Optical Fibers & Fiber Sensors for Advanced Satellite Structures

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InPhoTech – Who are we

We are delivering **INNOVATIVE PHOTONIC SOLUTIONS** to the market

60+ Employees

**over**

50% Of employees involved in R&D

9 Years on the market
Innovative Product Lifecycle

Demand Identification

Fiber or Component Design

Fiber Fabrication

Glass Processing, Protective Coatings

Device Design

Device Prototyping

Integral Solution Assembly

Product Development and Field Test

Production

Delivery & Installation

Property of InPhoTech – Confidential
Our solutions find application in

- **Aerospace**
- **Oil & Gas**
- **Machinery Industry**
- **Security**
- **Electromobility**
- **Temperature Distribution**
- **Telecommunications**
- **Next Gen. Optical Fiber for High-Capacity Networks**
- **Medicine**
- **Cancer Detection**
- **Leaks, Pipeline Integrity, Landslides**
- **SHM of Composites**

**Design Future with InPhotech**
SHM of Aircrafts & Space Structures: The challenge

- Production stages defects (including non-proper storage/transportation, impacts, etc.)
- Hard-to-reach sensing areas
- Limited density of sensing points
- Complex maintenance:
  - Acoustic sensing
  - Visual/manual inspection
  - Point sensors

- Limited Density
- Limited Scalability
- High Payload
Composite panel

- Optical fiber integrated within the structure
- Negligible effect on the mechanical properties of the structure
- Full mapping of strain / shape / temperature distribution
- Great freedom in designing the shape of the element
Distributed Optical Fiber Sensing Scheme

- A single optical fiber is the sensor itself, which allows monitoring the whole structure.
- Connected to a Remote Interrogation Unit.
- The fiber is lightweight, safe for harsh environments (e.g., resistant to extreme temperatures), immune to EMI, and embeddable within the composite materials.
- Allows accurately measuring (e.g., temperature, strain, vibrations) thousands of points (e.g., every 2 cm) in a single link in real-time.
SHM of Aircrafts & Space Structures: Our Solution

- Embeddable within the structure.
- Ultra high-density of sensing points (down to cm).
- Reduces the payload.
- Real-time SHM, measuring strain, temperature or vibrations.
- Allows for a accurate verification of Finite Element Models.
- Enables predictive maintenance.
Enabling High-Capacity Telecom Networks
Specialty Fibers for High-Capacity Satellite links

Our solutions:

- Radiation-hardened multi-core fibers:
  - Optical Interconnect
  - Optical Amplifiers

https://www.nature.com/articles/s41467-019-10077-4
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