

BROMEDIR

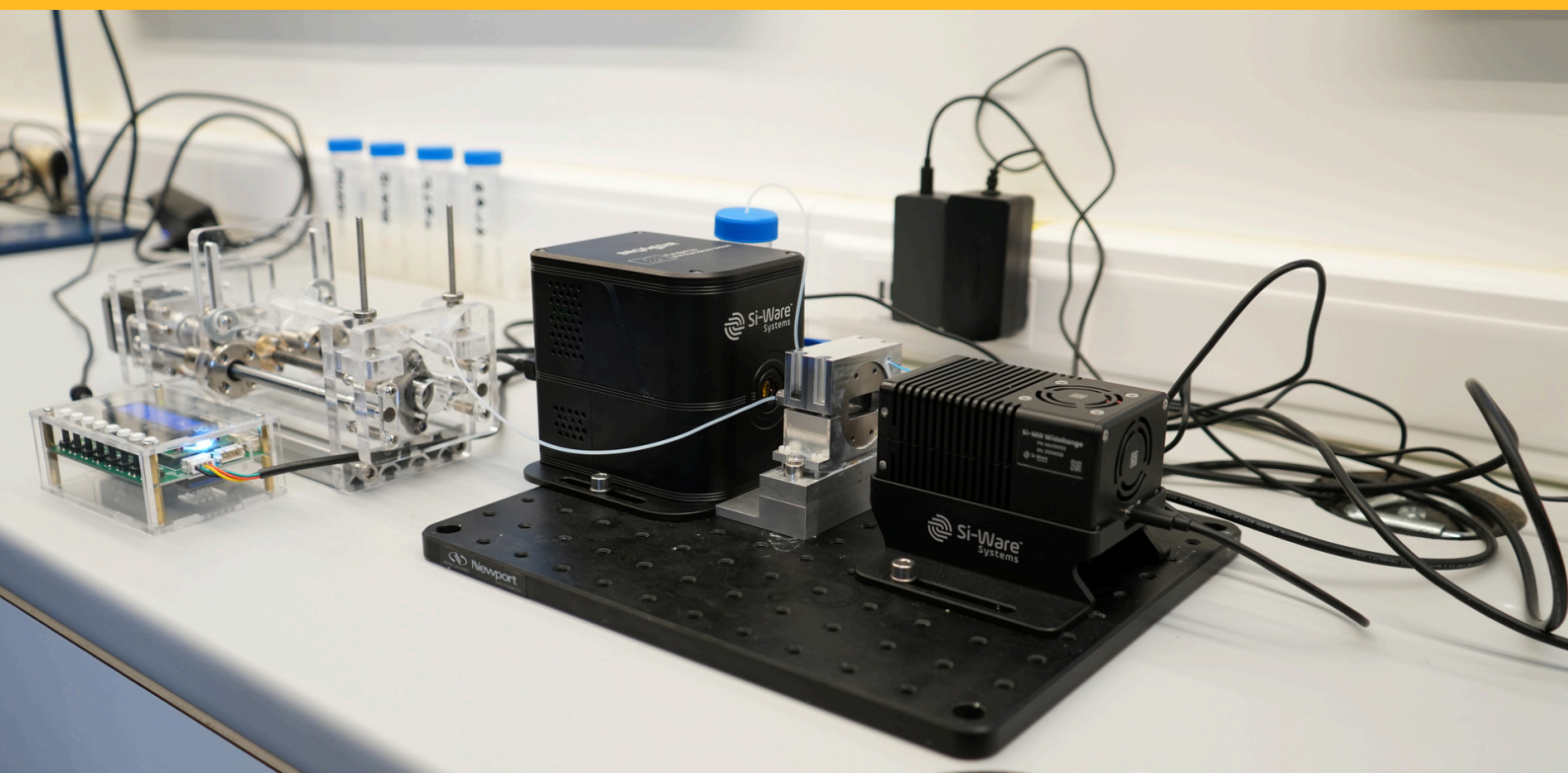
BROMEDIR Broadband MEMS-based InfraRed spectrometers: The core of a multipurpose spectral sensing photonic platform

BROMEDIR Introduction

The project aims to innovate by developing a new generation of miniaturized FTIR (Fourier Transform Infrared) and PTS (Photothermal) spectrometers for liquid and gas sensing applications respectively. In addition, a new cloud-based platform will be developed for enabling advanced data analytics. Therefore, the overall system approach intends also to achieve faster data analysis, with results easily accessed from anywhere by the end-user.

Project Objectives

- Develop the novel FTIR and PTS spectrometers
- Develop the new integrated and flexible platforms
- Tests and validations of the innovations developed
- Wide-scale but also audience specific communications to demonstrate the results and overall value to all stakeholders



PROJECT WORK COMPLETED TECHNICAL UPDATES UP TO PROJECT MONTH 36

BROMEDIR USE CASES

The 3 use cases of the project are:



1) Hydrogen supply chain



2) Fuel quality control FTIR System



3) Milk analysis FTIR System

Second-Generation FTIR Devices Successfully Completed

The second generation of the cooled and uncooled FTIR devices has been successfully completed, representing a major technological milestone for the project.

Key achievements include:

- Significant reduction in device size
- Extended spectral range covering 2–10 μm
- Improved portability and suitability for field deployment
- Enhanced integration capabilities for real-world applications

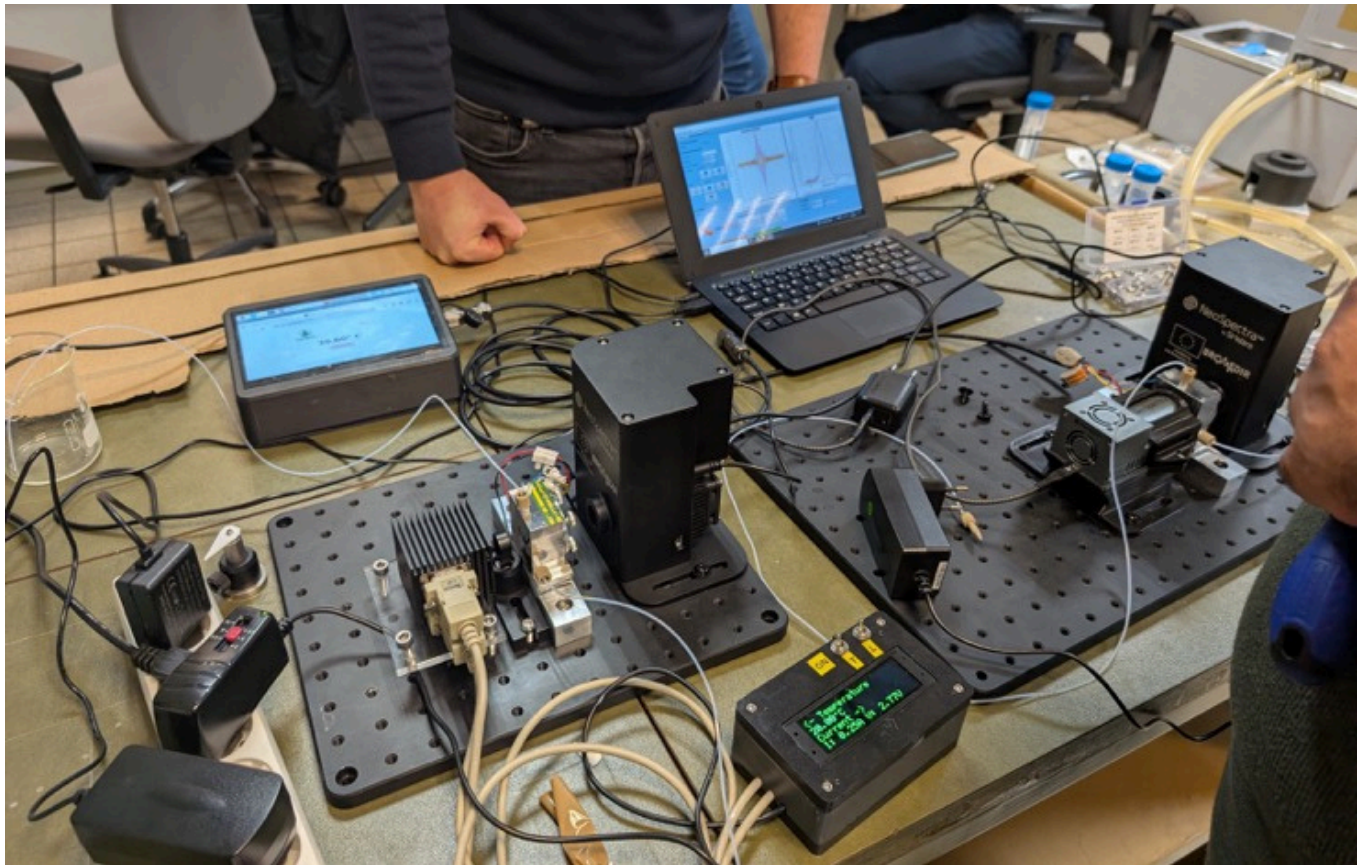


The compact architecture of the new devices demonstrates the strong potential of MEMS-based infrared spectrometers as an alternative to larger and more expensive laboratory systems.

FTIR Integration for Milk Analysis Completed

The integration of the second-generation FTIR spectrometer for the milk quality control use case has been successfully completed.

The system was optimized for rapid and reliable analysis, enabling efficient measurement workflows suitable for both laboratory and mobile environments. The integration activities also included improvements in system stability, usability, and compatibility with the project's cloud-based analytics framework.



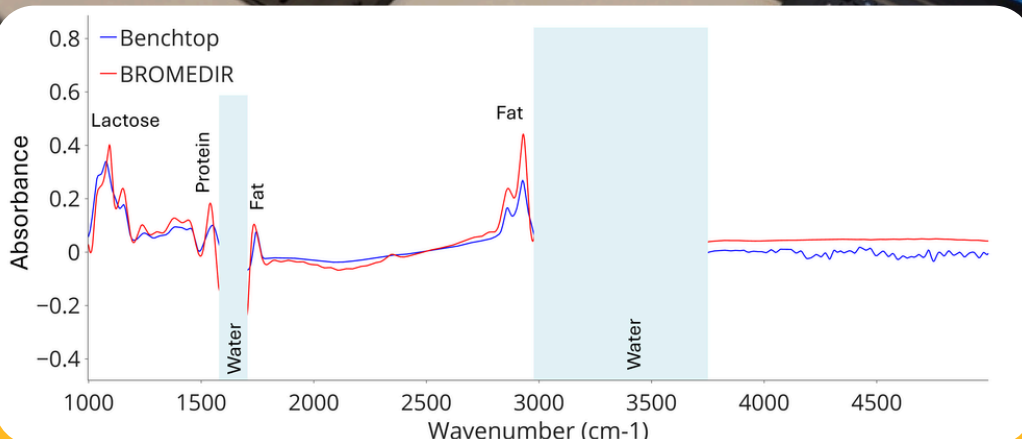
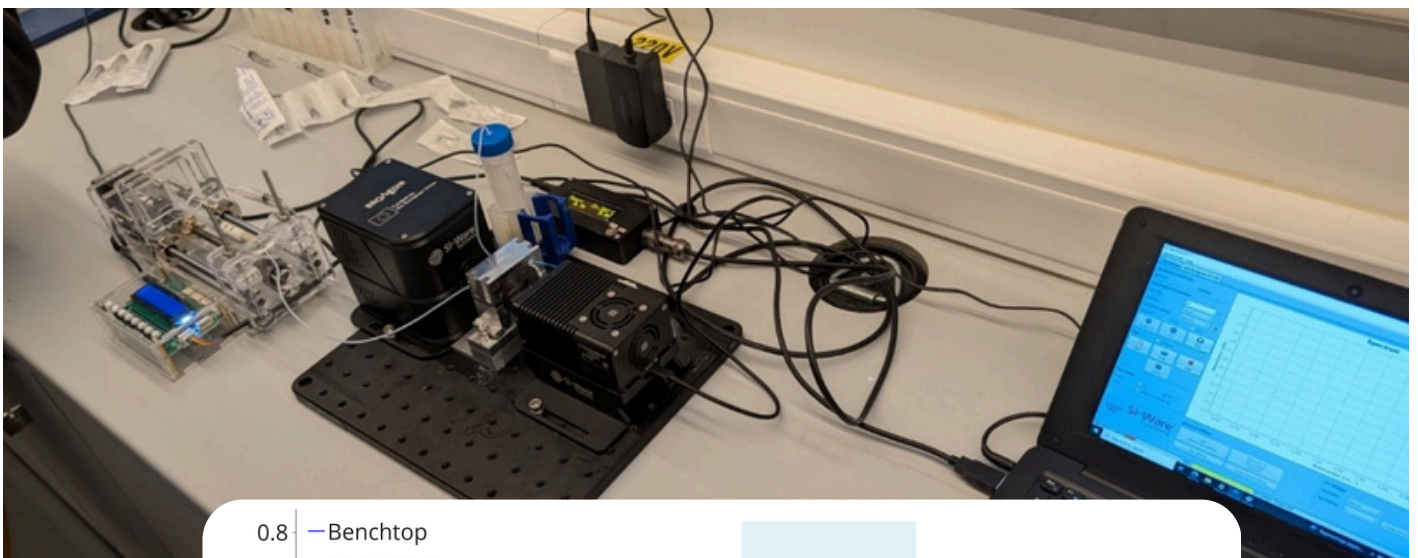
Successful Milk Analysis Demonstration in Mobile Laboratory

Third development. A full milk analysis demonstration was successfully performed in a mobile laboratory environment at a farm, showcasing the capability of the BROMEDIR platform to operate directly in real-world conditions.

The demonstration confirmed the robustness and portability of the developed FTIR spectrometer while validating its analytical performance under field conditions.

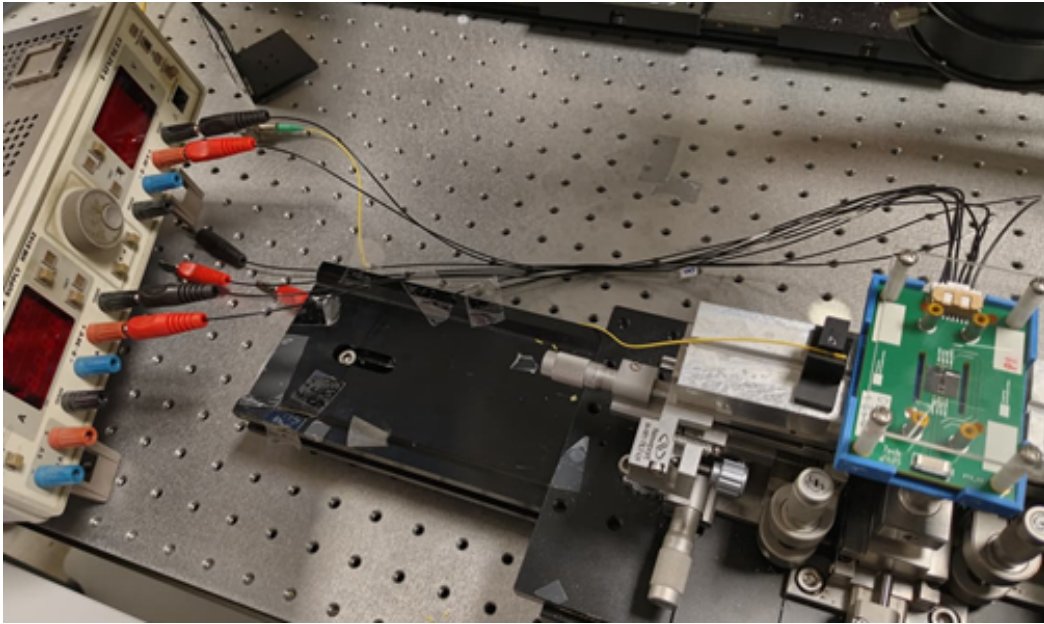
The obtained results demonstrated performance comparable to high-end benchtop instruments, highlighting the potential of the BROMEDIR technology to provide accurate and reliable measurements in a significantly more compact and portable form factor.

This represents an important step toward enabling on-site quality control and rapid decision-making in the dairy industry.



Advanced PTS PIC Development for Hydrogen Applications

The second generation of the PTS PIC for the hydrogen use case was successfully finalized. The PICs were assembled onto the PCB, and their performance was successfully validated.



Electrochemical Hydrogen Separator-Compressor Ready for Integration



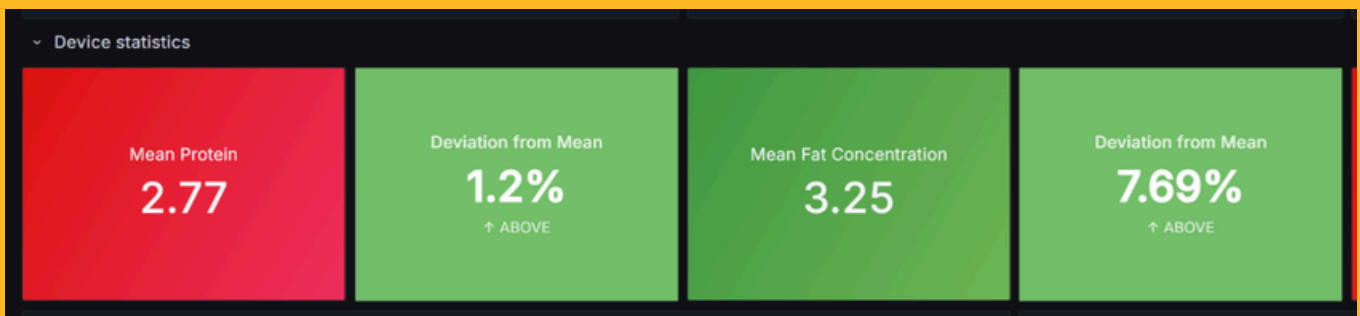
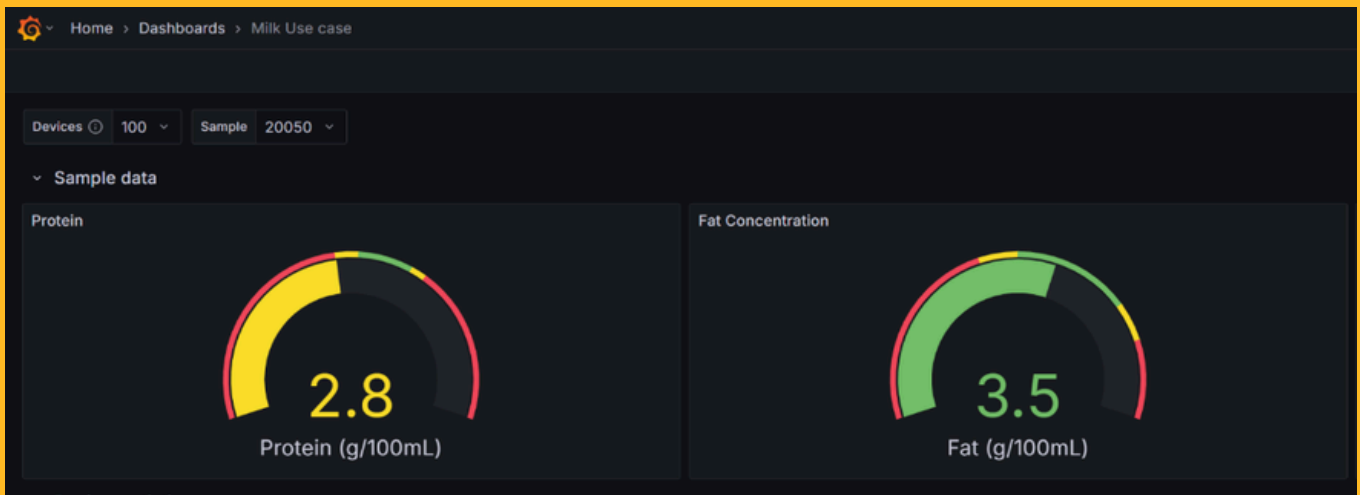
The development of the electrochemical hydrogen separator-compressor and all required auxiliary components has been completed. The full setup is now ready for integration with the PTS sensing assembly. This development represents an important step toward the implementation of advanced monitoring technologies within hydrogen production and processing systems, supporting safer and more efficient hydrogen supply chain operations.

Framework for Data Extraction and Visualization

A dedicated framework for extraction, processing, and visual presentation of the milk analysis results was successfully developed.

The framework enables efficient handling of measurement data and provides user-friendly visualization tools that support faster interpretation of results and improved accessibility for end-users.

The development also contributes to the broader BROMEDIR objective of combining advanced sensing technologies with cloud-based digital tools for enhanced data analytics and remote monitoring capabilities.

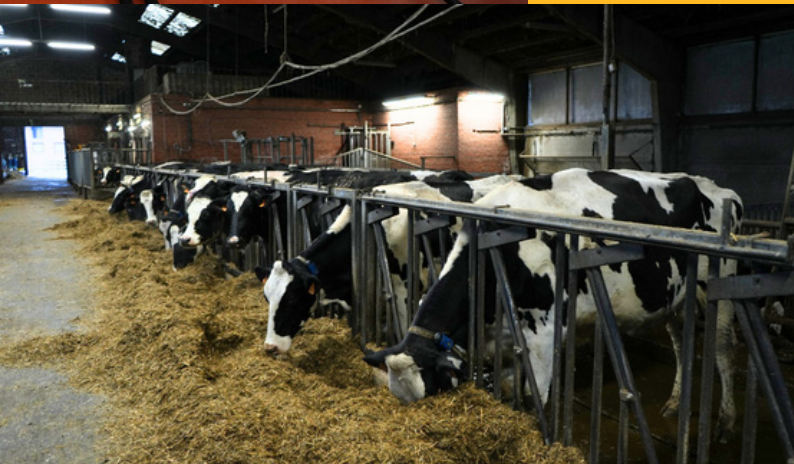
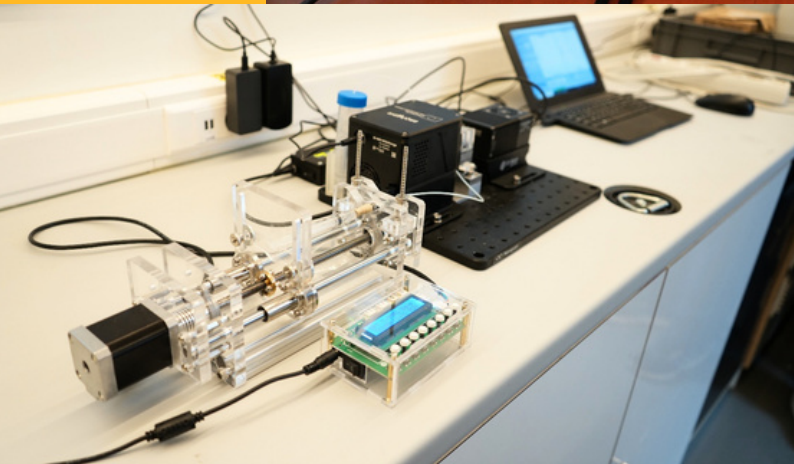


CONSROTIM MEETING AND MILK USE CASE VALIDATION IN FARM

M36 Meeting January 2027

A two-day project meeting was hosted by a project partner CRAW in Belgium, where partners had the opportunity to discuss the latest project updates and coordinate the final technical developments and upcoming validation activities.

In parallel, the milk use case validation was successfully carried out. As part of the validation activities, the BROMEDIR milk analyzer was installed in a portable laboratory and deployed directly at a farm for on-site testing and performance evaluation.



BROMEDIR

ONLINE PRESENCE OF THE PROJECT

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

CONSORTIUM



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