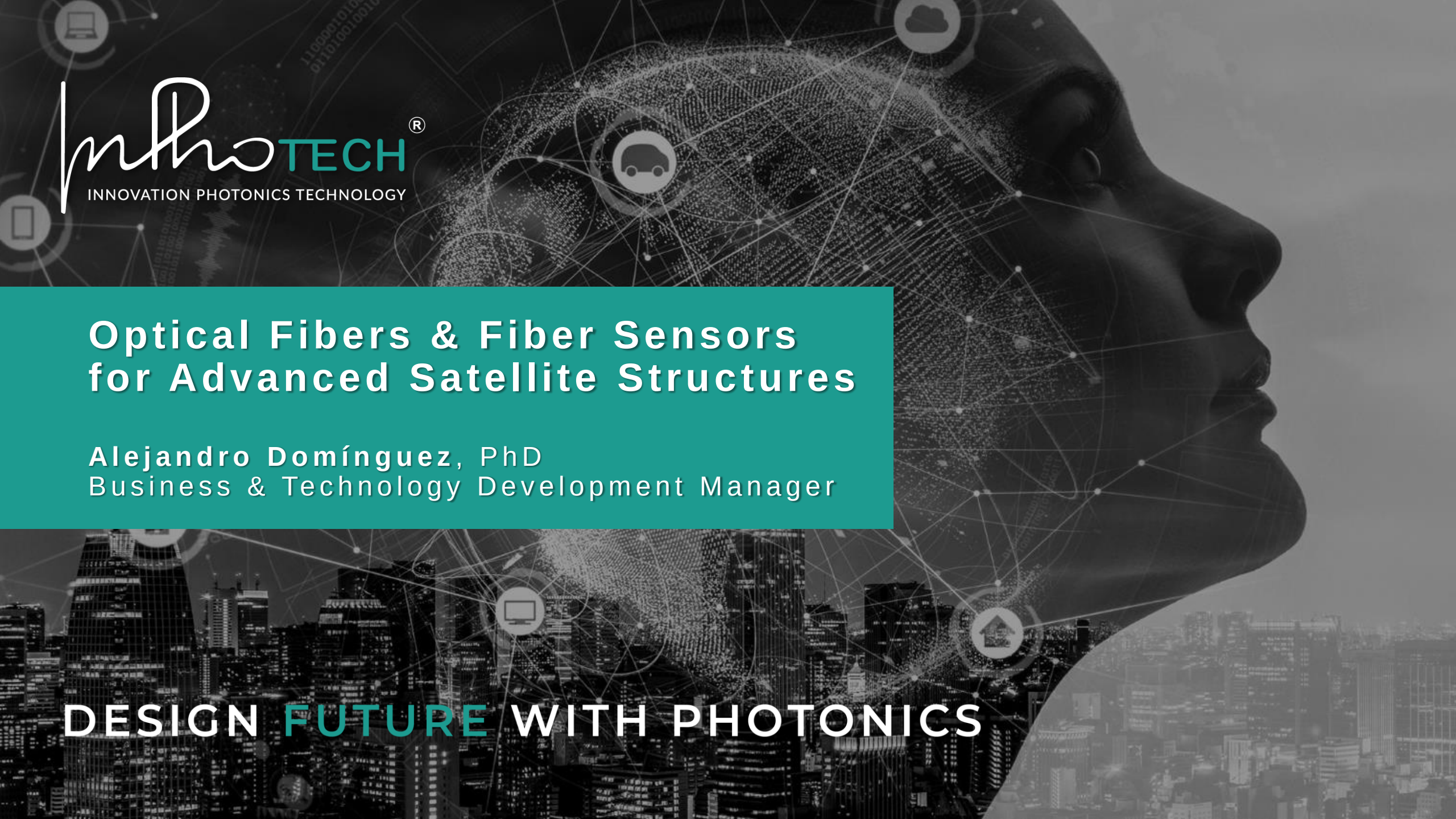


Optical Fibers & Fiber Sensors for Advanced Satellite Structures

Alejandro Domínguez, PhD
Business & Technology Development Manager

DESIGN FUTURE WITH PHOTONICS

InPhoTech – Who are we

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

60+

Employees

over

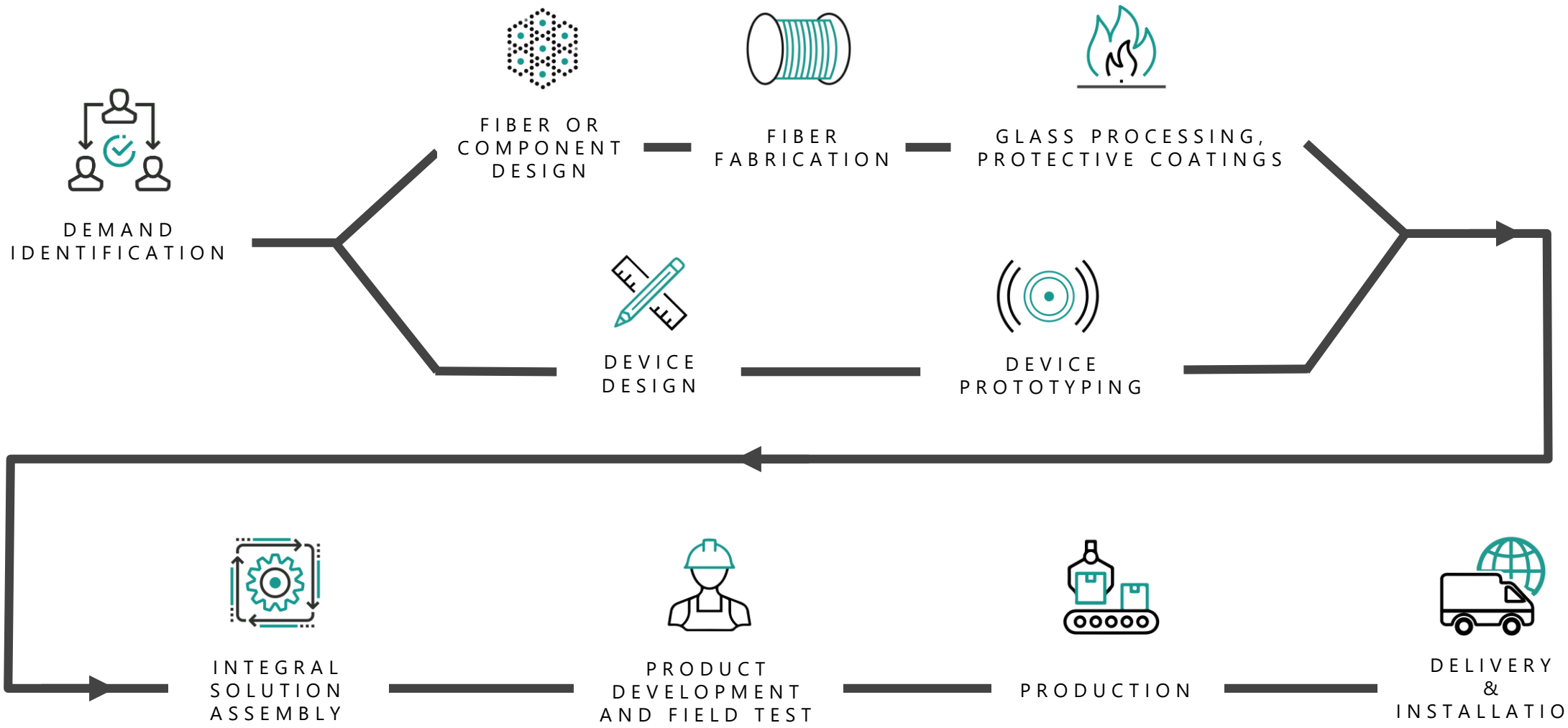
50%

Of employees involved in R&D

9

Years on the market

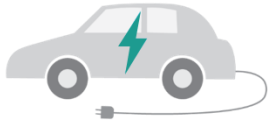
Innovative **Product Lifecycle**



Our solutions find application in

PROCESSES MONITORING

PRESSURE, STRAIN & TEMPERATURE SENSORS



E-MOBILITY

TEMPERATURE DISTRIBUTION

MEDICINE

CANCER DETECTION

HEAVY INDUSTRY

GAS, SEISMIC, SHM & TEMPERATURE SENSORS

DESIGN FUTURE WITH INPHOTECH

OIL&GAS

LEAKS, PIPELINE INTEGRITY, LANDSLIDES

SECURITY

INTRUSION DETECTION

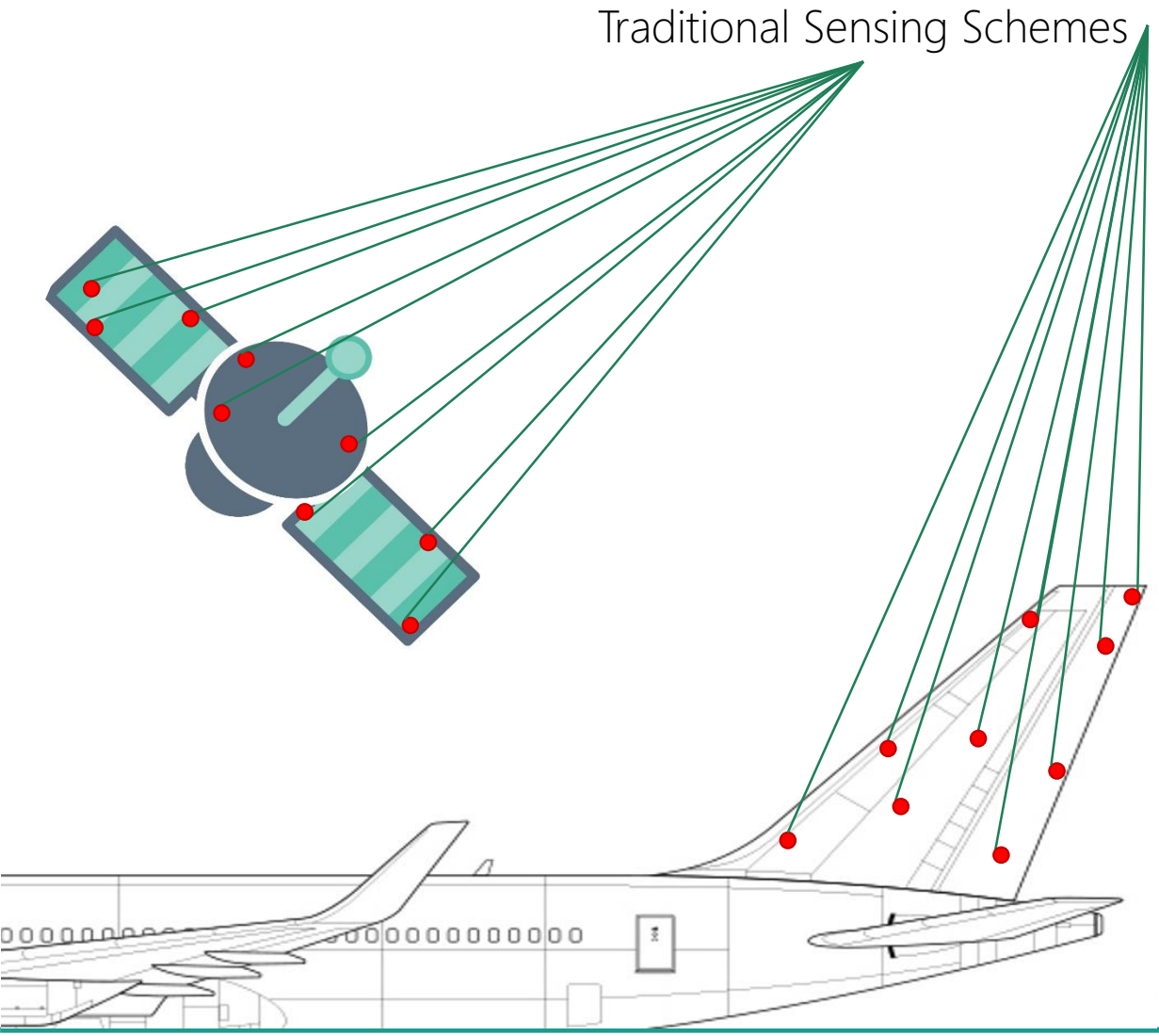
TELECOM

NEXT GEN. OPTICAL FIBER FOR HIGH-CAPACITY NETWORKS

AEROSPACE

SHM of COMPOSITES

SHM of Aircrafts & Space Structures: The challenge

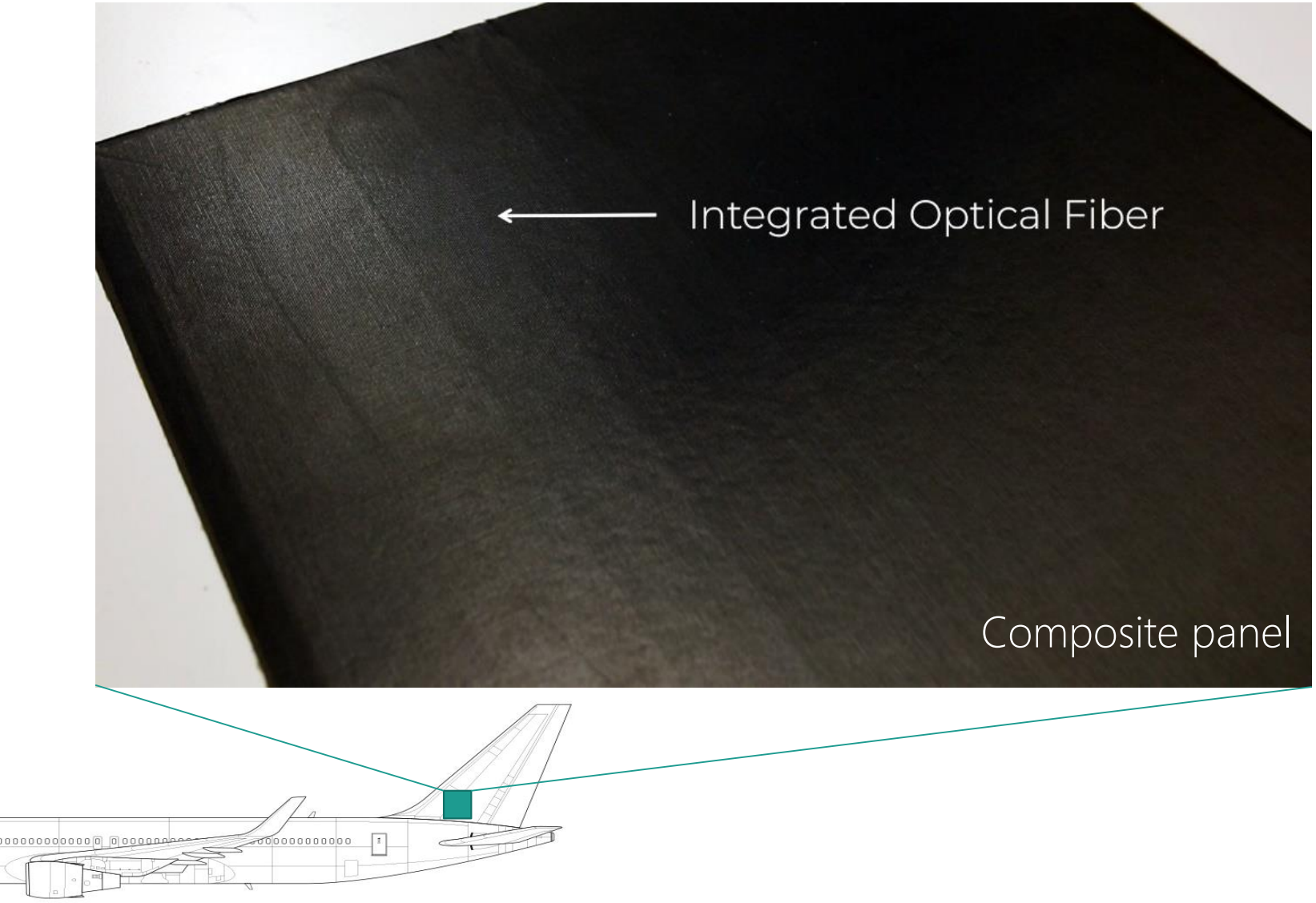


- Production stages defects (including non-proper storage/transportation, impacts, etc.)
- Hard-to-reach sensing areas
- Limited density of sensing points
- Complex maintenance:
  - Acoustic sensing
  - Visual/manual inspection
  - Point sensors

- Limited Density
- Limited Scalability
- High Payload

Point Sensor

SHM of Aircrafts & Space Structures: Our Solution

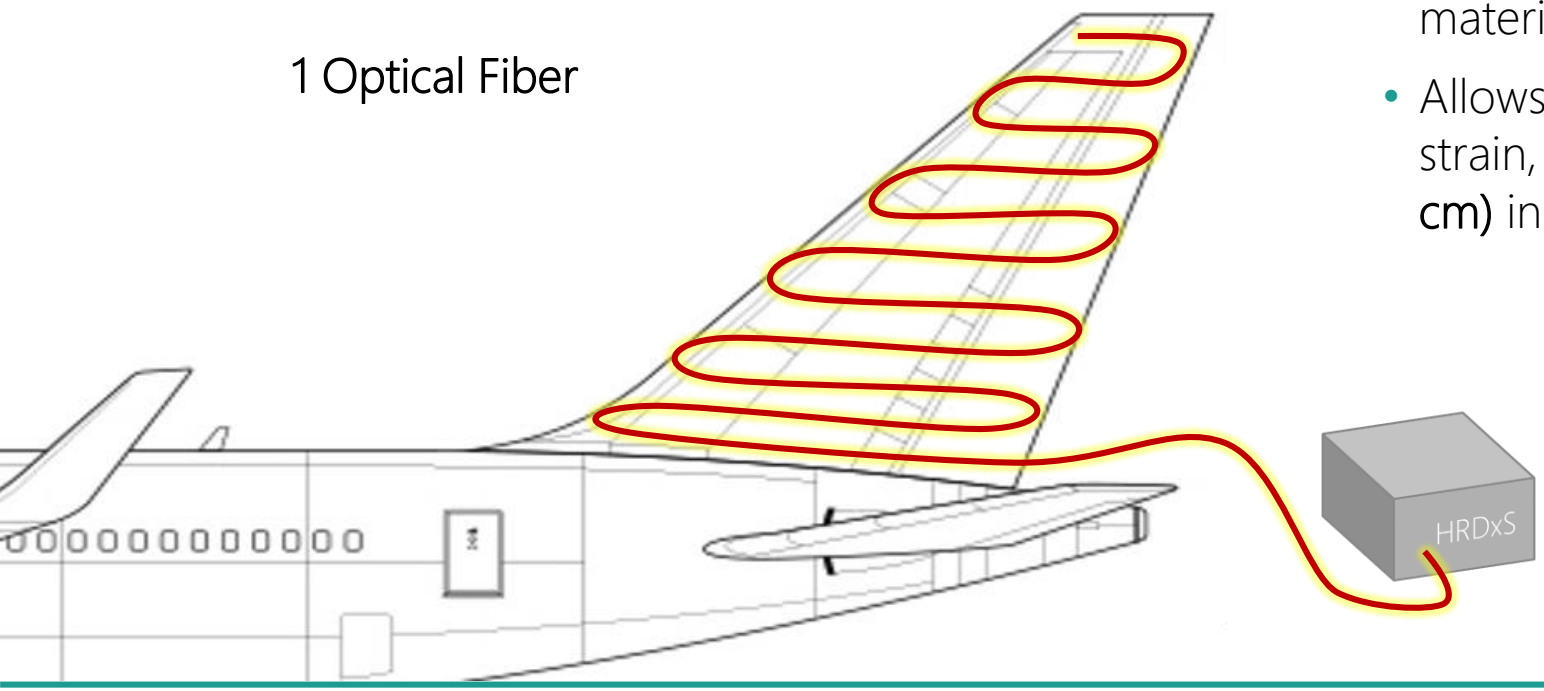


- Optical fiber integrated within the structure
- Negligible effect on the mechanical properties of the structure
- Full mapping of strain / shape / temperature distribution
- Great freedom in designing the shape of the element

SHM of Aircrafts & Space Structures: Our Solution

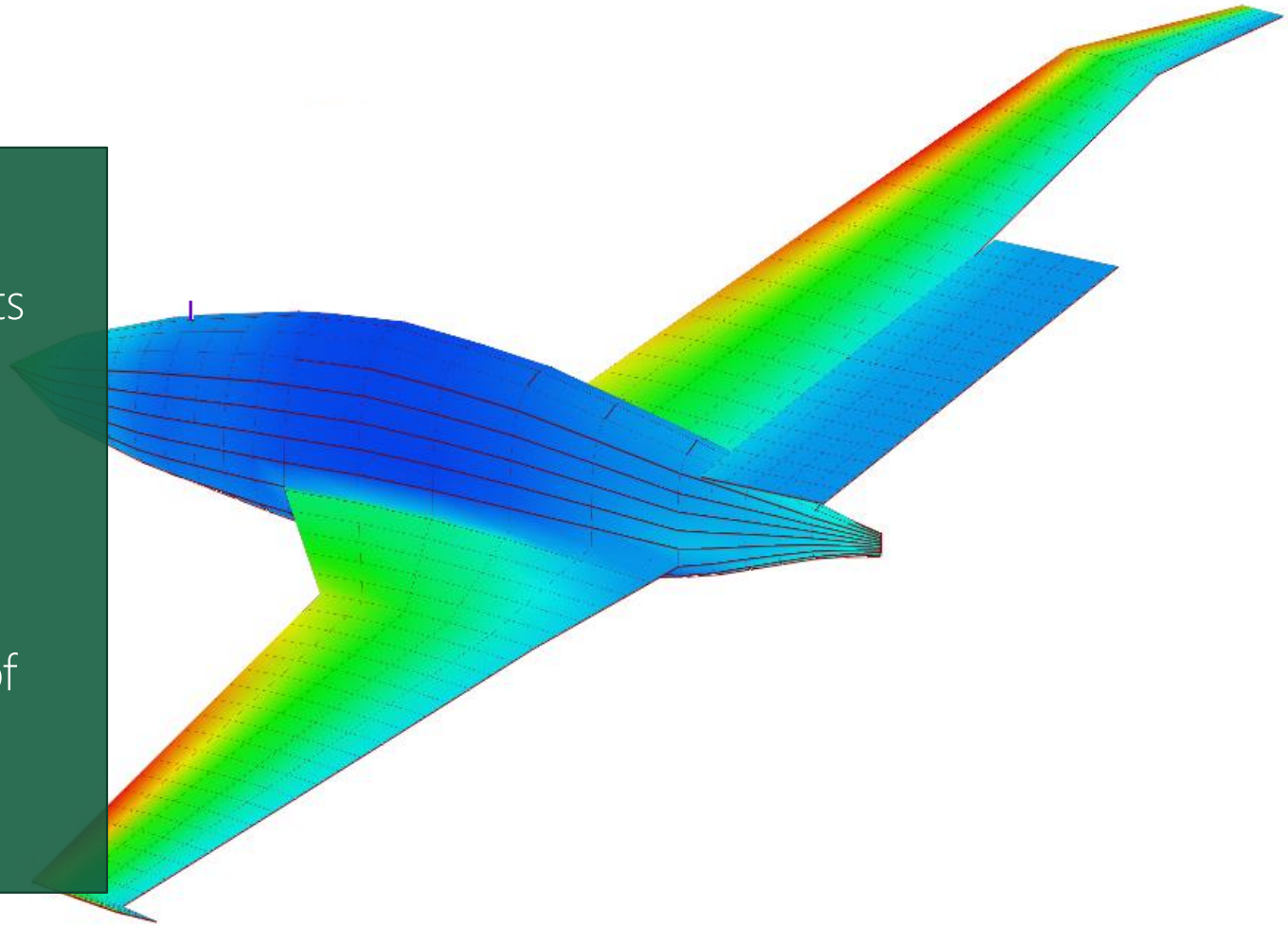
Distributed Optical Fiber Sensing Scheme

- 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**.

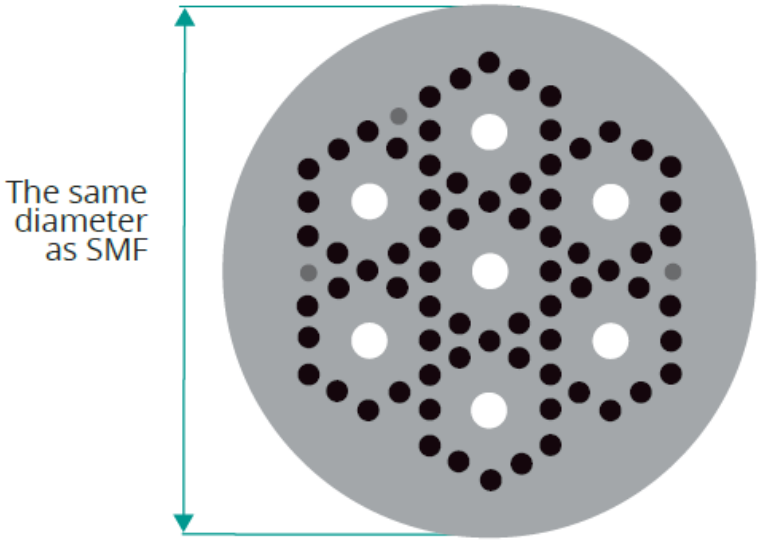


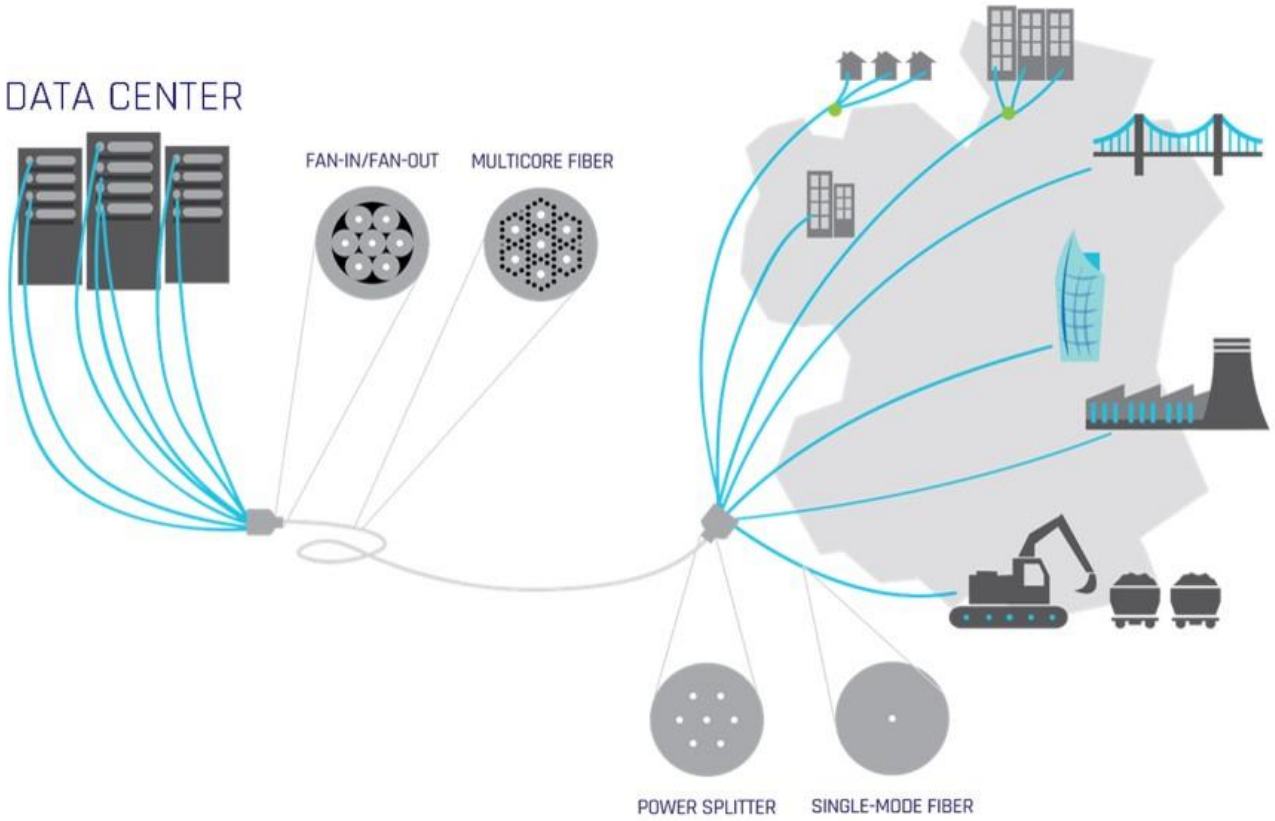
SHM of Aircrafts & Space Structures: Our Solution

- **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

Duarte, V. C., et al. Modular coherent photonic-aided payload receiver for communications satellites. *Nature Communications*, *10*(1). doi:10.1038/s41467-019-10077-4

INNOVATION PHOTONICS TECHNOLOGY

DESIGN FUTURE WITH PHOTONICS

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