

Newsletter

BROMEDIR Project ————— <https://bromedir.eu/>

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



Vol. 04
M25-M30

● Newsletter ●



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PROJECT WORK COMPLETED

TECHNICAL UPDATES UP TO PROJECT MONTH 30

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TECHNICAL PROGRESS FROM M25 TO M30

The second versions of the new mid-IR photodetectors by our partner VIGO Photonics and light sources by partner Nanoplus were delivered within this period. In parallel the second version of PICs for both FTIR and PTS are led towards finalisation by Prof. Tarik Bourouina group, UGE. All these brought together will allow the upgraded Spectrometer level integration and testing of the second versions of FTIR and PTS spectrometers by partners Si-Ware and TU Wien respectively.

Additionally the design, manufacture and implementation of the first version of the electrochemical Hydrogen separator compressor stack have been completed by partner TU Wien, Prof. Harasek group. Further work is now focused on continuing towards successful completion of a second upgraded version by the end of the year.

BROMEDIR USE CASES

The 3 use cases of the project are:

- 1) Hydrogen supply chain
- 2) Fuel quality control
- 3) Milk quality control

Featured in Newsletter Vol. 01

From January 2025 to date, all lab tests related to each use case continued successfully with significant progress delivered by Prof. Lendl group, TU Wien, on both technical developments and lab tests related to FAME analysis in Fuel monitoring use case made possible by Eralytics providing real samples and know-how as a partner already on the relevant market.

All relevant technical partners running lab tests per use case further shared initial data with partner CyRIC for the ongoing developments of the AI models on denoising and super resolution built for enhanced data analytics.

➤ UPDATED BUSINESS PLAN

The market and business research on components and integrated prototypes to be delivered as part of the project has successfully progressed during the past months with an upgraded version of the relevant deliverable led by partner Senseen was submitted with more in depth information surrounding the plans for the upcoming business, market and IPR developments.



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PROJECT WORK COMPLETED

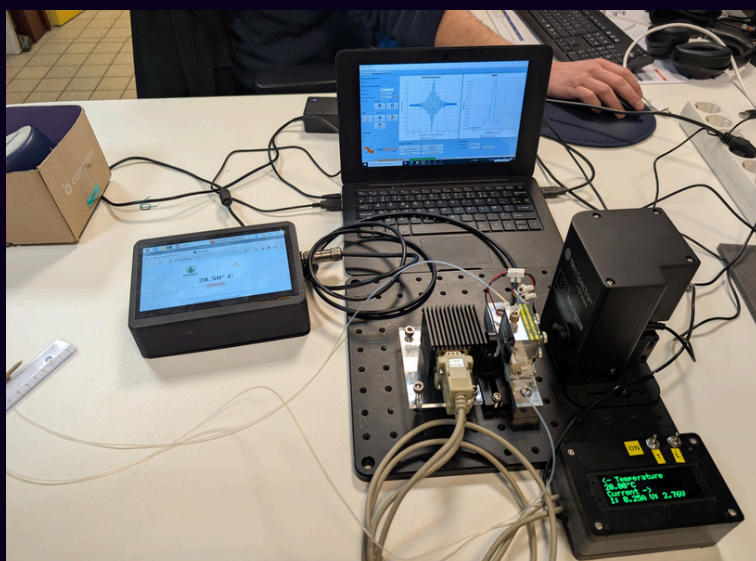
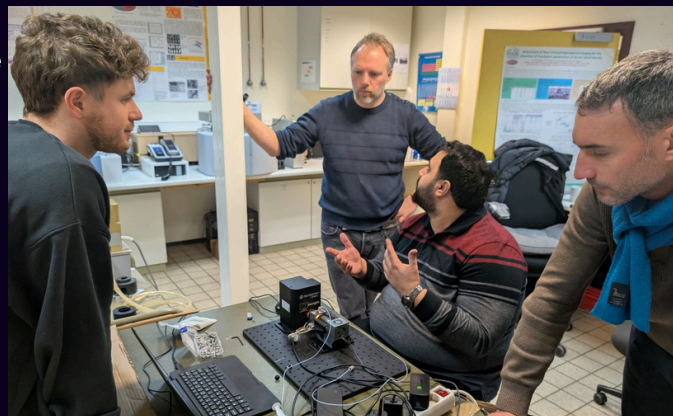
TECHNICAL UPDATES UP TO PROJECT MONTH 30

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SECOND ROUND OF FTIR INTEGRATIONS & LAB TESTS

A second round of integrations and lab tests was successfully performed for the Milk use case. The tests were held at partner CRA-W and also joined by partners Si-Ware, Senseen & Nanoplus.

Continuous integrations of all developments to reach fully integrated systems are ongoing and aimed to successfully enter full system validations by year end.



The integrated FTIR prototype connected with all external components for these system lab tests, shows initial results successfully collected.

Data from these tests further supported the work on AI models being developed by Dr Andreas Papadopoulos team from partner CyRIC. The analysed results will be presented on the Cloud platform also developed as part of the project.

PHOTOTHERMAL SPECTROSCOPY FOR GAS SENSING

Prof. Lendl's group from partner TU Wien developed and assembled the gas delivery subsystem, a dedicated sample preparation module allowing accurate preparation of gaseous calibration samples. Hydrogen compatible mass flow controllers were incorporated in a rather complex gas mixer capable of handling hydrogen. Partner CyRIC further supported with the development of the control program that facilitates operation.



Assembled Gas Delivery Subsystem (GDS)



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DISSEMINATION & COMMUNICATION

NEWS FROM BROMEDIR CONSORTIUM MEETINGS

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The Consortium meets regularly via online meetings where partners can share updates, discuss issues, and results. In addition, BROMEDIR holds in-person meetings every six months with an opportunity for a different partner each time to host the event.

➤➤➤ M24 MEETING - JANUARY 2025



A two-day meeting was hosted by project partner nanoplus Nanosystems & Technologies GmbH in Germany which included presentations on work performed, technical updates, discussions on various project matters, lab visits and informal catching up between colleagues from all partners.

➤➤➤ M30 MEETING - JUNE 2025



A two-day meeting was hosted by project partner SENSEEN in France where partners had the opportunity to discuss all updates to date and plan actions for final technical developments and initiation plans for the upcoming validations.



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DISSEMINATION & COMMUNICATION

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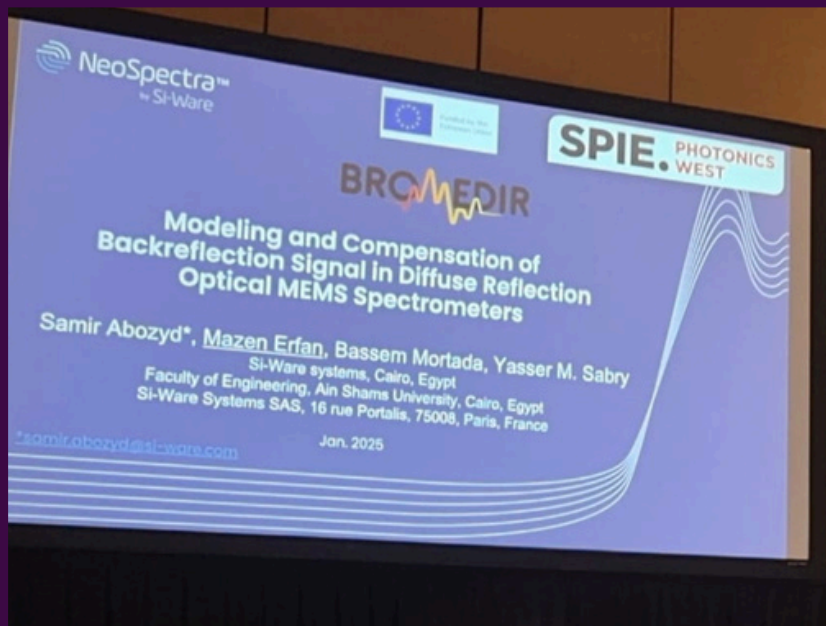
EVENTS ATTENDED IN 2025

»»» SPIE PHOTONICS WEST - JANUARY 2025



Dr Mazen Erfan from partner Si-Ware presented the scientific and technical progress achieved within the project via both poster and keynote presentations of accepted conference papers.

Along with Dr Alessandro Giusti from partner CyRIC, our colleagues jointly communicated the project at exhibitors where project leaflets were also disseminated.



Alessandro also represented BROMEDIR at special project workshops arranged with other EU projects funded under the same Horizon Europe call where the parallel projects progress was discussed along with future steps towards bringing to the world all the exciting work happening within the European photonics field.



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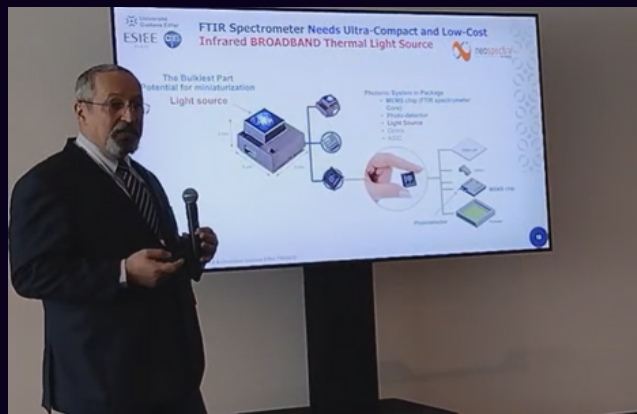
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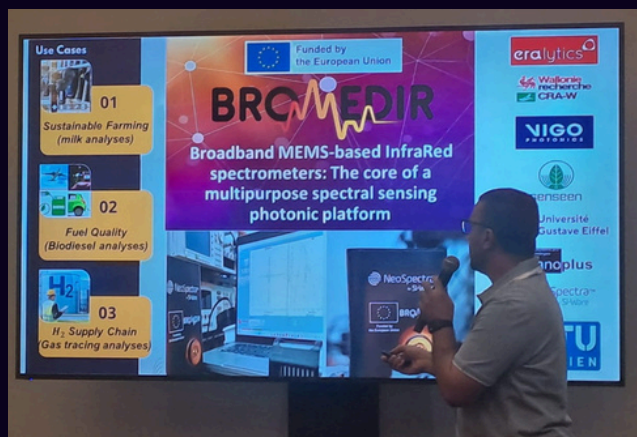
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EVENTS ATTENDED DURING THE LAST 6 MONTHS

PHOTONICS & ELECTROMAGNETICS RESEARCH SYMPOSIUM - PIERS 2025



BROMEDIR was presented by partners UGE and Si-Ware at PIERS 2025 – 46th Photonics & Electromagnetics Research Symposium on 4-8 May 2025 – Abu Dhabi, UAE with two conference papers by PhD students along with an additional invited talk by Prof. Tarik Bourouina.



“Tailorable Resonant Emissivity in the Mid-infrared Range between 10 μm and 25 μm on Highly Doped Pristine Silicon Gratings” was presented by Kirolos Ernest and “Effects of Extreme Downscaling on Micro Fabry-Perot Spectral Responses and Resonant Mode Profiles” by Ahmed Mahrous.

Congratulations to our colleagues for also having received an Award by the PIERS Young Scientist Program Committee for the 4th Place Honorable Best Student paper.



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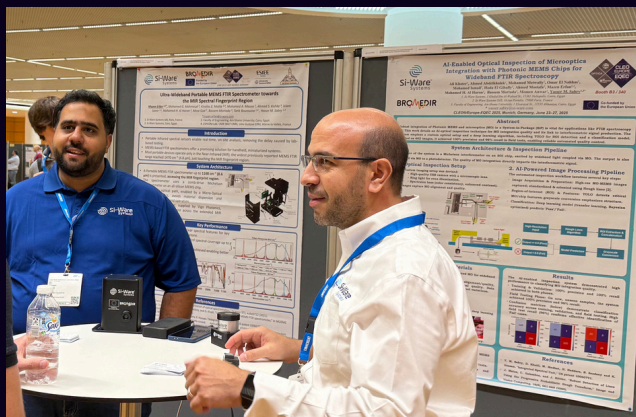
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EVENTS ATTENDED DURING THE LAST 6 MONTHS

»» CLEO EUROPE 2025



BROMEDIR attended CLEO EU on 22nd-27th June 2025 which took place in Munich Messe. The three conference papers accepted with two as posters were presented by Dr Mazen Erfan and Dr Yasser Sabri from partner Si-Ware on the advancements in FTIR prototype developments and data analysis. The third paper delivered as keynote presentation by Dr Mazen Erfan was focused on the joint work of partners TU Wien, UGE and Si-Ware on PTS developments for gas sensing.



»» LASER WORLD OF PHOTONICS 2025

At Laser World of Photonics 2025 running in parallel at Munich Messe, BROMEDIR was presented, as part of the ECREAM cluster booth, by colleagues Dr Dionysis Adamou, Dr Marios Sergides and Dr Nicolas Constantinou from partner CyRIC with Dr Mazen Erfan and Dr Yasser Sabri from partner Si-Ware.

All colleagues representing the ECREAM cluster projects, held the booth continuously active throughout the week with non-stop meetings, presentations and visitor engagements.



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EVENTS ATTENDED DURING THE LAST 6 MONTHS

>>> BROMEDIR FTIR PROTOTYPE WORKSHOPS



The FTIR prototype was physically presented at the booth and its live operation was demonstrated to several visitors including end users, various other exhibitors and colleagues from the integrated photonics industry interested in the miniaturised prototype technology developed within the project.



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BROMEDIR CONTACT DETAILS

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.

CONTACT DETAILS



Website: <https://bromedir.eu/>

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BROMEDIR

LET'S STAY CONNECTED

BROMEDIR ON SOCIAL MEDIA



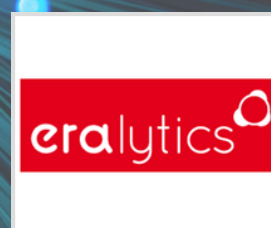
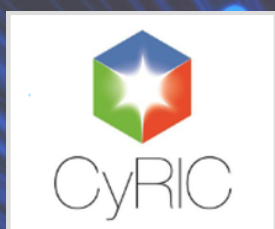
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