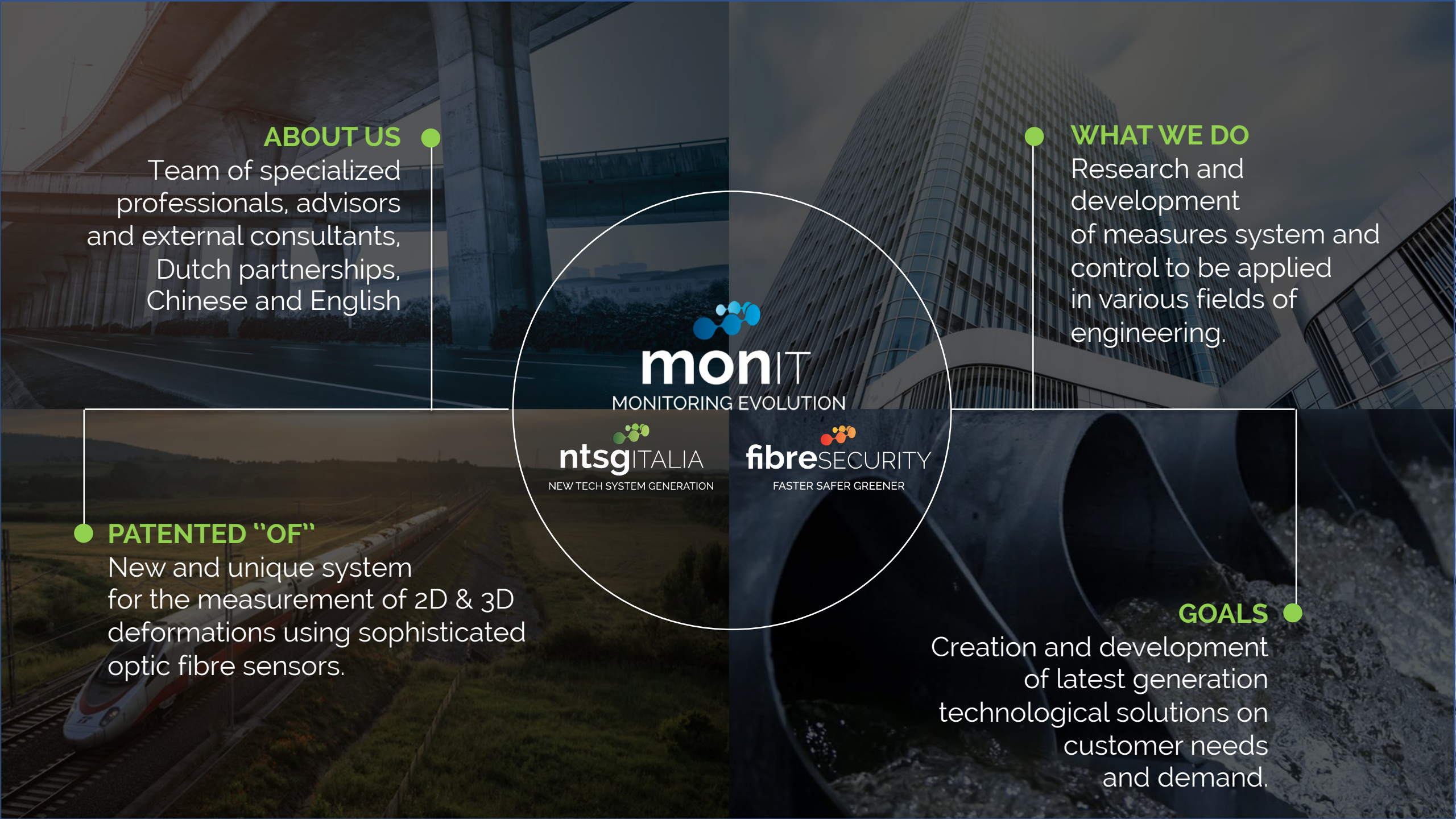

ntsgITALIA
NEW TECH SYSTEM GENERATION
monIT
MONITORING EVOLUTION
fibreSECURITY
FASTER SAFER GREENER

A **group of companies** dedicated to the creation, design and customization of **innovative measurement systems for any kind of application.**
By using **cutting-edge** technologies, materials and digital processes developed in **pioneering sectors** for the benefit of our customers.

The group **Mon-it** Sas (based in Paris) is composed by international team within three pillars including the branches **NTSG Italia** (based in Rome) and **Fibre Security BV** (based in Amsterdam).



ABOUT US

Team of specialized professionals, advisors and external consultants, Dutch partnerships, Chinese and English

WHAT WE DO

Research and development of measures system and control to be applied in various fields of engineering.

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PATENTED "OF"

New and unique system for the measurement of 2D & 3D deformations using sophisticated optic fibre sensors.

GOALS

Creation and development of latest generation technological solutions on customer needs and demand.

THE ITALIAN PATENT
«OF» e «OF PIPE»

2015

THE PATENT 'OF' IS BORN.
A 2D and 3D deformation measurement system for structures having a form, material and generic dimensions, based on fibre optic technology, with the aim of determining and monitoring the stresses in the structure and detecting parameters such as compression, stretching, bending, loading, twisting, vibration, pressure, displacement, corrosion, inclination, temperature and current levels.

2018

NTSG'S RESEARCH AND DEVELOPMENT TEAM FILES NEW PATENT 'OF PIPE'
A system for identifying and measuring the losses of a conduit (water, sewage, oil, gas), based on optical fiber sensing technology, with the aim of identifying the presence, position , dimension of a leak present in the duct.

Proprietary software that calculates in real time the quantities of interest using data interpretation models verified and certified by the CNR

«OF» e «OF PIPE»

UNIQUESS BECOMES SYSTEM

Deformation can be read remotely using Tablet, PC and Smartphones

MULTIPLEXING

Multiple sensor readable at the same time, installed on the same fiber.

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«OF» SYSTEM

CONTROL PASSES THOUGH THE OPTICAL FIBRES

"OF" System is able to measure deformation in space and in plan of the object under examination, thanks to the particular configuration of the sensors and the specific data analysis software.

WHAT MEASURE

- Direct measurements of mechanical and thermal strain;
- Indirect measurements of: load, pressure, deformation, vibration, torsion, inclination, corrosion, displacement, electrical current levels, temperature, etc.

INSTRUMENTS

- Optic fibre cables of reduced dimensions (250micron/6mm);
- Passive sensors created within the optical fibre (accelerometers, inclinometers, gauges of cracks/LVDT, inclinometer poles, deformation gauges, etc);
- Technology that does not suffer and does not produce electromagnetic interference;
- Signal transmission over long distances (100 km) with no significant power losses.

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«OF» APPLICATIONS
EVERYTHING UNDER CONTROL, ALWAYS

"OF" System can be used in multiple applications:

major infrastructures, transports, highways, tunnels, bridges, ships, cultural heritage.

The developments may be potentially infinite.

- To check the structures, carrying out measurements in real-time using high sampling frequency, with a consequent identification of fast stresses;
- To secure the facilities and the people who work in them or use them;
- To check the structural characteristics of materials of any type and shape;
- To verify the behavior of a structure and validate the technical specifications;
- To monitor the wear and aging of the structures by detecting its mechanical and physicochemical characteristics variations.

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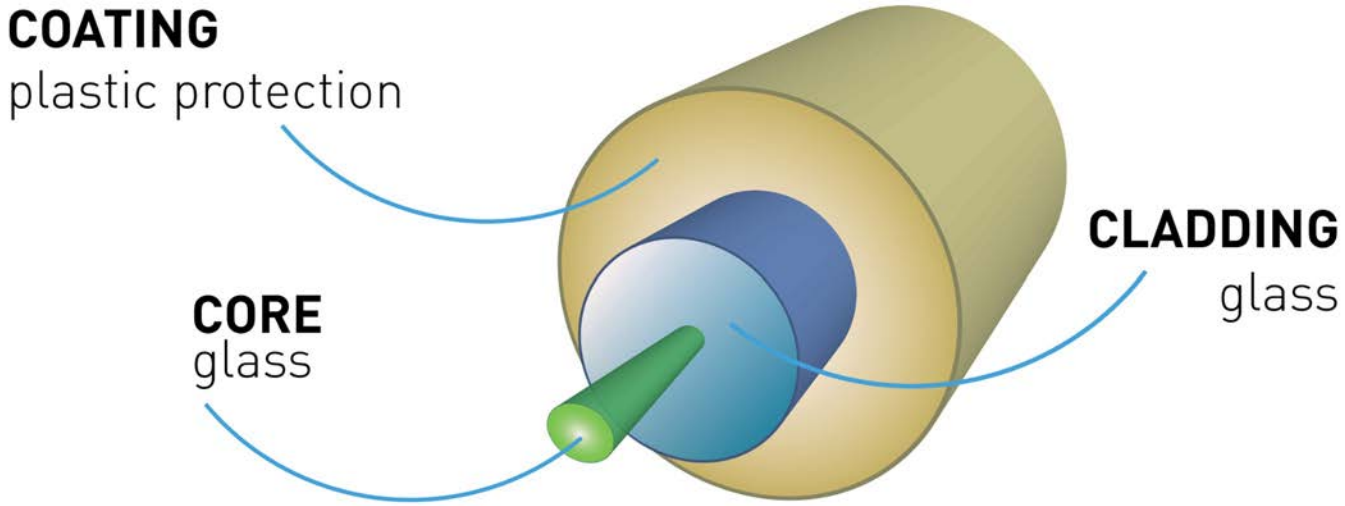
THE FIBRES, THE SENSOR, THE MATERIALS

THE FIBRES, THE SENSORS, THE MATERIALS

INNOVATIVE NON-INVASIVE SENSORS FOR ANY STRUCTURE



DIAMETER
Core: 5-9 µm
Cladding: 125 µm
Coating: 170-250 µm

COMPARISON
Human hair:
About 90 µm

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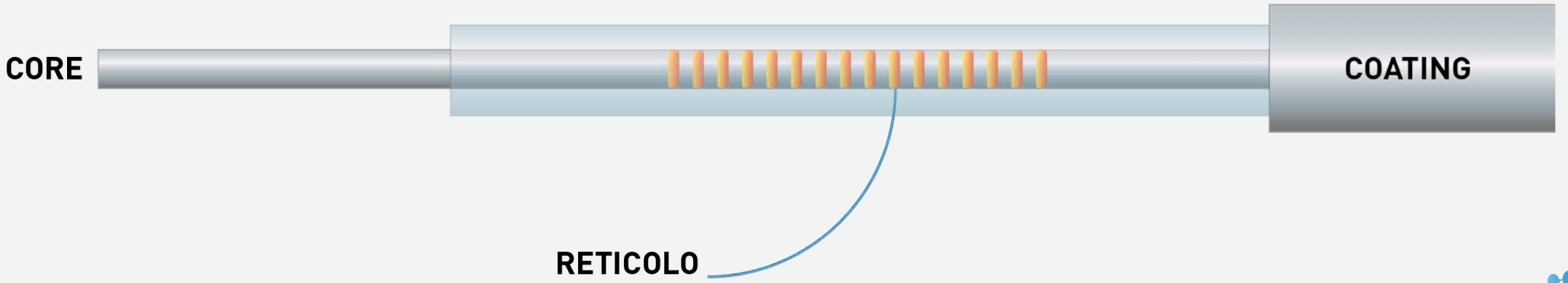
THE FIBRES, THE SENSORS, THE MATERIALS

INNOVATIVE NON-INVASIVE SENSORS FOR ANY STRUCTURE

FBG - fibre Bragg Grating
The grating is "written" in the fibre core with an ultraviolet laser. The grating is the sensor itself.
Grating dimension: 0.5-2 cm.

A peculiar characteristic of the FBG technology is that on a single optical cable can be wired in series, for the **measurement of various parameters**, using different sensors such as strain gauges, accelerometers and temperature sensors. The acquisition is performed with just one interrogation system.



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THE FIBRES, THE SENSORS, THE MATERIALS
TOTAL FLEXIBILITY

SYSTEM CHARACTERISTICS

- Possibility of placing the data collecting instrument at a long distance (km) from the monitoring area, without reducing the measurement accuracy;
- Up to 100 sensors can be installed, in series, on the same fibre;
- Significant reduction of the wiring amount required to monitor a structure.

SENSOR CHARACTERISTICS

- High sensitivity;
- Small size and possibility of being fitted in composite materials;
- Passive sensors: they do not produce and are not affected by electromagnetic fields.

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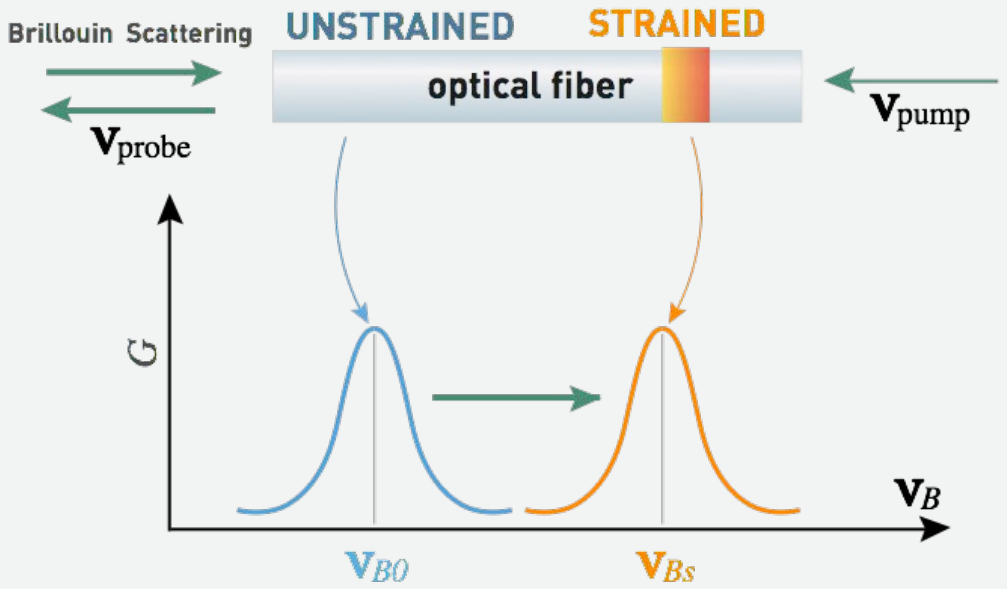
THE FIBRES, THE SENSORS, THE MATERIALS

INNOVATIVE NON-INVASIVE SENSORS FOR ANY STRUCTURE

DSTS solution: Optic Fiber with Distributed Sensors
DSTS based on Brillouin strain and temperature sensor using a phenomenon known as stimulated Brillouin scattering.
DSTS System is especially suitable for monitoring of long-length structures.

- High sensitivity;
- It does not produce and is not affected by electromagnetic fields;
- Real-time measurement of strain and temperature;
- Multiple channels available;
- Small size and possibility of being fitted in composite materials;
- High spatial resolution (sensors positioned every 5 cm/ 50 cm) at long distances (up to 100 km);
- No zero shift.

Brillouin Sensor - Principle of Operation

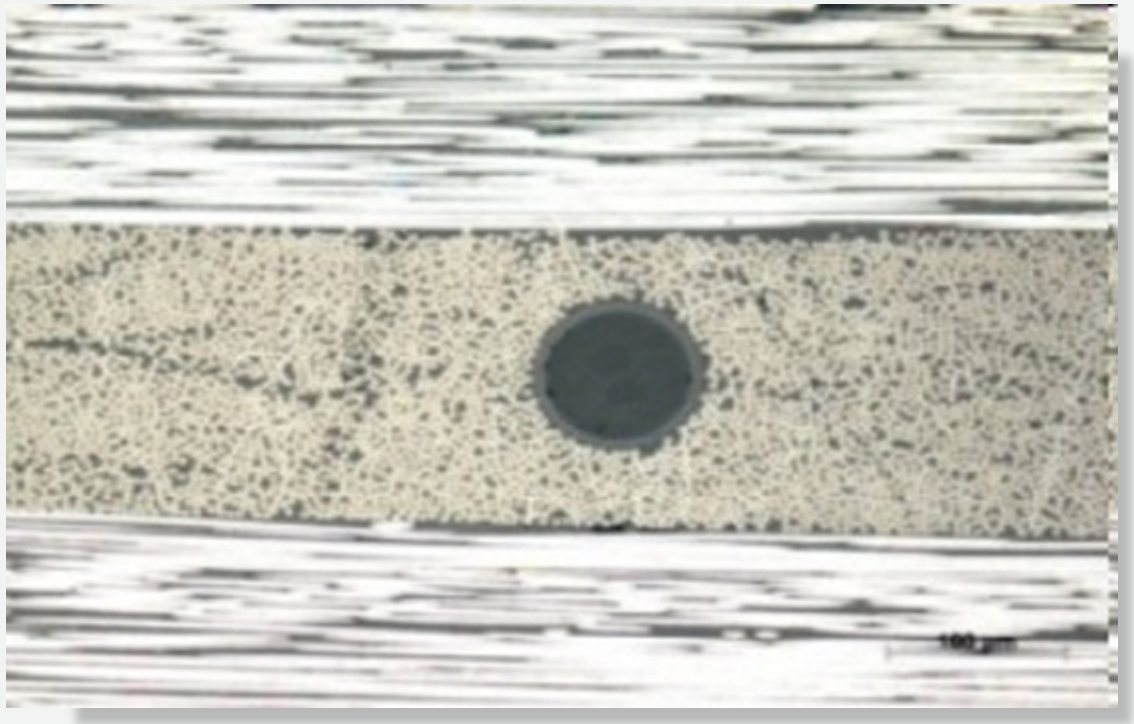


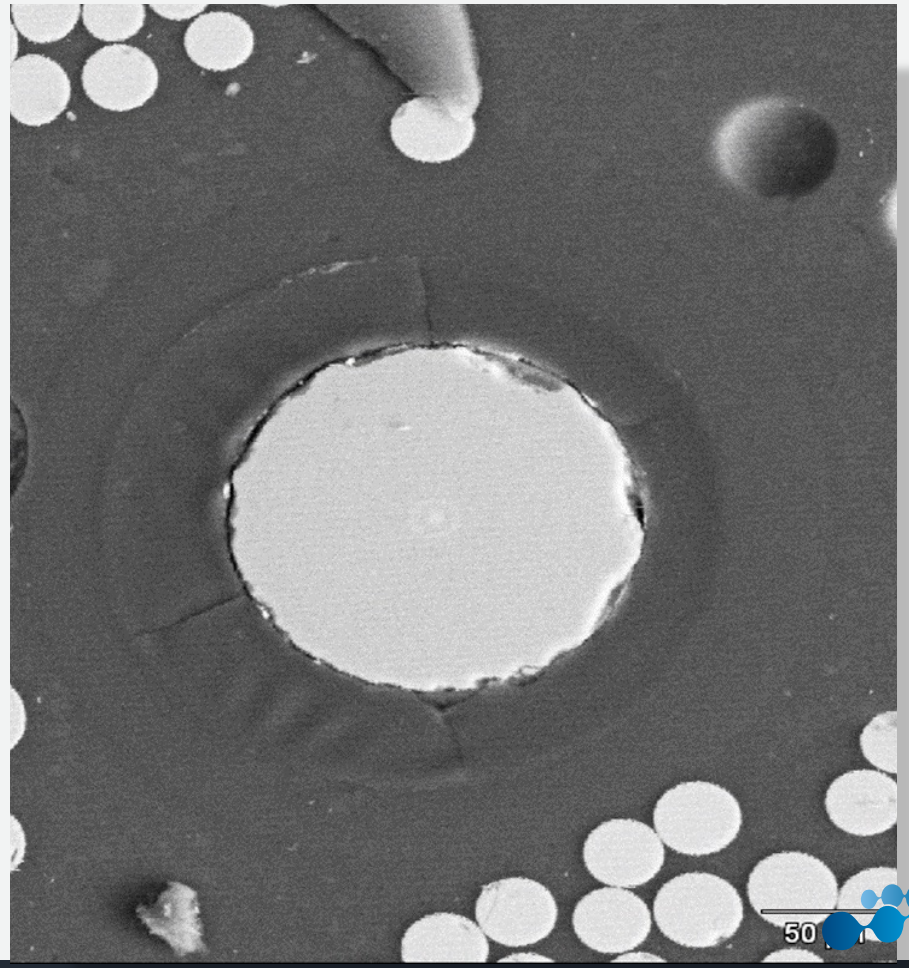
$$\nu_{Bs} = \nu_{B0} + C_T(T + T_0) + C_\varepsilon(\varepsilon + \varepsilon_0)$$

THE FIBRES, THE SENSORS, THE MATERIALS

INNOVATIVE NON-INVASIVE SENSORS FOR ANY STRUCTURE

Fibres with FBG sensors can be inserted directly into composite materials thanks to their small size, during the rolling process.





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TARGET

The "OF" systems monitor the structures with the aim of ensuring their safety, optimizing their maintenance, estimating their useful life, studying their evolutionary behavior.
All these aspects added to the characteristics/performance
of fiber optic technology allow to:

- Determine the state of health of a plant = plan exactly a maintenance intervention
- Estimate the remaining life of a structure = plan without waste when the structure needs to be replaced
- Longevity of the system = reduced maintenance/replacement interventions, therefore less pollution
- Longevity + System liabilities = reusable/recyclable on new applications and ECO for reduced emissivity.

TECHNOLOGIES IN COMPARISON

ELECTRIC TECHNOLOGY

- Electrical sensors
- Signal decay over long distances
- 3 cables to manage a single sensor
- Weather sensitive
- High maintenance costs

«OF»TECHNOLOGY

- Fiber optics
- No signal loss
- Up to 100 sensors of different types can be connected on 1 fiber
- Immune to atmospheric agents
- Reduced maintenance costs

WHY CHOOSE «OF» SYSTEM?
For a safer future.

Safety of plants and structures.

- Chance to place the data acquisition tool at large distance (km) from the monitoring area, without reducing the accuracy of the measurement;
- Multiplexing, up to 160 sensors, even of different types, applied in series on the same fibre;
- Reduce the required wiring to monitor a structure.
- High sensitivity;
- Small size and insertion possibilities inside composite materials;
- Sensors are passive, do not generate and are not affected by electric and magnetic fields.
- Reduction of maintenance costs and energy consumption up to 17 times less than traditional systems with copper cables: a valid tool on the way to **aecological transition**

MOBILE INTEGRATION AND DATA FEED "ON THE GO"

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Creating innovative mobile application systems that are able to read data in real time and provide key information on the tip of your fingers.

MAINTENANCE & SECURITY "ON THE GO"

The System is connected to the control unit that allows you to send notifications directly to the tablet or smartphone of the technicians, so that they can go out on the field and compare the data in real time.

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A SOLUTION, ENDLESS POSSIBILITIES

APPLICATION FIELDS

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MONITORING EVOLUTION

MONITORING

How it works and why it plays a fundamental role in infrastructure.

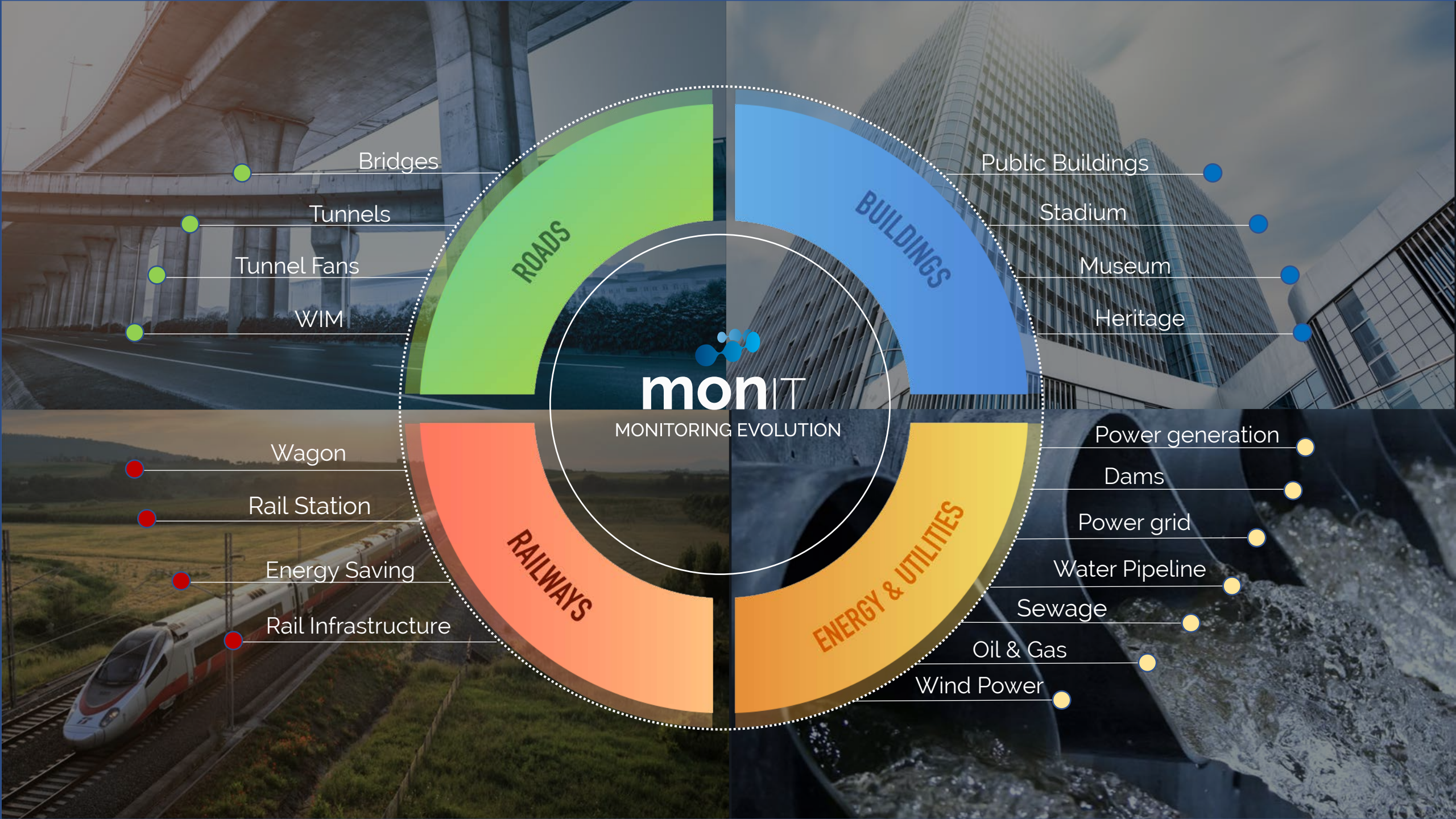
Buildings, roads, bridges, tunnels, railways, trains. Vehicles in constant motion, people on the road, operators at work.

In a world in constant activity and movement, monitoring infrastructure means checking the health of structures such as: buildings, roads, bridges, tunnels, heritages, schools, hospitals, but also railways, pipelines, dams, and more.

The proprietary data processing software **EG-NTSG** and the **IoT-NTSG** software platform, process the data, analyse the information and estimate the state of the structure, with the ultimate aim of optimizing the planning of maintenance activities.

Our systems prevent failures, damage, for the safety and health of all.





Bridges
Tunnels
Tunnel Fans
WIM
ROADS
BUILDINGS
Public Buildings
Stadium
Museum
Heritage
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Wagon
Rail Station
Energy Saving
Rail Infrastructure
RAILWAYS
ENERGY & UTILITIES
Power generation
Dams
Power grid
Water Pipeline
Sewage
Oil & Gas
Wind Power

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