

# SoFiN Project

Software enabled

Fiber optic multisensing

Network



## PROJECT INTRODUCTION

The goal of SoFiN project is the development of a flexible, modular, software-defined platform for fiber optical sensing that can be implemented in existing communication fiber networks.

The final system will be tested in near-to-operational environment for three different case studies, respectively focusing on the supervision of a telecommunication infrastructure, a water supply network and a powerline grid.

## KEY OBJECTIVES

- Develop an Adaptive, Modular & Highly integrated photonic multi-sensing platform
- Exploit new types of digital signal processing and cloud connection approaches
- Validation & Demonstration under the context of end-user needs



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# PROJECT WORK COMPLETED

TECHNICAL UPDATES FROM LAST 6 MONTHS

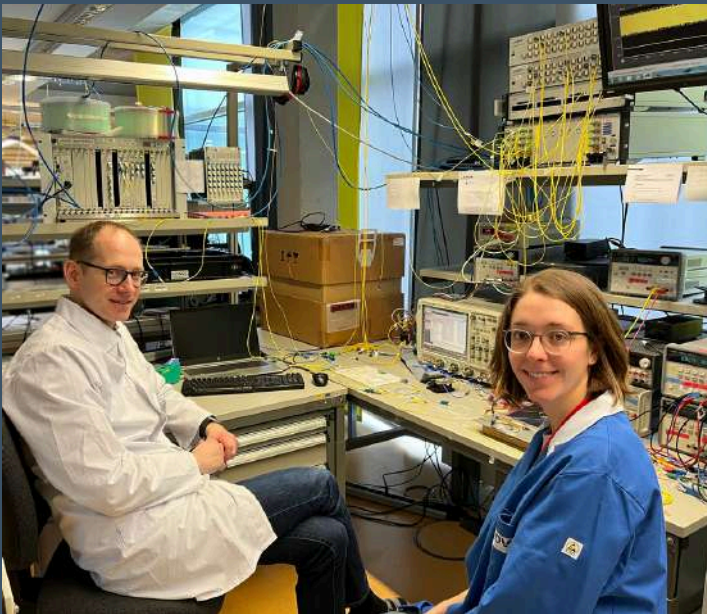
## >> LASER PROTOTYPES & CHARACTERIZATION

As part of this work, a detailed description of the laser supplied by NKT Photonics for SoFiN was presented with results from several characterization measurements, including output power, central emission wavelength and range, speed and resolution of wavelength tunability. All these parameters match the requirements for a successful integration into the interrogator platform.



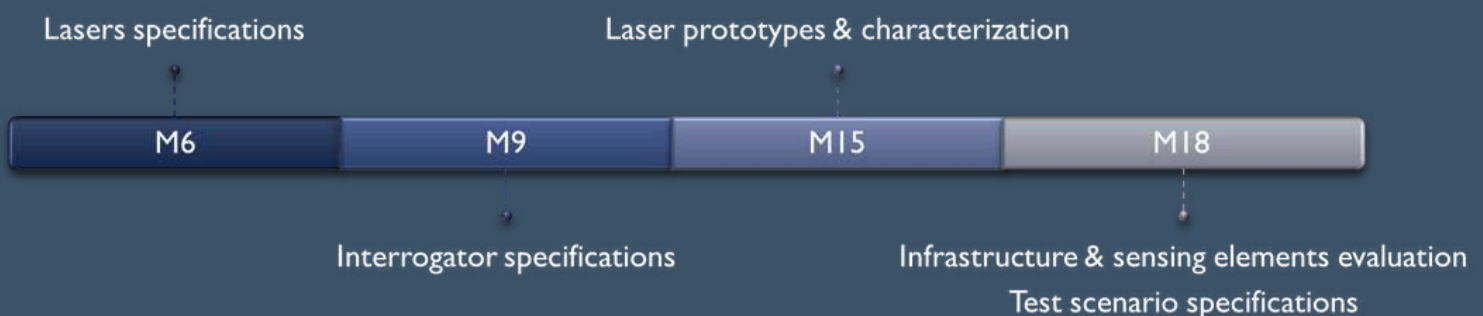
## >> INFRASTRUCTURE AND SENSING ELEMENTS EVALUATION

The aim of SoFiN is to develop a fiber optic sensing network, which is easily controllable and adaptable by software and therefore can read out data from different types of optical fiber sensing elements. With respect to fiber as sensing element, different fiber types have to be characterized and special interest lies on the use of already installed fibers in the network of telecom service providers. The purpose of this work was the evaluation of different sensing elements and the use of existing infrastructure for sensing applications. Measurements with short to medium lengths and long standard fibers but also specialty fibers, FBG sensors and special sensing elements were performed.



*Joint experiment with partners FAU & ADTRAN.  
Photo taken at the ADTRAN laboratory.*

## >> TECHNICAL OUTCOMES TIMELINE UP TO M18



# PROJECT WORK COMPLETED

TECHNICAL UPDATES FROM LAST 6 MONTHS

## PROJECT USE CASES

The 3 use cases of the project are:

- 1) Powerlines supervision
- 2) Telecommunications supervision
- 3) Water Supply Network supervision

Featured in previous Newsletter Vol. 01

## >> TEST SCENARIO SPECIFICATIONS

As part of this work the requirements for the different test scenarios and their applications were determined in collaboration with the relevant use cases partners that make the real-world tests possible as they provide the inhouse know-how and test infrastructure.



## >> IPR, PATENTABILITY ANALYSIS & BUSINESS PLAN

SoFiN project brings together a set of newly developed tools and methods to provide a complete system for structural health monitoring. An innovative system to challenge the current standards in structural monitoring of large infrastructures with an automated, high precision event detection and in advance alerts of potential failures.

Therefore, this work is focused on studying an initial Business and Exploitation Plan, Viability Analysis and further evaluates Intellectual Property Rights.

These studies serve the following purposes:

- Assess & validate commercial viability of SoFiN system
- Illustrate the business model and plan
- Present a preliminary commercialization plan



# DISSEMINATION & COMMUNICATION

UPDATES FROM EVENTS ATTENDED

## >> ENLIT EUROPE 2023



Many exciting topics including smart technologies, grids, transmission and distribution, networks utilizing novel digital technologies, sensors and software were showcased at Enlit Europe 2023 with a dedicated EU Projects Zone and an overall Enlit aim to connect industries, inspire action and help Europe evolve into a digitalised system.

## >> OFC 2024

From March 24 to 28, this year's edition of the Optical Fiber Communication Conference and Exposition was held in San Diego, USA. Dr. Ing. André Sandmann, Adtran Networks SE, presented the latest results of the Adtran team related to SoFiN.

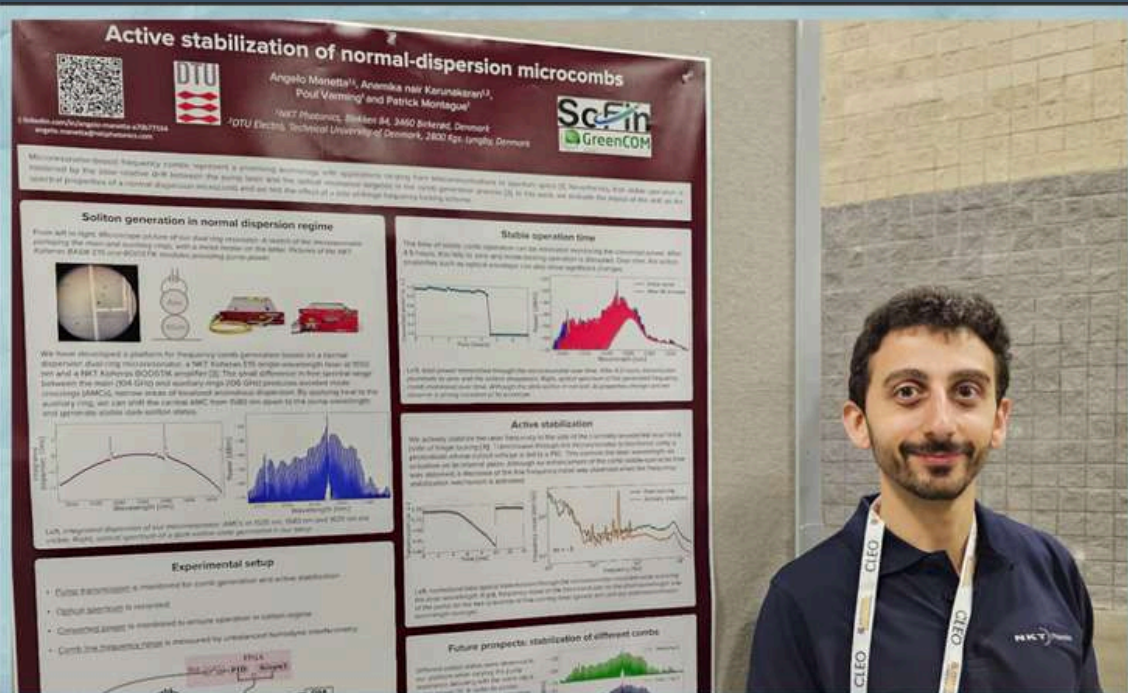


In the contributed paper presentation “Pressure Wave Detection and Localization in Deployed Underground Fiber Using Coherent Correlation OTDR” the localization of a pressure wave with using deployed optical fiber as a sensor was presented. Therefore, the interrogator setup developed for SoFiN was utilized. In addition, André gave an overview of “Remote Sensing With High Spatial Resolution” in an invited presentation.

# DISSEMINATION & COMMUNICATION

UPDATES FROM EVENTS ATTENDED

## >> CLEO US 2024



At this year's CLEO US, the SoFin project was represented by the technical partner NKT Photonics. Key results were presented by Dr. Angelo Manetta with a poster on "Active stabilisation of normal-dispersion microcombs" to introduce the study on methods to extend the operation time of the generated soliton states.

Angelo also presented the contributed paper "Reducing Frequency Noise in Dark-Pulse Kerr Combs", introducing the investigations performed on the impact of pump-resonance detuning on various soliton properties in dual ring microresonators.



# DISSEMINATION & COMMUNICATION

UPDATES FROM EVENTS ATTENDED

## >> SPIE PHOTONICS EUROPE 2024

SoFin was represented by CyRIC at SPIE Photonics Europe 2024. News from the project were communicated and flyers disseminated at this year's event marking also an important milestone celebrating 20 years of research presented at a cross-disciplinary environment where innovations in optics and photonics technologies are highlighted.



## >> PHOTONICS PARTNERSHIP ANNUAL MEETING 2024

SoFin flyers were disseminated by CyRIC during the networking event at the Photonics Partnership Meeting 2024 in Brussels. News and progress from the project communicated to industrial and academic leaders of the EU Photonics field.



# DISSEMINATION & COMMUNICATION

## NEWS FROM CONSORTIUM MEETINGS

### >> M18 PHYSICAL MEETING

The SoFiN project physical Consortium Meeting took place on project month 18, June 2024 in Copenhagen, Denmark and hosted by the project partner DTU - Danmarks Tekniske Universitet.

Colleagues from all partners gathered to discuss project updates, exchange ideas on several aspects of the project and align plans for the next 6 months. Following the two-day meeting, the consortium also had the opportunity to visit Photonics labs at the university and experience various research developments.



# PROJECT CONTACT DETAILS

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## ONLINE PRESENCE OF THE PROJECT

### »»» PROJECT NEWSLETTER

The newsletter aims at presenting a quick overview of project updates, news, work performed and events attended, every 6 months throughout the project duration. Anyone interested in SoFin project, may conveniently subscribe via the project website to receive an automated notification once a newsletter is released.

### »»» CONTACT DETAILS

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