

# AI FORSchung

## Improving fibre-optic sensing with artificial intelligence

The AI Call 2021 project AI FORSchung (AI for fibre-optic remote sensing) will tackle the growing technological and financial obstacles to fibre-optic sensing (FOS) via neural networks for intelligent data compression, precise parameter estimation and robust anomaly detection & characterisation.

### Addressing the challenge

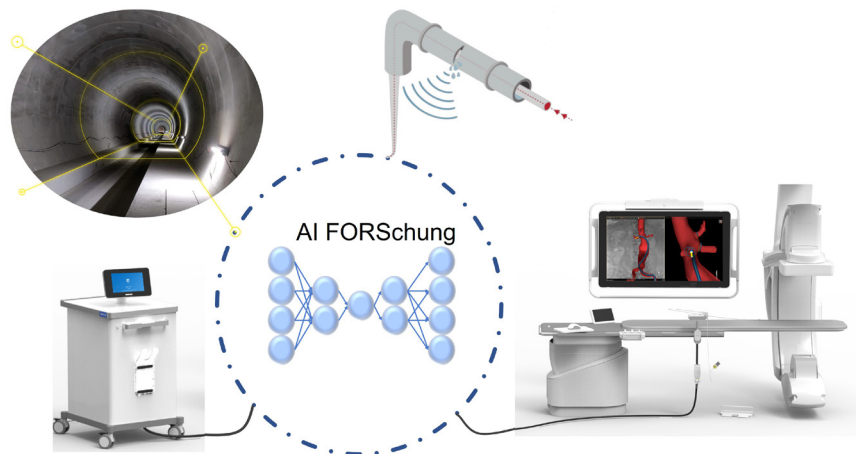
FOS provides information on strain and temperature changes along glass or polymer fibres, often in domains in which anomalies must be detected extremely quickly. However, technological developments risk hindering this market and the growth of promising start-ups and SMEs: a lack of application-agnostic AI models results in incomprehensiveness between anomaly detection models and huge amounts of generated data require high storage and processing costs. These issues are especially pertinent as FOS expands in areas like civil infrastructure monitoring and minimally-invasive medical treatment.

### Proposed solutions

To accelerate FOS innovation and growth, AI FORSchung will augment large-scale signal and data analysis with cross-domain validated AI. The core of this is the development and leveraging of neural networks for intelligent data compression, precise parameter estimation and robust anomaly detection & characterisation from the resulting datasets. These technologies are necessary enablers for advanced, robust and widely accessible FOS applications in the project's three focus domains: leak detection, shape sensing for minimally-invasive interventions and structural health monitoring of civil infrastructure. Such domains require a high degree of trustworthiness from AI applications, so the embedded solutions will be rigorously developed to ensure compliance with standard industrial and regulatory processes, including verification,

validation, quality assurance & control and accreditation. The resulting cost-effective and easy-to-use products will extract rich information from fibre-optic data to advance the adoption of FOS across the spectrum of applications.

entry barriers to the global distributed FOS market that was worth USD 1.14 billion in 2020 and is expected to grow by 8.4% annually until 2028. For the consortium, the project's technologies and products also aim for market segments with considerable expected growth despite the economic burden of COVID-19; the commercial partners therefore anticipate a total annual revenue increase of EUR 40-60 million within three years of completion. Finally, AI FORSchung's use-cases serve a larger

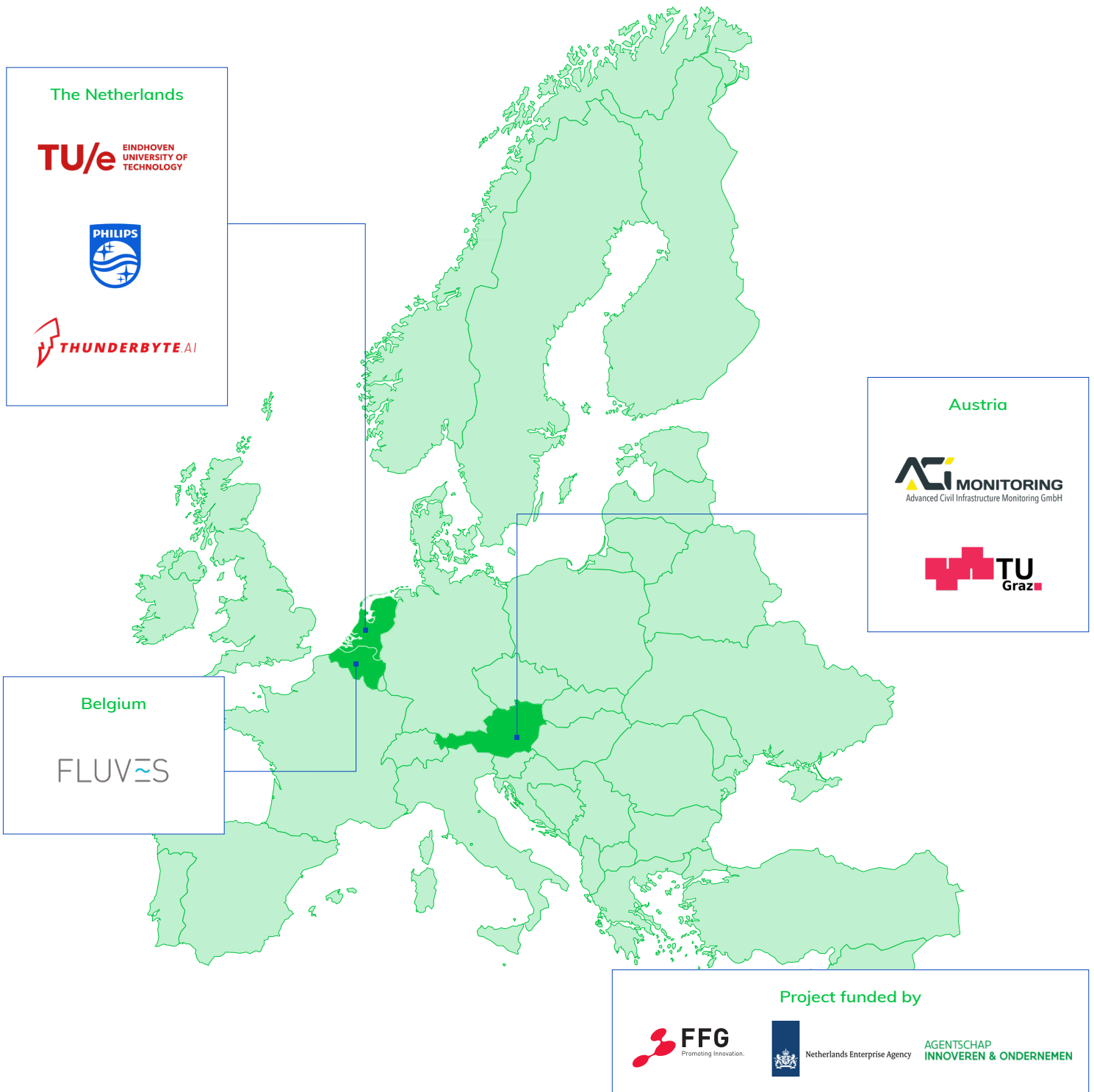


^ AI FORSchung focuses on the use of AI in three FOS applications: leak detection, shape sensing for minimally-invasive interventions, and structural health monitoring of civil infrastructure

### Projected results and impact

AI FORSchung aims for sizeable technical, financial and societal results. Regarding technology, the project expects to compress data by 10-50% with zero loss of actionable insights, greatly reducing the costs of data storage and streaming. On an application basis, anomaly detection models and parameter estimation accuracy will also be improved without requiring greater computation time/power. For smaller companies in particular, these innovations will remove

purpose of contributing to the United Nations' Sustainable Development Goals; in the longer term, the direct societal benefits of these FOS applications will include reduced risk of water scarcity, safer civil infrastructure, more secure renewable energy supply from offshore wind parks & alpine fresh-water dams and safer medical treatments with less radiation for both patients and practitioners.



**Project start**  
September 2022

**Project leader**  
Ahmet Ekin, Philips

**Project website**  
<https://itea4.org/project/ai-forschung.html>

**Project end**  
August 2025

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