



MILADO

Multiwavelength Laser for fast Diagnostic in
Biomedical and Manufacturing Applications

Revolutionizing Precision
Diagnostics with Advanced
Multispectral Laser
Technology for Biomedical
and Industrial Innovations

ISSUE 2

Newsletter

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Duration

36 Months

01/06/2024 -
31/05/2027



Consortium

7 Partners

4 countries



Budget

€ 4.9 Million

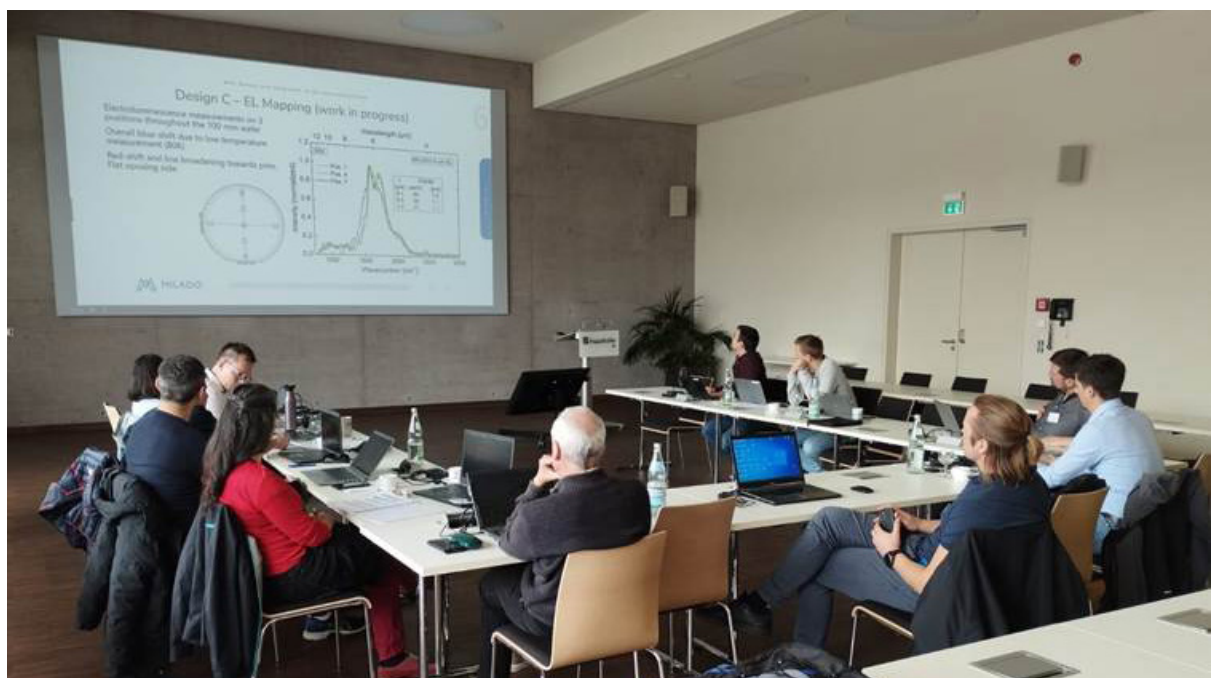
100% EU contribution

What's MILADO been up to for the last 6 months?



MILADO M10 Progress Review + Technical Meeting at FHG IAF (Freiburg Germany)

The MILADO team met in Freiburg, Germany hosted by our partners Fraunhofer IAF. The meeting's objectives were firstly for the first review meeting with the European Commission Project Officer, their external experts and our consortium partners- to check that everything is on track and that the project is progressing well. We're happy to report that we had only positive feedback from the external reviewers and the European Commission officials!



The second objective of the meet-up was the Technical Meeting for all partners to discuss their updates on inter-related work packages and results. Our technical juices were really stimulated when we were given a tour of the laboratory facilities at Fraunhofer.

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DID YOU KNOW...?

What is Mid-infrared laser technology Anyway?



Mid-infrared laser technology enables novel sensitive sensors for all kind of spectroscopic applications. It is like using an invisible light to “sniff out” and identify what is in the air, in a substance or on a surface, based on how the mid-infrared light, a part of the light spectrum that’s

especially good at detecting things like gases and chemicals, is absorbed or reflected. It can be used in things like pollution monitors, medical breath tests, and detecting chemicals in manufacturing.

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Why does MILADO want to develop the technology more, if it already exists?



Quantum cascade lasers (QCL) are the first choice for many of the laser applications, such as pollution monitors or medical testing devices. However, QCLs are expensive and cumbersome. MILADO is working to make this powerful sensing technology more affordable and widely available. We'll use smart, cost-effective ways to build the tiny light sources that work in the mid-infrared (MIR) range.

MILADO is working to bring advanced sensor technology out of the lab and into real-world! This is great news for things like medical diagnostics (e.g. non-invasive blood glucose, digital histopathology and biomarker measurements) and industrial processes (e.g. inline monitoring of chemical parameters during production and manufacturing processes).

Technical Progress to date:

WP3 finalized

In month 11, WP3 was successfully completed. This work package focussed on the development of a robust heterostructure design and an optimized growth process on large-scale substrates focussing on low defect density for the following wafer bonding process. For the less tech-minded among us, this was a critical part of the process to develop a strong and reliable layered material structure (heterostructure) on large semiconductor wafers. They need to be high quality and ready for the next steps (and work packages!)- bonding different materials together to build the advanced sensors.

During WP3 the 3 Deliverables were submitted successfully:

- **D3.1:** Describes the heterostructure designs for MILADO for the different use cases of the project.
- **D3.2:** Describes the development and documentation of the epitaxial growth required for MILADO.
- **D3.3:** This report builds upon the development and insights presented in D3.2 and complements it with even further characterization results.

WP4 progress update

D4.1 was submitted – and this centred around the presentation of the design of the light sources, Quantum Cascade Lasers (QCLs), as well as the design of the chip required, Photonic Integrated Circuit (PIC). The report focuses on the design of QCL structures operating in two specific mid-infrared spectral regions: 5.5-6.5 μm and 8-10 μm . These ranges correspond to the fundamental vibrational bands of many molecules of interest for spectroscopy-based sensing. Extensive in-depth simulations and optimization strategies were carried out paving the way for the upcoming fabrication and experimental validation phases, which will be essential to achieving TRL advancement within the project timeline.

WP8 progress update

In WP8, which deals with the development of direct epitaxial growth of III-V semiconductors on silicon towards monolithic integration of high quality QCL, deliverable 8.1 has been submitted. D8.1 describes the design and processing of silicon substrate- those that are with suitable architectures for direct epitaxial III-V –semiconductor growth. The public deliverable can be found on the project website:

<https://milado.eu/wp-content/uploads/2025/05/MILADO-D8.1-PU-M08.pdf>

<https://milado.eu>



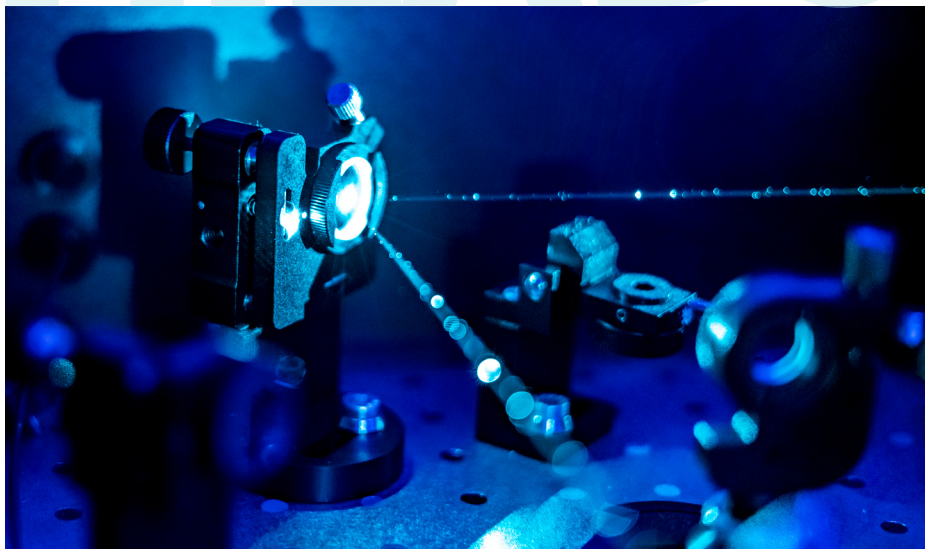
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What's on the horizon for MILADO?

The first project period comes to an end in November 2025 (M18) at our halfway point, with many demonstrator deliverables from WP6 and their related use-case results being then due. The next few months will see the consortium work extensively on these outputs. We're expecting exciting updates on the first use-case related outputs from MILADO. Keep checking back at our website milado.eu for more developments!



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Upcoming Events

All past and upcoming events can be found on the MILADO official webpage:

<https://milado.eu/events/>

Project Facts

Consortium: 7 partners (4 countries)

Project Coordinator: Barbara Gaggl (Technikon)

Technical Leader: Marko Haertelt (Fraunhofer IAF)

Scientific Leader: Badhise Ben Bakir (CEA Leti)

Project number: 101070008

Project website: <https://milado.eu>

Project start: 1st June 2024

Project end: 31st May 2027

Duration: 36 Months

Total cost: EUR 4,943,399,27

EC contribution: EUR 4,943,399,27

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