

# MATHEMATICAL MODELLING AND NUMERICAL SIMULATION OF COUPLED THERMO-ACOUSTIC MULTI-LAYER SYSTEMS FOR ENABLING PARTICLE VELOCITY MEASUREMENTS IN THE PRESENCE OF AIRFLOW

## PRINCIPAL INVESTIGATOR:

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Dr. Daniel Fernández (Microflown Technologies- NL)

## EARLY STAGE RESEARCHER ESR02:

Ashwin Sadanand Nayak

## HOST INSTITUTION:

ITMATI, ES

## SECONDMENT INSTITUTION:

Microflown Technologies- NL

## PLANNED SECONDMENTS:

50% of the time at Microflown Technologies

## LENGTH:

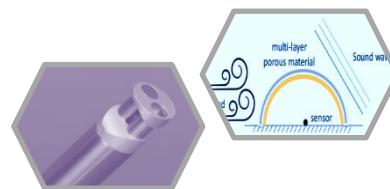
36 months



Simulation Databases  
Business processes  
Data mining Photovoltaic Choice  
Strategy Industrial processes Solar  
Exploitation of internal information Bioestadística Optimization  
Quality control Logistics Modelling Software  
Market studies Business intelligence  
Pollutants Renewables  
Dispersion Propagation Planning  
Analysis of customers

## Project Description:

Microflown USP probes, which are able to measure particle velocity and acoustic pressure fields simultaneously, are sensitive to the effect of wind, since they are based on thermal transducers and hence highly dependent on the variations of thermal flow velocity. **Objectives** of this research project are the mathematical modelling and numerical simulation of thermo-acoustic coupled systems (involving USP probes, the compressible fluid in the presence of flow, and the multilayer windscreen). The numerical results will play a key role in the design of novel windscreens to mitigate the flow effects on the measures of acoustic probes.



## Description of academic partner:

The **Technological Institute for Industrial Mathematics (ITMATI)** is a public consortium set up by the three Galician Universities (University of Santiago de Compostela, University of A Coruña, and University of Vigo). Its goal is to become a national and international reference center for technological research in the field of Industrial Mathematics. Its main mission is to reinforce and boost competitiveness in the industrial and business environment, providing advanced solutions and supporting innovation in the productive sector.

## Portfolio of Industry Partner:

Based upon its unique MEMS technology based acoustic particle velocity sensor, **Microflown Technologies** develops and markets highly innovative products and testing services in the field of sound and vibration. Microflown Technologies develops and markets innovative (acoustic) testing techniques to a wide range of market segments such as aerospace, automotive, appliances, manufacturing industries. Within the industry, Microflown based testing methods are used from the development of new prototypes till the end of line acoustic quality testing during manufacturing.