



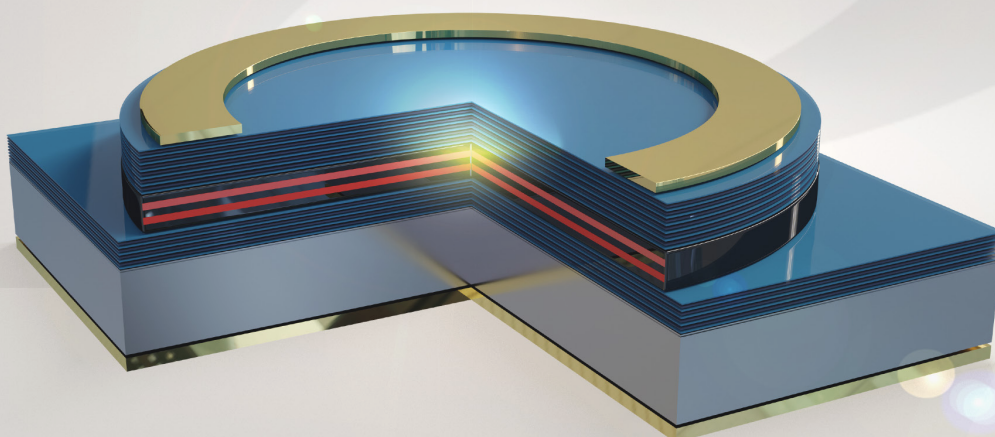
PHOTOGENIC

Issue 02

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# A GAME CHANGER FOR THE PHOTONICS INDUSTRY

NOVEL LASER TECHNOLOGY



horizon-photogenic.eu



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## Budget

€ 4.8 Million

100% EU-funded



## Consortium

8 Partners

5 countries



## Duration

36 Months

10/2022 - 09/2025

## Message from the Coordinator

This Newsletter intends to open a new communication channel to provide news on the project's progress and discuss ongoing topics relevant to PhotoGeNIC. This newsletter is intended for internal and external project partners, stakeholders, and all other interested bodies. For more detailed information about the project, we invite you to visit our [website](#), which is constantly updated with the latest project-related news: Website. Just over 18 months after the start of our PhotoGeNIC project, I reflect on the collabora-

tion and tireless efforts of the consortium. In that time, we have seen remarkable growth and innovation within PhotoGeNIC and can be proud of what we have achieved so far. From the humble beginnings of our project to the community we have become, each of us has played an integral role in making PhotoGeNIC what it is today and contributing to the progress of our objectives.



The PhotoGeNIC project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101069490.



## PhotoGeNIC Technical Meeting in Toulouse

The PhotoGeNIC team recently convened at our partner, LAAS-CNRS in Toulouse, for a technical meeting on February 15, 2024. This gathering marked a significant milestone in our journey of exploration and innovation, providing a platform for in-depth discussions and strategic planning.

Throughout the day, lively discussions took place in the LAAS-CNRS rooms, fueled by the expertise of each team member. One

of the standout moments of the meeting was the fascinating tour of the state-of-the-art cleanroom facilities at LAAS-CNRS. During our tour, we gained valuable insights into the complex world of microfabrication and nanotechnology. Looking to the future, we are ready to embark on the next phase of our journey.

## VIGO and IMiF at PhotonicsWest 2024

The global stage for lasers, biomedical optics, and cutting-edge photonics technologies witnessed a remarkable presence from our partners, VIGO and IMiF, at this year's PhotonicsWest event held in San Francisco. As one of the most anticipated gatherings in the field, PhotonicsWest served as an unparalleled platform for showcasing groundbreaking advancements and fostering collaboration among industry leaders and innovators.

From February 5th to 10th, 2024, the halls of the Moscone Center buzzed with activity as participants from around the world came together to explore the latest developments in photonics. Amidst

a packed schedule brimming with world-class plenary speakers, technical sessions, networking events, and insightful course offerings, VIGO stood out with their expertise.

At the heart of the event lay a robust exhibition floor, where VIGO proudly showcased its cutting-edge technologies and solutions to an eager audience of professionals and enthusiasts alike. From state-of-the-art laser systems to advanced biomedical optics and biophotonic technologies, VIGO captivated attendees with its diverse array of offerings and unwavering commitment to excellence.

## Main achievements and results

In the realm of VCSEL technology, significant strides have been made through collaborative efforts within the PhotoGeNIC project. Here's a glimpse into the latest breakthroughs and developments:

- Design Innovation:** The VCSEL heterostructure, meticulously crafted by TUL, serves as the cornerstone for Ge-VCSEL growth technology development. Design modifications were carefully curated in alignment with the specificity of Metalorganic Chemical Vapor Deposition (MOCVD) and Molecular Beam Epitaxy (MBE) methods, tailored to meet the project's application requirements.
- High-Quality Growth:** VIGO spearheaded the development of a high-quality GaAs buffer on Ge, laying the groundwork for MOCVD/MBE growth of VCSEL structure. The inaugural series of full laser epi-stack was successfully grown via MOCVD, paving the way for subsequent device processing.
- Template Production:** Templates Ge/GaAs for MBE were expertly produced and delivered to Partner CNRS-LAAS, facilitating further research and development endeavors.
- Material Characterization:** An advanced material characterization process was initiated to discern VCSEL epi-structures grown on GaAs and Ge substrates, informing future production endeavors.
- Process Optimization:** A qualification procedure of Ge substrates type N was executed, with observations and conclusions informing subsequent production batches by UMICORE. The first release of VCSEL process flow on Ge was defined and described, marking a pivotal milestone in process standardization.
- Prototype Success:** Initial achievements in basic process flow development and full VCSEL process flow were realized, with lasing devices obtained, enabling further optimization of epitaxy and processing methodologies.

# Main Project Info

The VCSEL sector is developing dynamically, with laser production expected to triple in the next five years. With its innovative Ge-VCSEL solution, the project has the potential to be a game changer for the photonics industry. The PhotoGeNIC Project involves advanced photonics and concerns semiconductor vertical-cavity surface-emitting lasers (VCSEL), widely used in the photonics industry, including short-distance communication

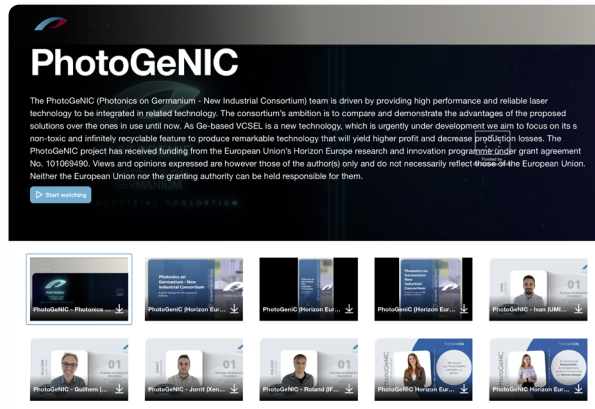
systems, LIDARs, time-of-flight sensors, autonomous vehicles, robots, and drones. The goal is to meet the demand of the constantly growing photonics market by providing a novel solution that will increase production yield, reduce defectivity, and introduce reduced environmental impact. Moreover, the project findings can be developed into usable tools, bringing innovative change across various end-user industries.



## Video Showcase

Check out the new video showcase, where we've collected all the videos created for the PhotoGeNIC project in one place!

Link:  
[PhotoGeNIC video showcase](#)



## The PhotoGeNIC Consortium

The PhotoGeNIC consortium comprises eight partners from 5 countries (AT, BE, DE, FR, PL). It consists of a well-balanced mixture of academic

and industrial players, from large to small semiconductor companies.

TECHNIKON

VIGO  
PHOTONICS

Politechnika Łódźka

CNRS LAAS  
CNRS

pmd  
IMAGINE YOU CAN

umicore  
Electro-Optic Materials

XenomatiX  
True solid state lidar

Łukasiewicz  
Institute of Microelectronics  
and Photonics



## Upcoming Events

Be sure to attend all upcoming events. Make sure you follow PhotoGeNIC on [LinkedIn](#) and [Twitter](#), where all events and important information are being published.

### 21st International Conference on Metal Organic Vapor Phase Epitaxy

12 – 17th May 2024  
@Las Vegas, US

Members of the PhotoGeNIC consortium will be present at the ICMOVPE and be more than happy to discuss the project and the first results with interested parties.