



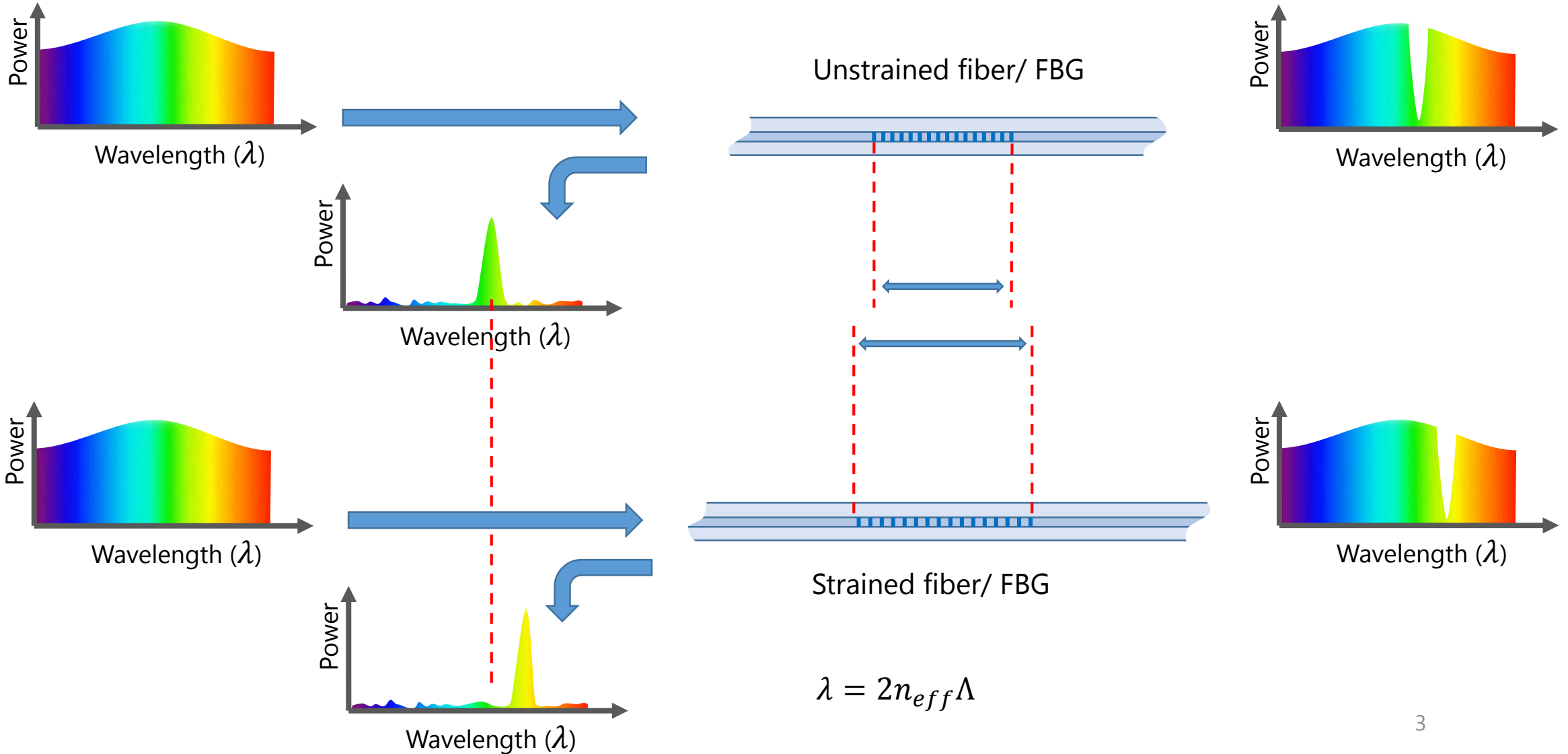
S o m n i

fiber optic sensor systems

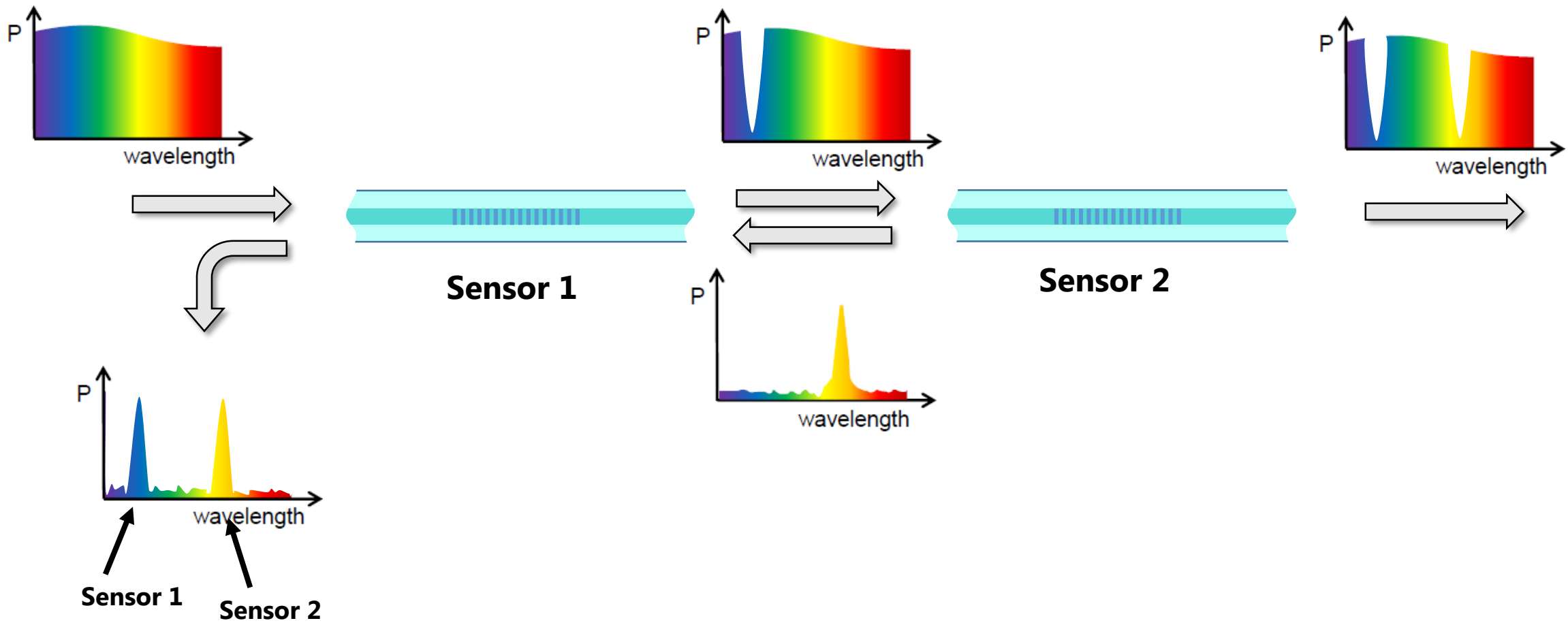
# Content

- Fiber Bragg Grating (FBG) working principal
- Somni's core competence
- FBG sensor network
- The unique properties of Fiber Optic Sensing
- Somni activities
  - Fiber optic hydrophone
  - ITER tender

# FBG working principal



# FBG working principal

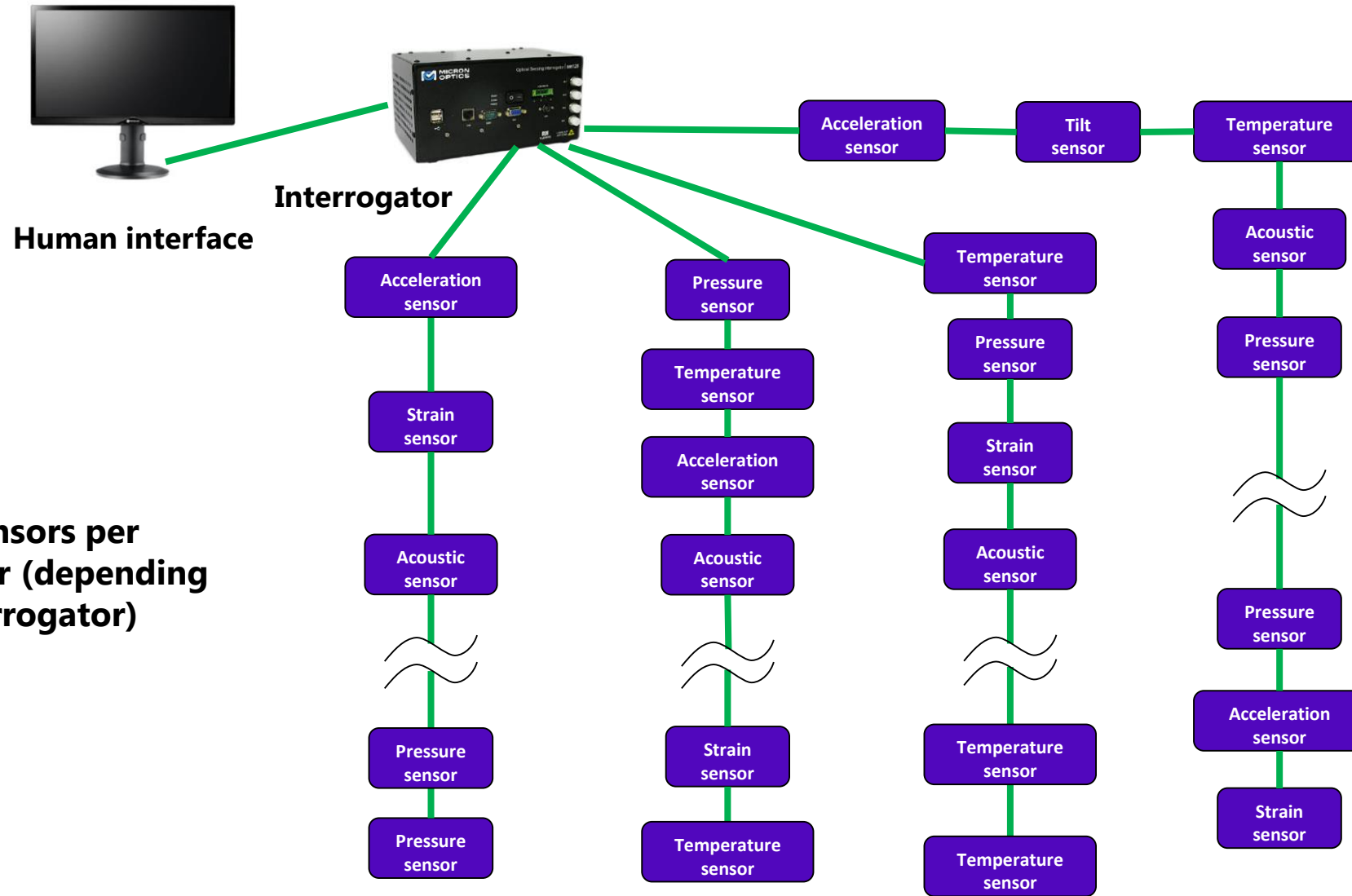


# Somni's core competence

- Converting the measurand to strain in the fiber.
  - With very high precision
  - Without hysteresis
  - Without loss of accuracy over time

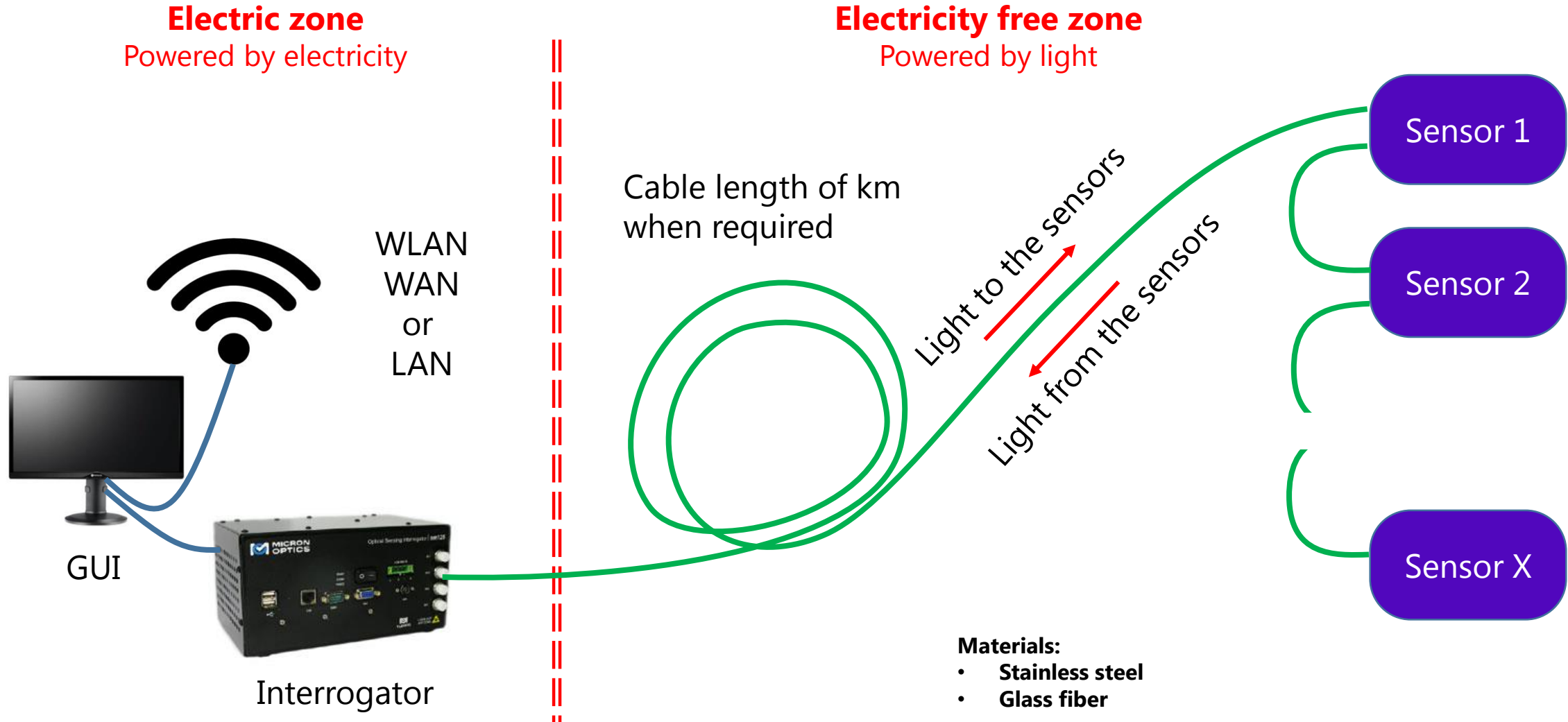


# FBG sensor network



**100-600 sensors per interrogator (depending on the interrogator)**

# Overall network system design

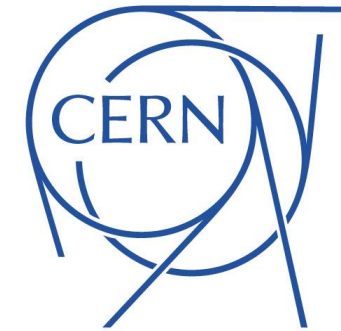


# The unique properties of Fiber Optic Sensing in Big Science applications

**Long distances**



**Vacuum compatibility**



**Radiation hardness**



**EMI insensitive**





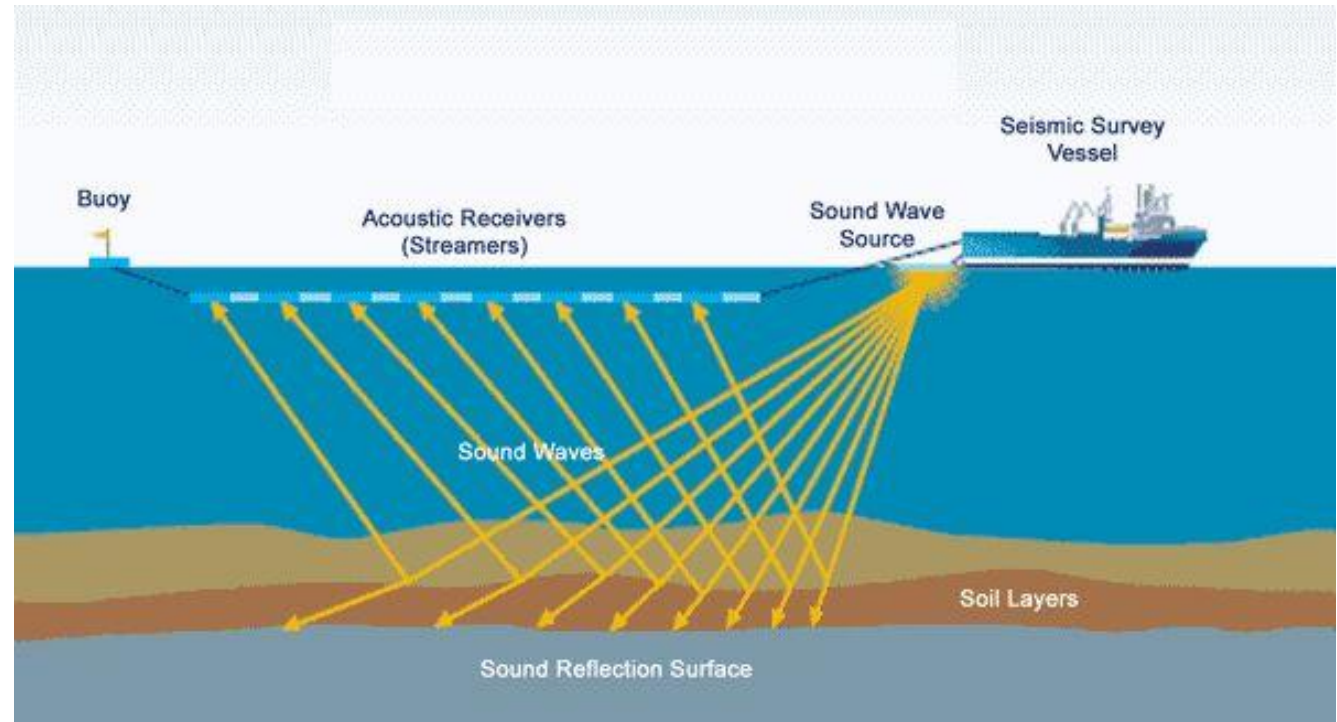
# Somni activities

- Sensor sales
  - Focused on:
    - acceleration
    - tilt sensors
- Research:
  - Medical application (0.2mm pressure sensors in catheter)
  - Defense (Sea state zero hydrophones)
  - Aerospace (glass fibers in composite structures)
  - Infrastructure (Tilt sensors for Genova bridge)
  - Big science (Vacuum compatible acceleration and temperature sensors for ITER neutral beam test facility (Istituto gas ionizzati) )
  - Public safety (Low frequency accelerometers for Taipei 101)



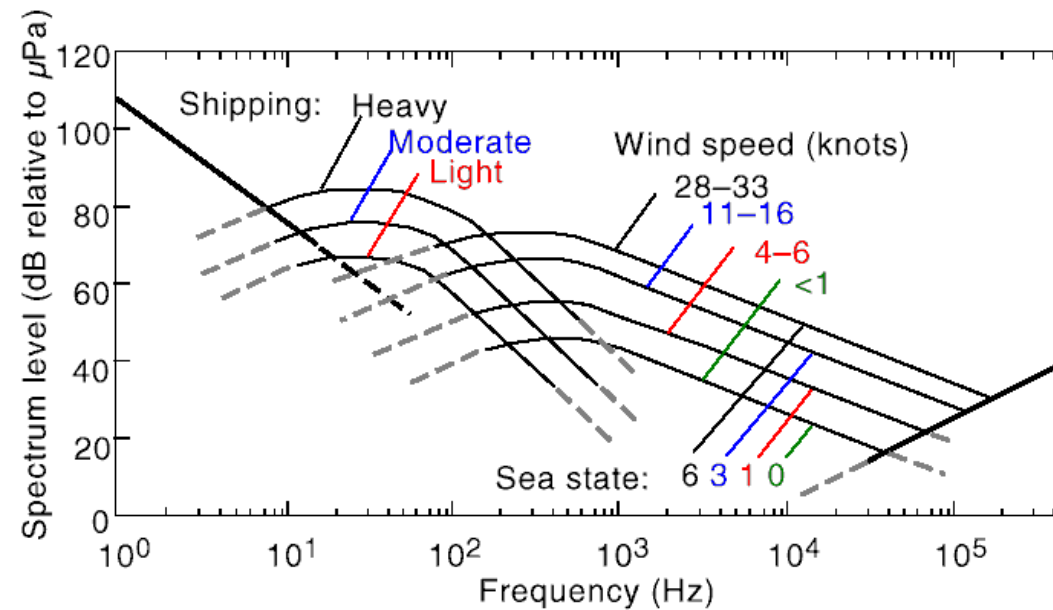
# Fiber optic hydrophone

- ✓ Small in size and weight
- ✓ High sensitivity
- ✓ High dynamic range
- ✓ No EM radiation → reduces risk of shark attack
- ✓ Cable weight and drag drastically reduced
- ✓ Ruggedized and reliable



# Hydrophone challenges

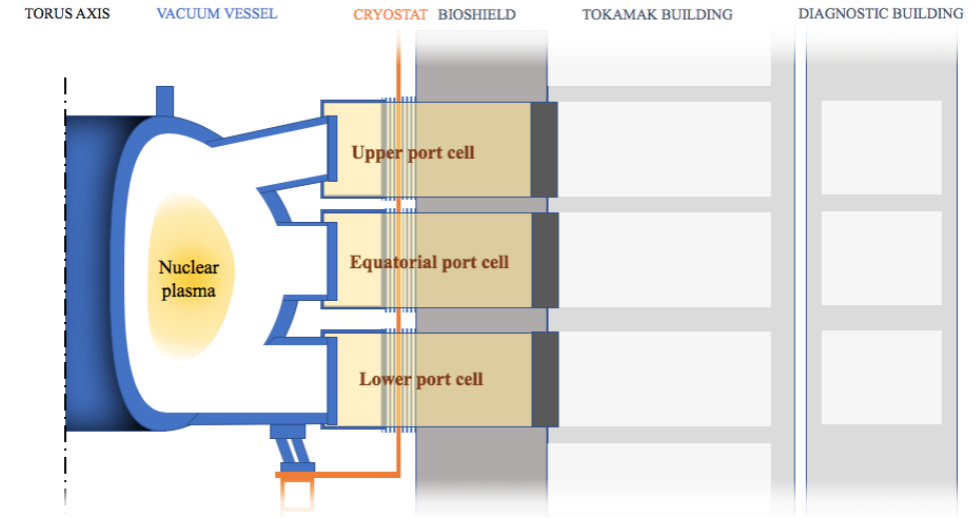
- Build a fully depth compensated small hydrophone capable of tracking sea state zero.



Average deep-water ambient noise spectra  
© 1983 by McGraw-Hill

# ITER tender

## Partners:



## Assignment is:

- Optical accelerometers (201)
- Optical displacement transducers (121)
- Optical signal conditioners
- Support structures

## Challenges:

- High vacuum
- Radiation resistance
- 200°C
- Lots of paperwork

**Thank you!**

**Hope we can help you in the near future**

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