instruments, integrated systems and operations at sea.

Vertical Integration

All necessary **know-how** for any **critical** component is developed **in-house**

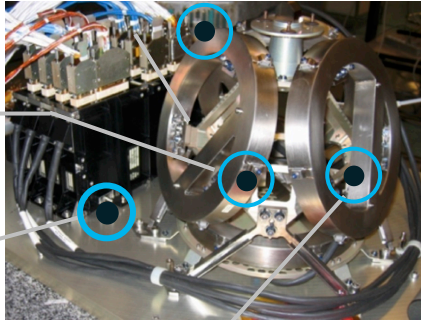
In a Fiber Optic Gyroscope (FOG)

Integrated optical circuit

PM Optical fiber for sensing

FBG roadband Filter
Er doped ASE source

Quartz Accelerometers



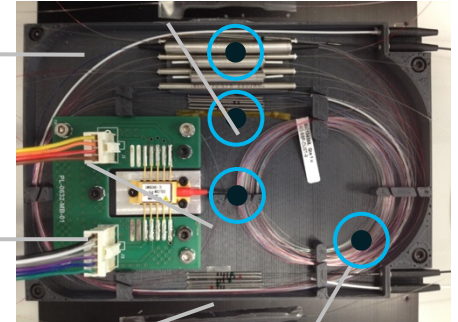
In a Erbium Doped Fiber Amplifier (EDFA)

Space compatible selection of optical fiber components

FBG broadband filter

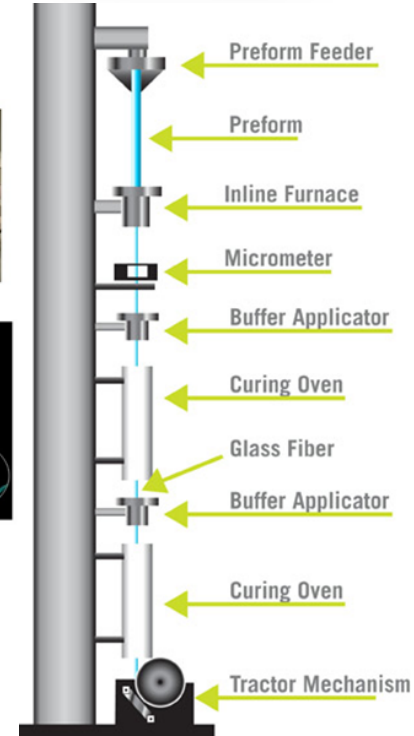
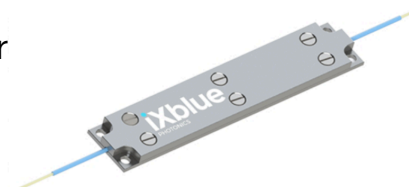
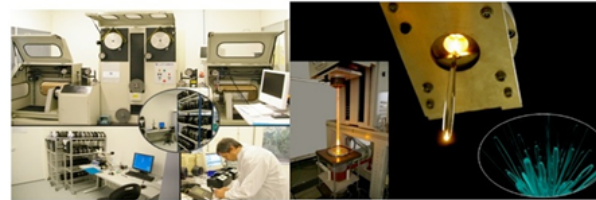
FBG Laser Diode Stabilizer

Radiation hardened Erbium doped fiber



Specialty Fibers & Photonics Components

- Founded in 2006 – iXBlue, based in Lannion, France
- Unique Know-How in Heritage Technology from France Telecom Labs
- Core Competencies
 - Specialty Fiber based on silica
 - Fiber Bragg Technologies
 - 350 to 2200 nm
- MCVD, SPCVD, drawing towers
- FBG lasers prod. line
- High Scientific skills
 - 2 on-going PhD thesis per year
 - 10-20 scientific papers published every year



Laser & Amplifier Fibers

Main specifications

Fiber Type	Single, Double, Triple Clad, All Glass
Active Doping	Er, Yb, Er/Yb, Tm, Ho, Tm/Ho, Nd
	P-doped for Raman Amplifier
Core Diameter	Up to 30 μm , LMA
Polarization Maintaining	Panda design available



Applications

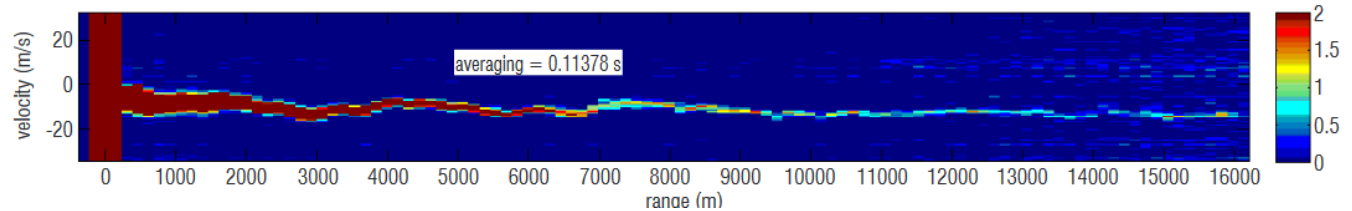
- . Lidar
- . High power CW and pulsed lasers or amplifiers
- . 0.9 μm fs laser sources
- . 1 μm industrial lasers
- . 1.5 and 2 μm Eye-safe lasers
- . CATV and telecom amplifiers
- . Medical lasers
- . Space grade amplifiers and lasers

Key features

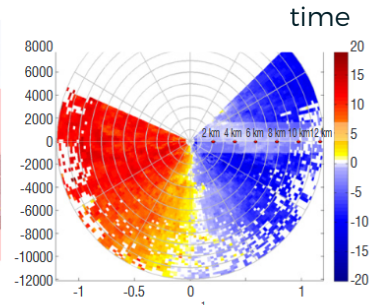
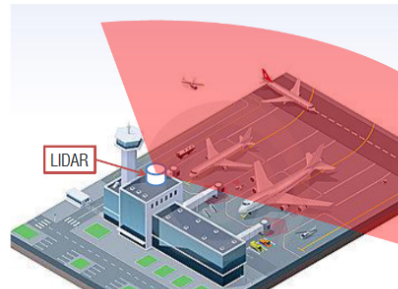
- . Highest efficiency Er/Yb fibers on the market
- . High temperature coating
- . WW distance record for coherent Lidar for wind measurement
- . First PM Neodymium LMA fiber
- . More than 10 years experience in Radiation Resistant Doped fiber
- . TRL9 Erbium doped fiber
- . E-store for fast delivery from stock

Ex. : Lidar for Wind Measurement – LMA EY Fibers

- Detection of turbulences, wind gusts... based on doppler effect
- Long-range Lidar measurement: FEYMOUS projet (iXblue/Onera/Thales)
 - Development of LMA Erbium/Ytterbium co-doped fibers: low NA, PM, low 1um emission
 - 25-250 and 30-300 PM fibers now commercially available



Wind Speed Measurement over 16km in 0,1s average

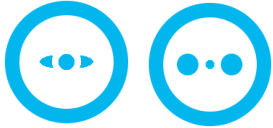


Optical Fibers for Sensors

Fibers Type

Key features

PM Gyro Fibers



PM fiber, 820 to 1550 nm

- Reduced coating available
- Space Grade available
- No twist for easy coil winding
- Low PER fluctuation over wide temperature range
- Acrylate and Silicon coating available

Polarizing Fibers



PM fiber but only one axis of polarisation

- > 100 nm polarizing window
- > 30 dB extinction ratio
- Available as bare fiber, polarizer, full assembly

Spun Fibers



Maintain circular polarisation

- Matched PM fiber for current sensors available
- EC for low temperature dependence application


Harsh Environments



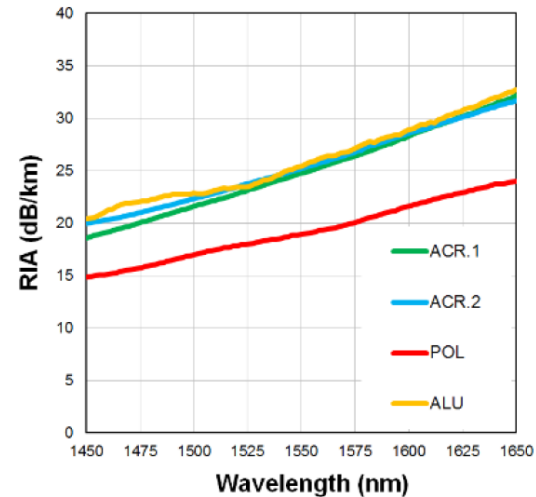
Fiber designed to be resistant to radiation
And temperature
Ex:DTS (distributed temperature sensing)

- Radiation resistant
- High Energy physics
- High temperature operation
- Acrylate, acrylate HT, polyimide, aluminium and carbon coating available

Harsh Environmental Fibers

- New range of SMF fiber able to operate in high temperature & radiative environment
- Designed for sensing operation in harsh environment
-  : common laboratory between iXblue and Laboratoire Hubert Currien (St Etienne University)

Ref.	Coating	Max. Temperature
IXF-RAD-SM-1550-0.14	Acrylate (Telecom Type)	85°C
IXF-RAD-SM-1550-0.14-HT	Acrylate High Temperature	150°C
IXF-RAD-SM-1550-0.14-PI	Polyimide	300°C
IXF-RAD-SM-1550-0.14-AL	Aluminium	400°C

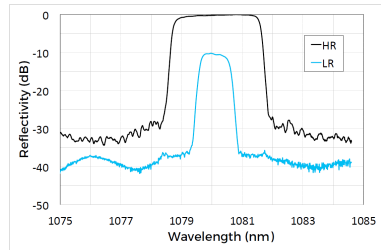


Spectral RIA of different samples fiber with various coating with 750 kGY irradiation

Fiber Bragg Gratings (FBG)

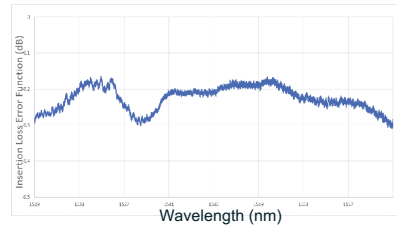
FBG laser mirrors pairs

- All fiber types: single, double or triple clads; PM
- From 600 to 2100 nm
- HR reflectivity up to 99.9%
- HR FWHM from 0.5 to 1.5 nm



Gain flattening filters

- Low reflection slanted GFF for Terrestrial and Submarine grades
- Available in recoat, athermal or non-athermal package
- C&L bands
- PM version available



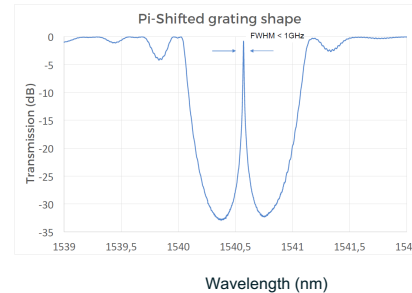
Focus on



- High Power Mirror Laser cavity @ 1, 1.5 and 2 μm
- Improved thermal slope by a factor of ten
- Handling pump power up to 3 kW

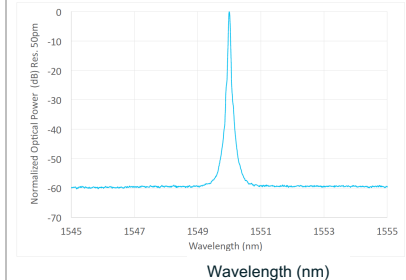
Ultra-narrow bandwidth filters

- Narrow band: < 1 GHz bandwidth filter
- Low Insertion Loss
- Fine adjustment of central wavelength
- Athermal packaging available



Low linewidth single frequency lasers (DFB)

- Combination of iXblue doped fibers and FBG technologies
- 1.5 and 2 μm available
- 1 kHz linewidth
- Up to 10 mW output power



Offering Custom Solutions

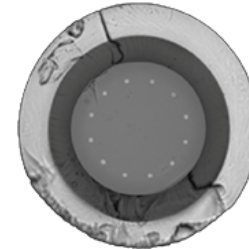
Custom fibers



- Mastering of the entire production process, from the Preform to the fiber characterization

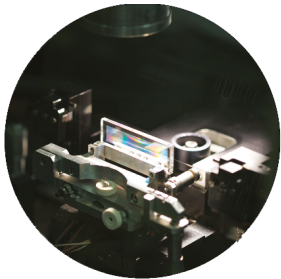


- Custom
- Fiber Coils



- Multicore fibers,
- Hollow Core fibers
- Photonics Crystal fibers

Custom components



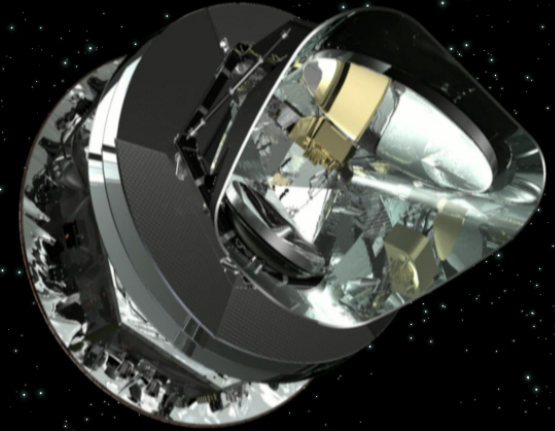
- FBG from 400 to 2100 nm
- Apodized profile
High SLSR
- All fiber types

Offering fiber based solutions from deep water to outer space

- what iXblue Photonics can bring to other EPIC members ?
- what can other members of EPIC could do for us ?



- 6 km



+ 1.500.000 km

ixblue



Specialty Fibers Division

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