

## DEVELOPMENT OF A PERSONALIZED AND AT-HOME FOLLOW-UP SYSTEM FOR AFFECTED PATIENTS OF CYSTIC FIBROSIS.

### PROJECT OBJECTIVES

The MucoPiezoRheo Project, led by Rheonova in partnership with Cedrat Technologies (CTEC), TIMA and LRP laboratories of Grenoble-Alpes University, was selected as part of the PSPC program (Structuring Projects for Competitiveness).

Labeled by LyonBioPole this project is financed by the State through a Public Investment Bank under the Future Investment Program, the Auvergne-Rhône-Alpes Region and Grenoble-Alpes City. The project started in 2020 with a duration of 36 months.

MucoPiezoRheo aims to establish a personalized monitoring tool for patients with cystic fibrosis and to anticipate exacerbations phases. These crises are characterized by a significant deterioration of patients' conditions, leading to emergency hospitalizations and irreversible loss of respiratory capacities. The analysis of the mechanical properties of mucus enables the detection of pre-exacerbation conditions, enhancing the ability to optimize treatment adjustments at an early stage. This approach, helps mitigate clinical consequences and the frequency of emergency hospitalizations. However, it requires a regular and personalized follow-up of patients.

The MucoPiezoRheo project aims to bring this rheological analysis directly to patients' bedsides, allowing regular follow-up through the development of a miniaturized, ergonomic, and accessible medical device.

### CEDRAT TECHNOLOGIES CONTRIBUTION

At the beginning of the project, CEDRAT TECHNOLOGIES (CTEC) planned to leverage its expertise in Piezo Technology and Magnetic Sensor design to help the consortium. The goal was to develop a new, innovative magnetic sensor integrated into the existing Rheometer, which would significantly reduce the machine's size. Additionally, the use of Piezo Technology aimed to create a High-Frequency Rheometer.

Since the start of the project, significant scientific and technological advancements have been achieved:

- A nanometric displacement sensor was developed by combining multiple sensor technologies. In the long term, it will improve displacement control of CTEC mechanisms
- A force calibration sensor was also successfully created, representing a major advancement for Rheonova's machines

### PARTNERS & FUNDERS



Fig. 1: Eddy Sensing Probe (ESP) and its associated electronic ECS25