Novel and Reliable Optical Fibre Sensor Systems for Future Security and Safety Applications (OFSeSa)

Exploiting the different ways in which the guiding mechanisms of an optical fibre can be modulated by external factors, such as pressure, liquid and gas presence, strain, temperature, has given rise to a large number of different configurations and working principles of optical sensors. Optical sensors have many advantages over their non-optical counterparts, amongst which being lightweight, accurate, compact and immune to electro-magnetic, radio-frequency, and microwave interference, making them ideal for use in hostile environments, common in safety and security applications.

Sensor technology for safety and security applications is still in its infancy although the development of accurate and reliable sensors for use in this environment is essential for its future development.

Technical safety of novel and innovative structures and materials, as well as security requirements, defines a wide application embrace: extreme physical conditions, environmental hazards, innovative and high performance materials. Optical fibre sensors have well known advantages in the above application areas and are therefore widely used in monitoring and evaluation of existing structures as well as for early detection of damage and stability risks.

The basic requirements for sensors are identified as **Portability, Accuracy and low drift, Robustness, Passivity.** However, there remain several unsolved technical problems associated with these:
- Long term measurements are fundamentally uncertain because several impacts on the measurement result (creep, aging, delamination, temperature, etc.) cannot be separated from the real measurand response.
- Inadequate, and non-standardised, test methods and facilities to characterise sensor function after application.
-Existing uncertainty of significant measurement specifications: linearity, hysteresis, sensitivity, reproducibility, long term drift.

With background-experiences of previous ongoing European Research Projects in the area of optical fibre sensing, the COST researchers are divided into Study Groups (WG1-WG4). Technical University will provide experts to:

- WG1: Novel Sensor Concepts and Designs - SG1.2: Modelling (prof. Emil Voiculescu, PhD and Lecturer Ramona Galatus PhD) and
- WG3: Sensor Characterisation & Onsite Evaluation (Teacher assistant Lorant Szolga)