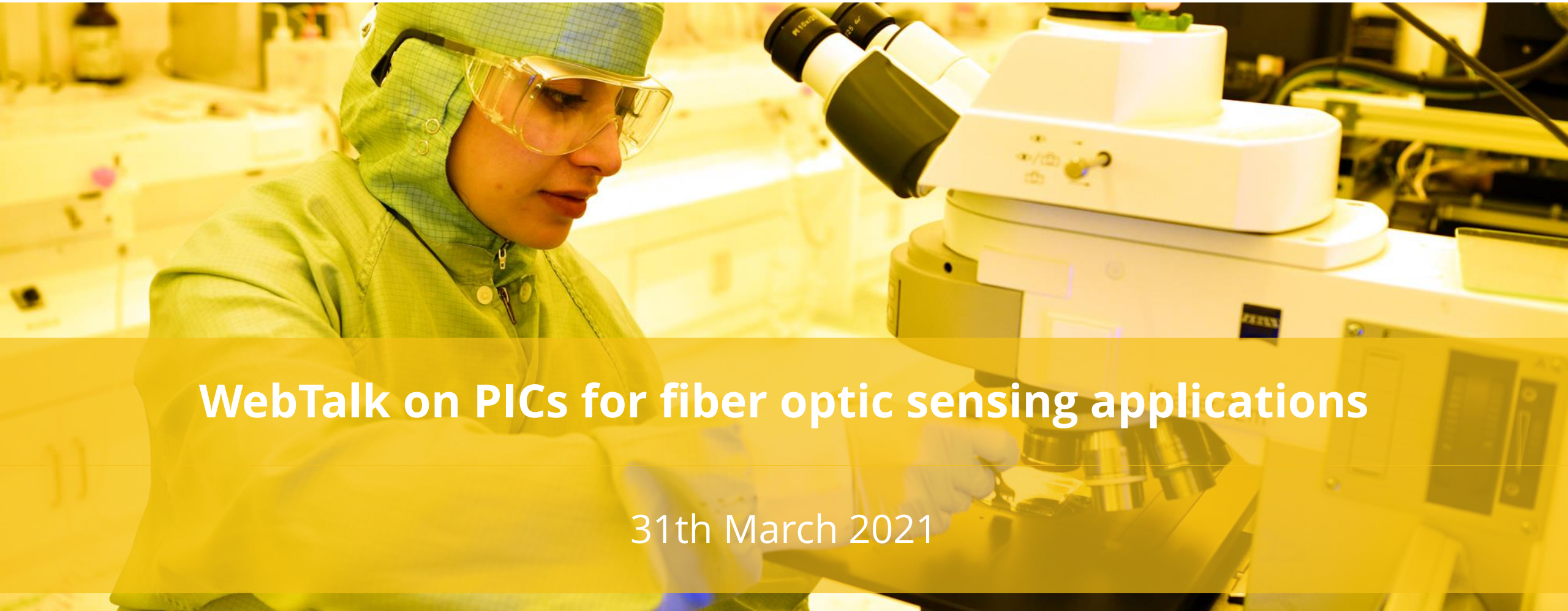
Interreg North-West Europe
EUROPEAN UNION
OIP4NWE
European Regional Development Fund

OIP4NWE
Open Innovation PIC Pilot



WebTalk on PICs for fiber optic sensing applications

31th March 2021

Agenda

- **Welcome and Introduction**
  Marija Trajkovic, Marija
  Eindhoven University of Technology (TU/e)

- **Measuring with light**
  Jelmer Weda
  PhotonFirst

- **Open Discussion**

- **Introduction of the Innovation Support Fund and how to apply**
  Prof. Jürgen van Erps
  Vrije Universiteit Brussel

Welcome and Introduction

Marija Trajkovic

Eindhoven University of Technology

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Open Innovation PIC Pilot

Open -Innovation Photonics pilot for North West Europe

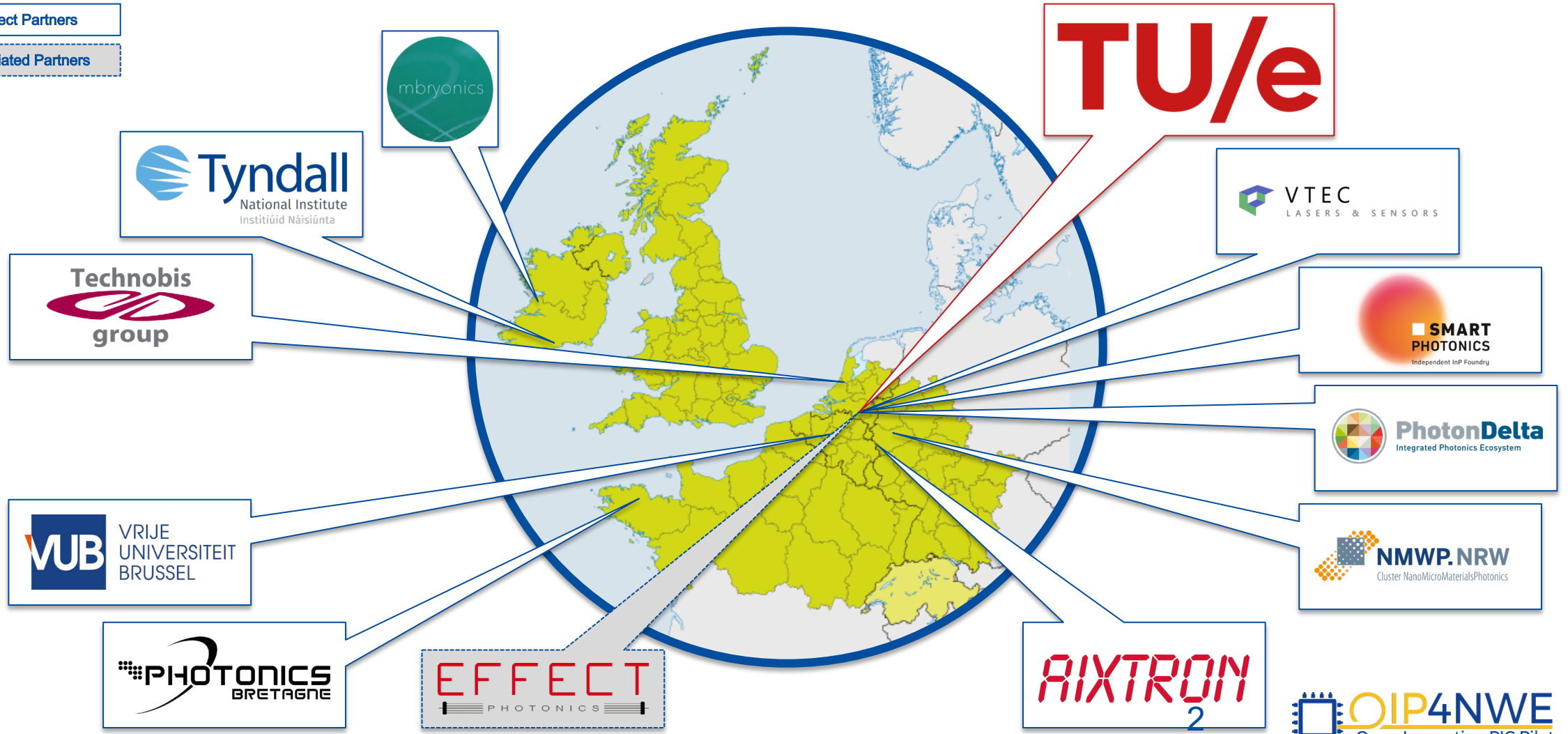
Victor Calzadilla, TU/e

10.02.2021

Open -innovation photonics consortium

Interreg North-West Europe
OIP4NWE
European Regional Development Fund

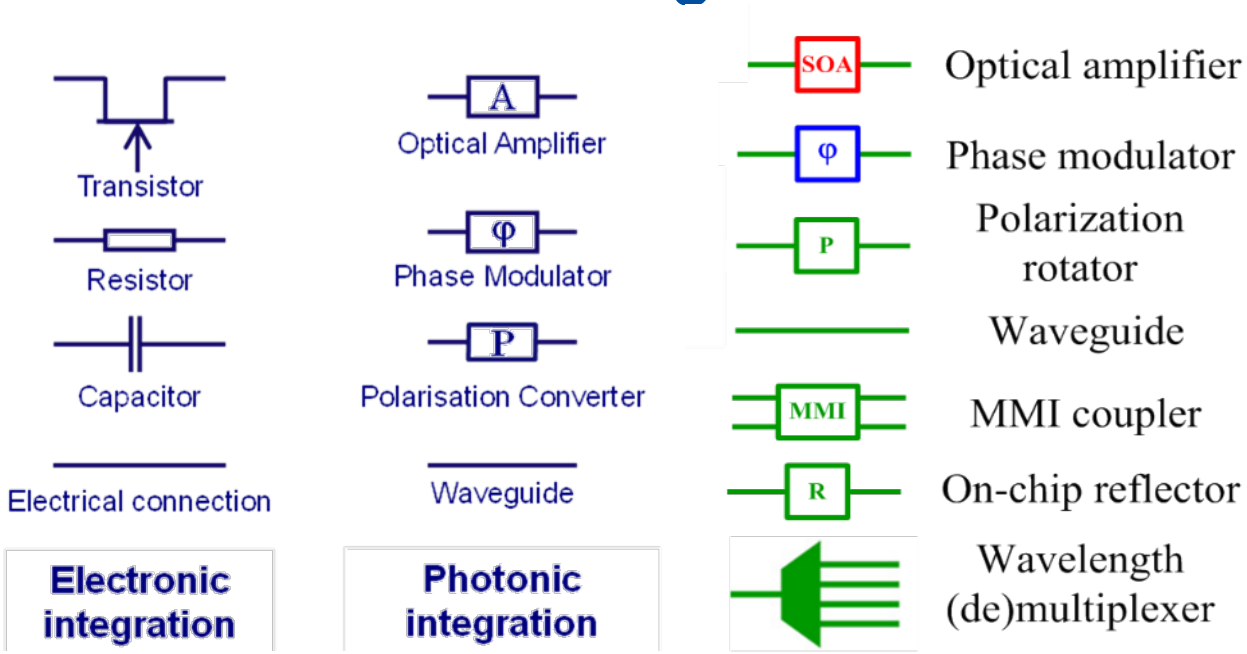
Project Partners
Associated Partners

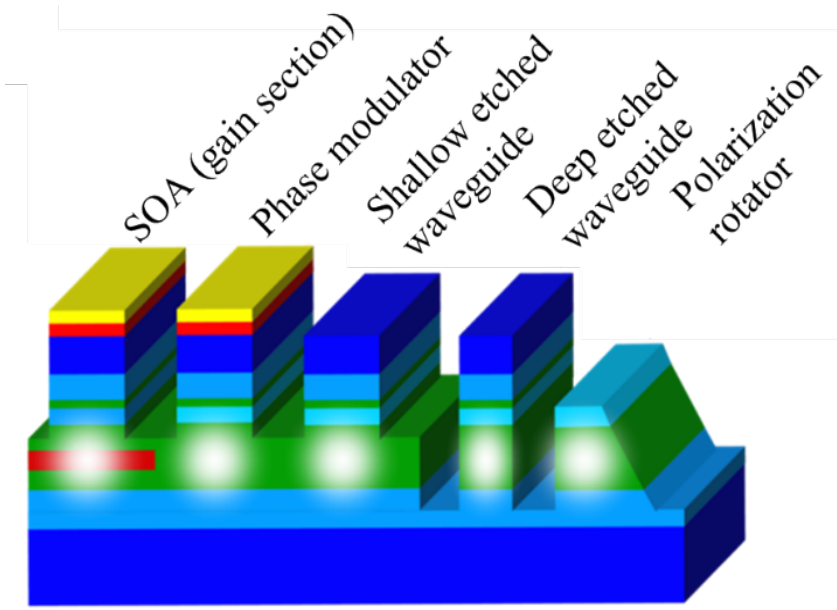


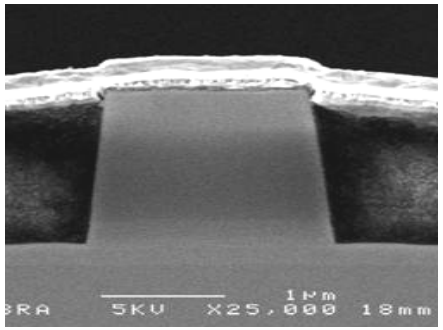
Our targets

- Contribute to increase maturity and scaling of open access InP Photonic Integrated Circuits (PICs).
- Provide technology support to SMEs looking to mature their PIC -based products through open collaboration
- Establish an open innovation environment for generic InP PIC technology in Europe:
  - Collaborative ecosystem: researchers, foundries, equipment manufacturers, application developers
  - Working on state -of-the-art equipment development and fabrication methods

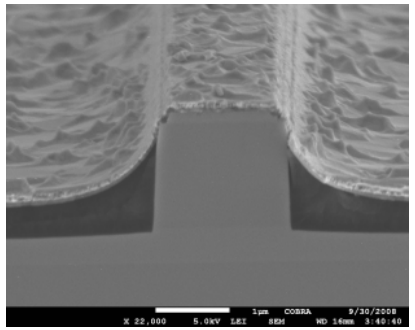
Generic Photonic Integration in InP



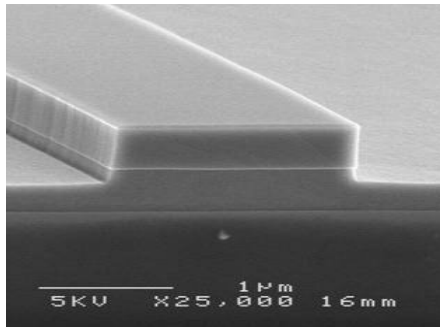




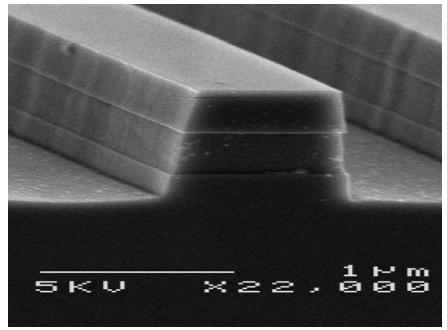
Amplifier



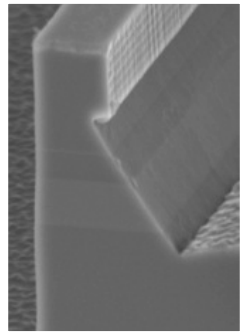
Phase Modulator



Shallow waveguide

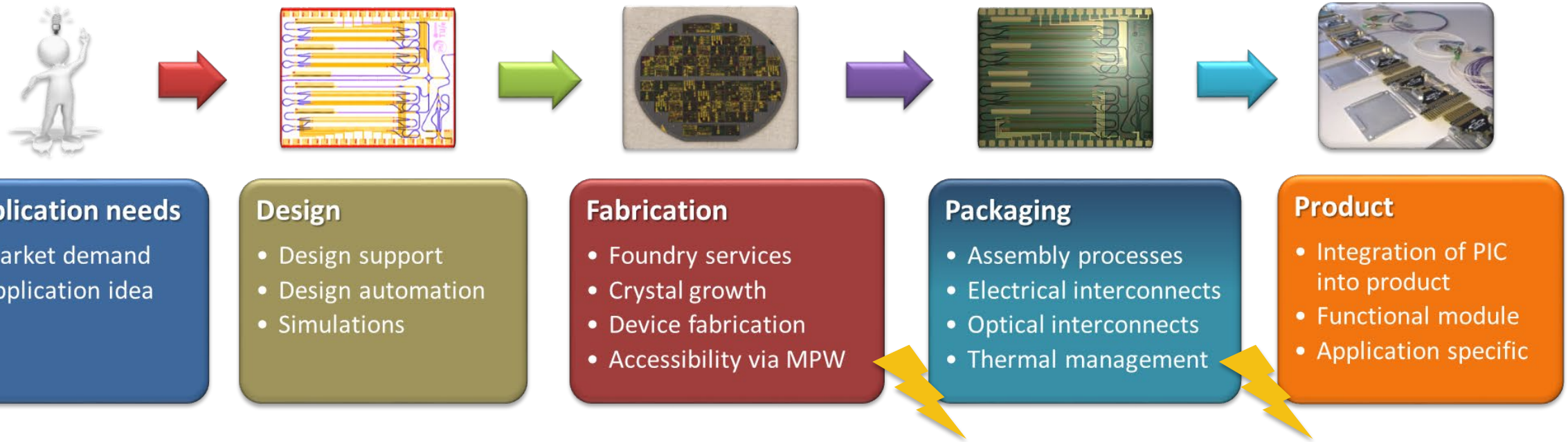


Deep waveguide



Polarization converter

The development cycle in photonic ICs

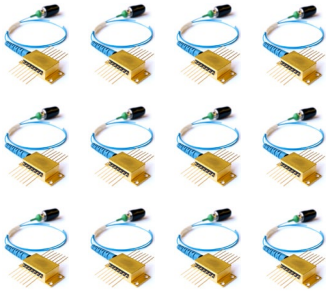


OIP4NWE supports SMEs via Innovation Support Fund

From prototype to pilot production

Idea | Research | Prototyping | Piloting | Manufacturing

TRL1 TRL2 TRL3 TRL4 TRL5 TRL6 TRL7 TRL8 TRL9



OIP4NWE: path to manufacturing

Main hurdles:

Reliability, Cost, Yield, Scalability

Accelerate PIC industry through open innovation

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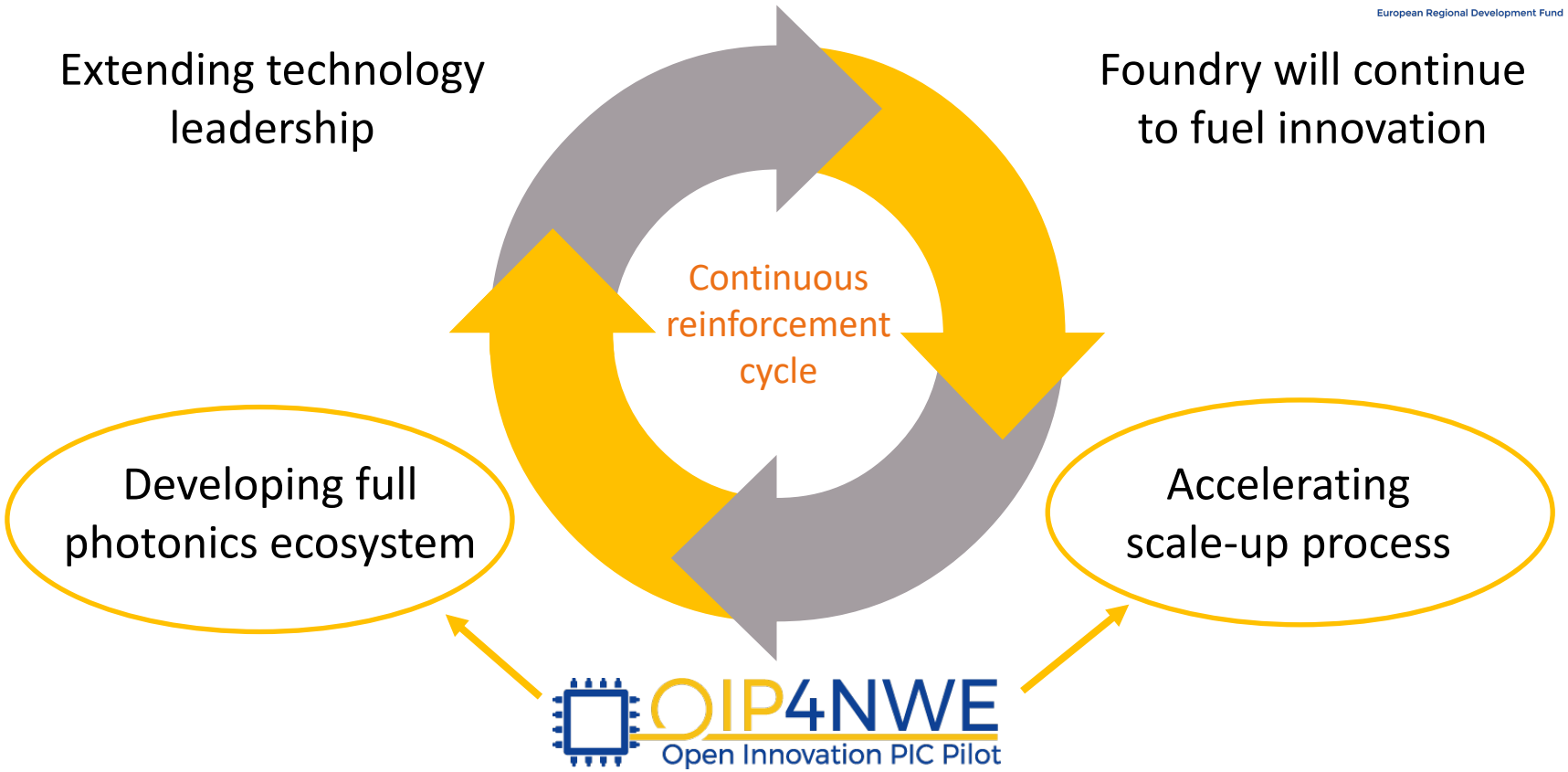

Photonic Integrated Chips (PIC's) based on Indium Phosphide (InP) will play a key role in the lives of many people as they enable new and improved functionalities, ultimately making our world better, greener and safer

OIP4NWE
Open Innovation PIC Pilot

Design and manufacturing of photonic ICs

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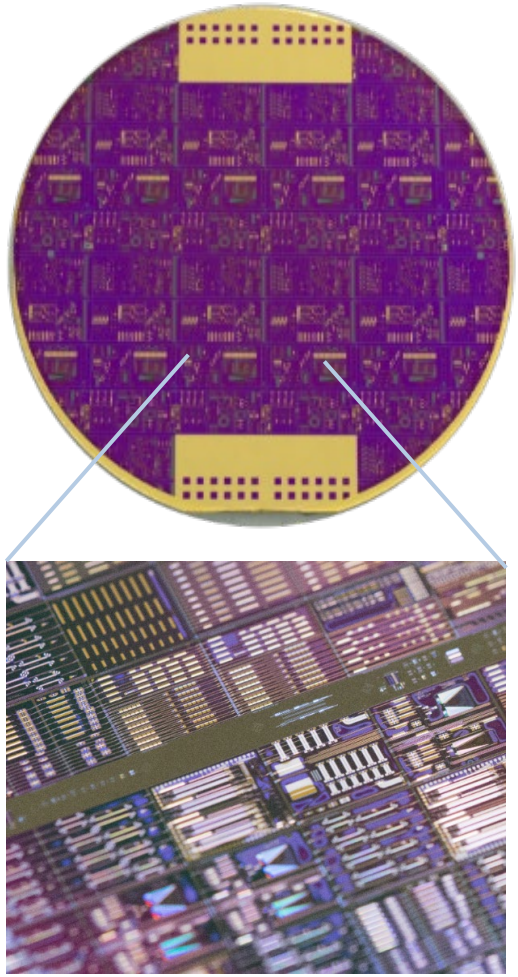
OIP4NWE
European Regional Development Fund

- Broad set of building blocks for Integrated Photonics
- Process Design Kit
  - Design manual and Functional building block description
  - Enables Circuit simulation and Mask design in a full layout -aware design flow
- Technology developments
  - Process improvements
    - Epitaxy
    - Yield
    - Stability
  - Functionality (new building blocks)

OIP4NWE Open Innovation PIC Pilot



SMART PHOTONICS Independent InP Foundry

OIP4NWE Open Innovation PIC Pilot

Packaging of photonic integrated circuits

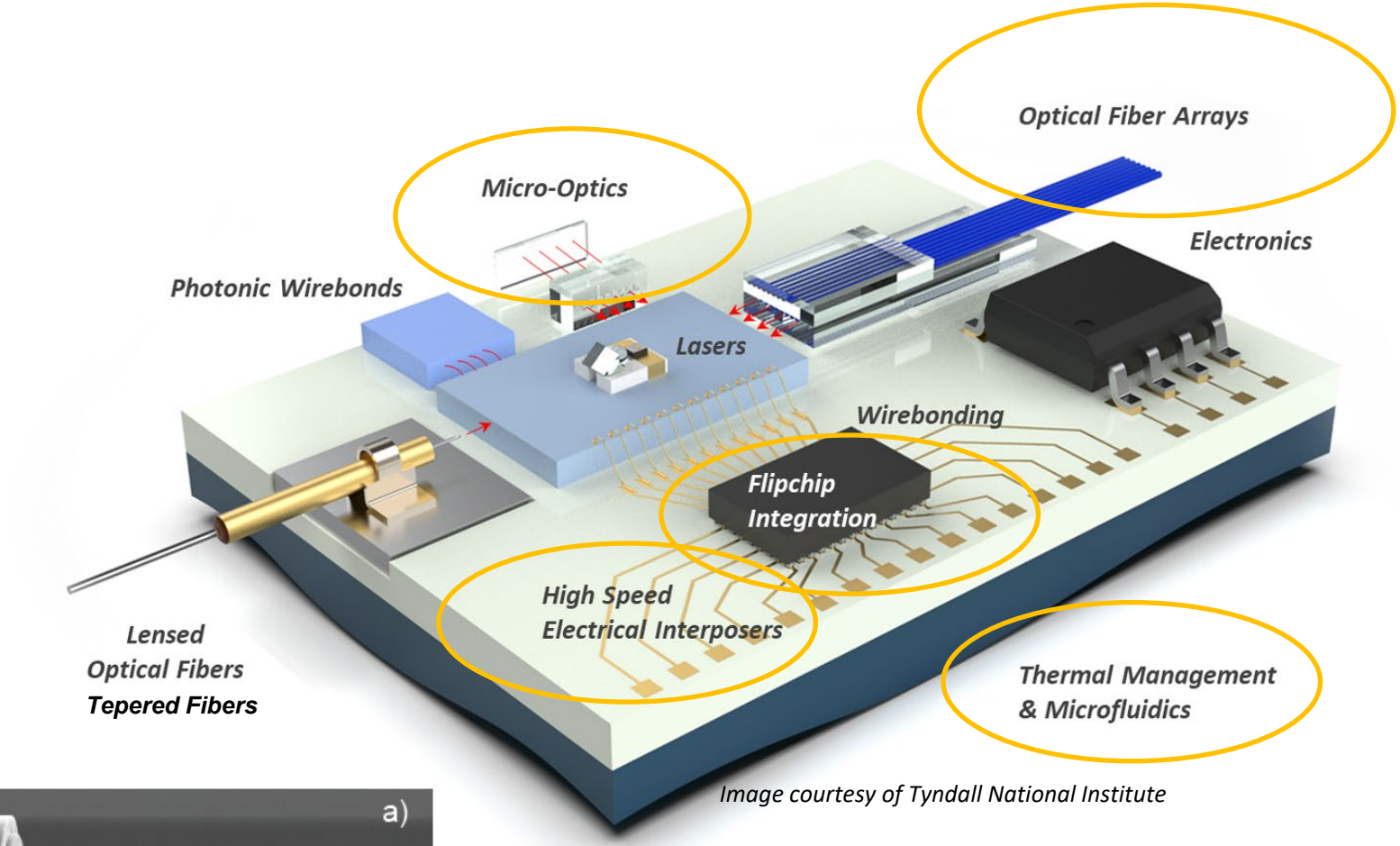
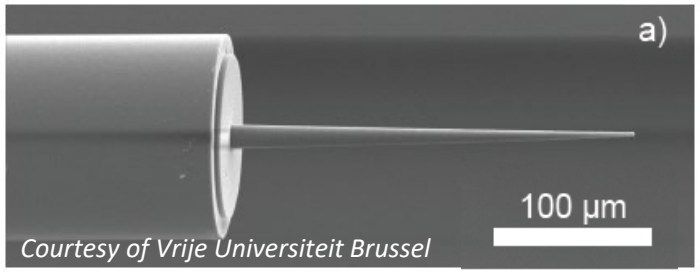


Image courtesy of Tyndall National Institute



Courtesy of Vrije Universiteit Brussel

Developments in the project:

- Optical connections:
  - Fiber to Edge Coupler (horizontal)
  - Micro-lenses
  - Microfluidic channels
- Electrical connections:
  - Flip Chip Bonding
- Thermal management

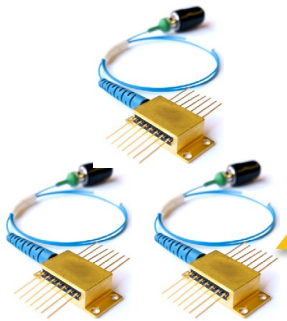
Innovation Support Fund

Call is open (3 months)

SMART PHOTONICS
Independent InP Foundry

VUB VRIJE UNIVERSITEIT BRUSSEL

Tyndall National Institute
Institiúid Náisiúnta



- Fabrication of PICs
- External optics design
- Packaging

www.oip4nwe.eu/vouchers

http://www.oip4nwe.eu

Presentation

Measuring with light

Jelmer Weda
Photon First

Measuring with light

OIP4NWE webinar

31 March 2021, Jelmer Weda - PhotonFirst

PHOTONFIRST
Integrated Photonics Sensing

We measure the world

In 2006 Pim Kat started with the photonics activities in Technobis

- PhotonFirst founder Pim Kat, a visionary in our field, started 15 years ago with the World's first application development and in 2008 designed the first chip for photonics sensing

- Ever since, our company has invested millions in development of proprietary integrated photonics sensing solutions in aerospace, medical, automotive, energy, infrastructure and high-tech systems

- In 2021, the company, rebranded per January 1st to PhotonFirst, employs an amazing team of 36 most highly educated professionals, mainly working on the technology advancement.

PHOTONFIRST

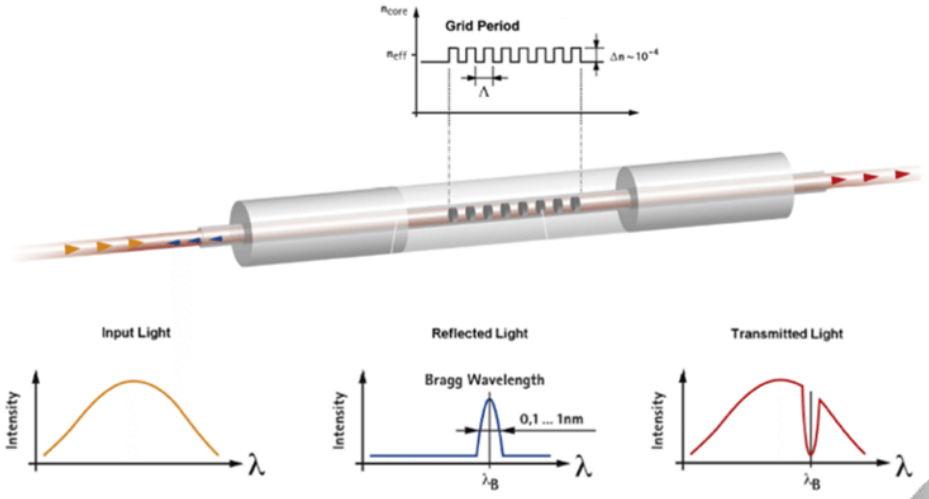
We help customers unlock the power of the photon at our corporate headquarters in Alkmaar and a satellite office on the High Tech Campus in Eindhoven

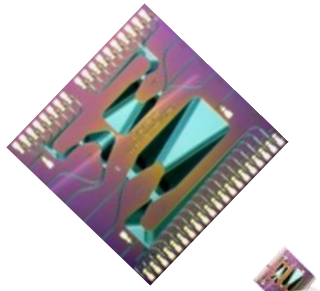
Headquarters
Pyrietstraat 2a
1812 SC Alkmaar
the Netherlands

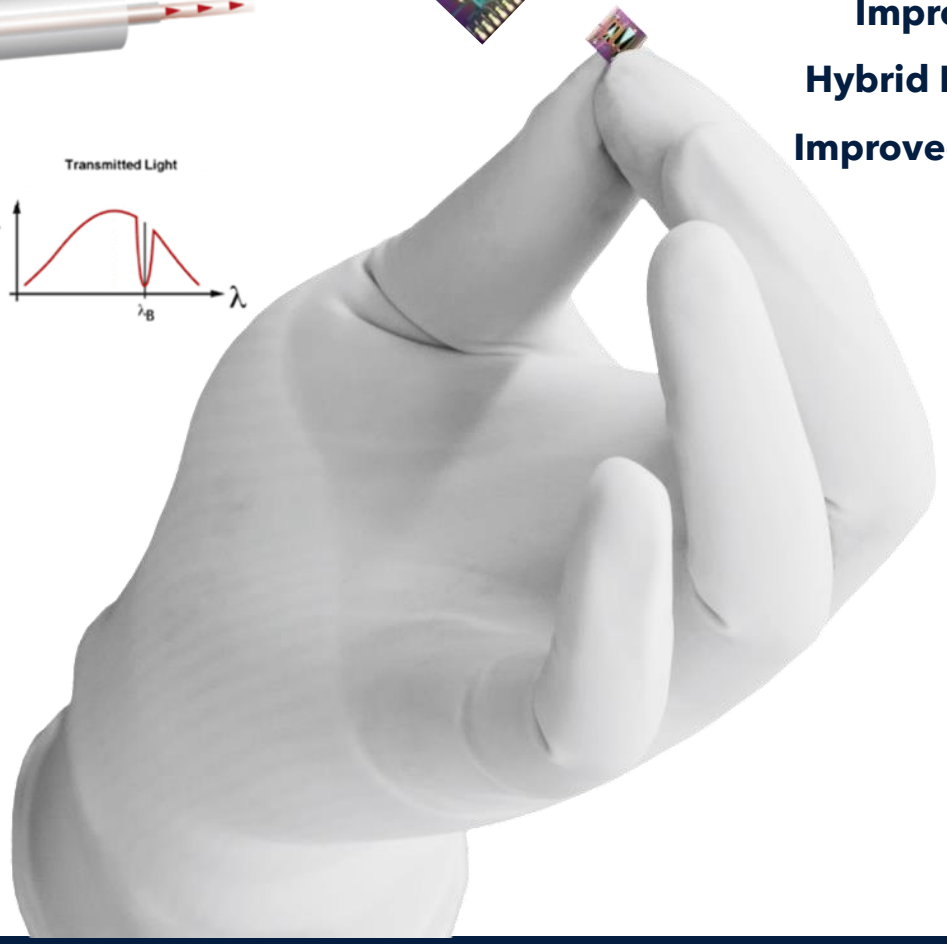
Phone: +31 85 00 76 700
E-mail: team@photonfirst.com

Satellite Office
High Tech Campus 5
5656 AE Eindhoven
the Netherlands

We use integrated photonics for advanced sensing applications







Photonic Integrated Circuit (PIC) Technology

Small Size, Reduced Weight

Improved Thermal and Vibration Stability

Hybrid Integration of Optics and Electronics

Improved Reliability | Low Power | Low Costs

Fibre Sensing Technology

Totally Passive | Small Size & Weight

Chemically Inert | Intrinsically Safe

Non-conductive Immune to EMI

Low Loss | Remote Sensing

PHOTONFIRST

We measure strain, temperature and pressure

Strain

We measure microstrain & shape

με

Temperature

We measure temperature

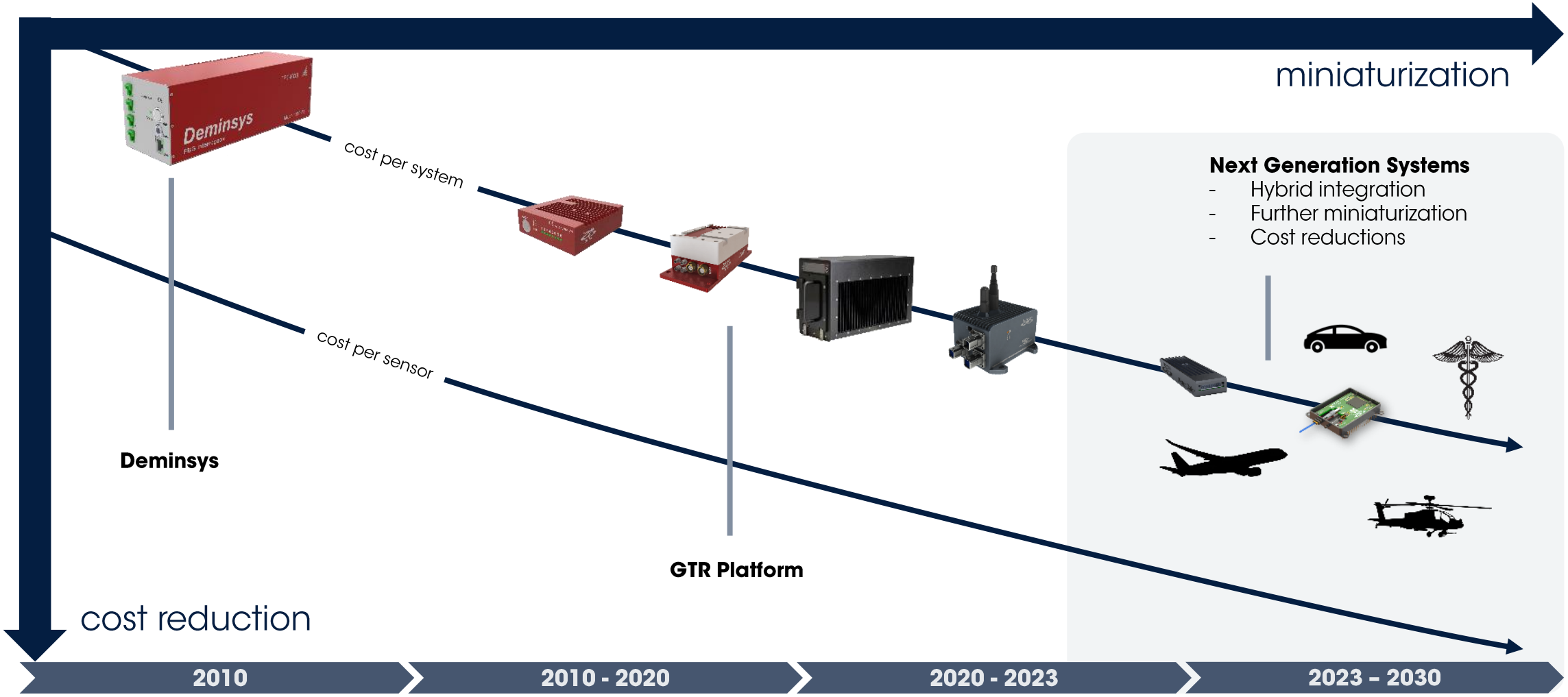
K

Pressure

We measure pressure

Δp

Our ambition is to lead innovation towards the future of sensing

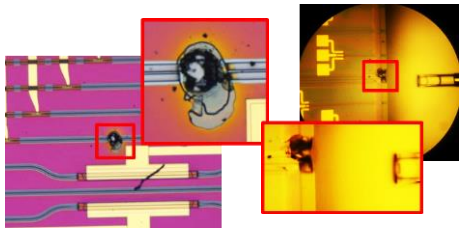


We focus on advanced applications in demanding markets

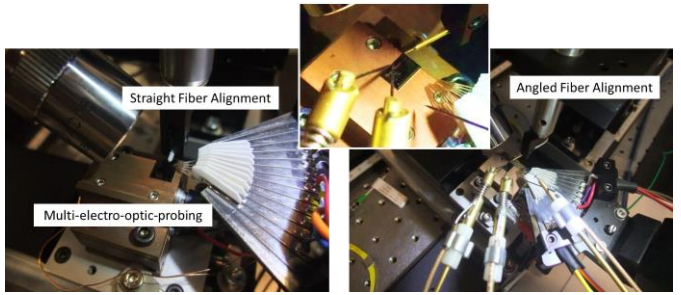
PIC Packaging services

PIC packaging equipment

Visual inspection



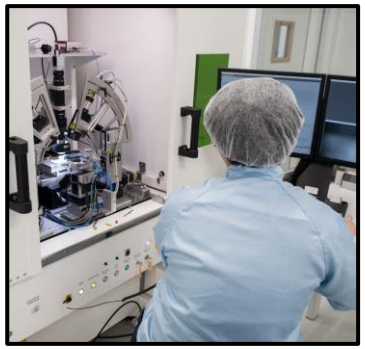
Examples of PIC defects

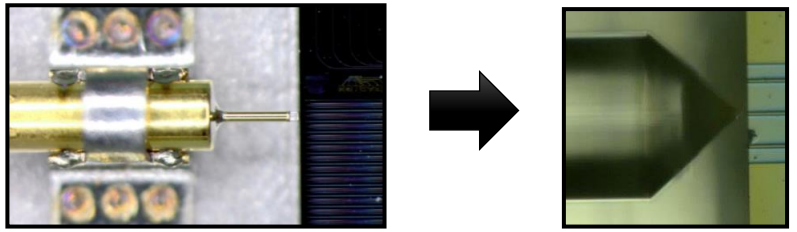


Electro – optical testing (automation planned 2021)

Automatic Die Bonder

Automatic Wire Bonder





Semi-Automatic Fibre Aligner

Acknowledgements

- PhotonFirst participation validation programme
- Timeline: 2018-2022
- Total project budget: € 13.9 million
- ERDF-funding: € 8.3 million
- Thematic Priority on “INNOVATION“
- Countries involved: The Netherlands, Germany, France, Belgium, Ireland, United Kingdom

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European Regional Development Fund

Thank you for your attention.
www.photonfirst.com | team@photonfirst.com

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Open Discussion

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European Regional Development Fund

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Open Innovation PIC Pilot

Presentation

Introduction of the Innovation Support Fund and how to apply

Prof. Jürgen van Erps
Vrije Universiteit Brussel

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European Regional Development Fund

OIP4NWE
Open Innovation PIC Pilot

Open-Innovation Photonics pilot for North West Europe

Innovation Support Fund – Call for applications

Jürgen Van Erps, VUB

Innovation Support Fund - Call for applications

Interreg North-West Europe
OIP4NWE
European Regional Development Fund

Are you an SME in the NWE region wanting to scale up production of PICs to a trial series beyond proof-of-concept demonstration?

Apply now to receive 1 of 7 vouchers providing you with up to 50k€* support and access to the OIP4NWE open innovation pilot line, covering

1) Design verification to check compatibility of the PIC design with the OIP4NWE pilot line
2) Manufacturing of the PICs, external optics and packaging

22/1/2021
Call opens

27/01/2021
03/03/2021
10/2/2021
Webinars

Submit
Expression
of interest

Submit
application
form & sign
Proxy NDA

15/04/2021
Call closes

Evaluation
by
OIP4NWE
selection
committee

30/06/2021
Announcement
of winners

Voucher
execution

For more information, visit www.oip4nwe.eu/vouchers

* A financial contribution of 20% will be required from the SME on the total project cost and of 100% for anything above the 50k€ max support.

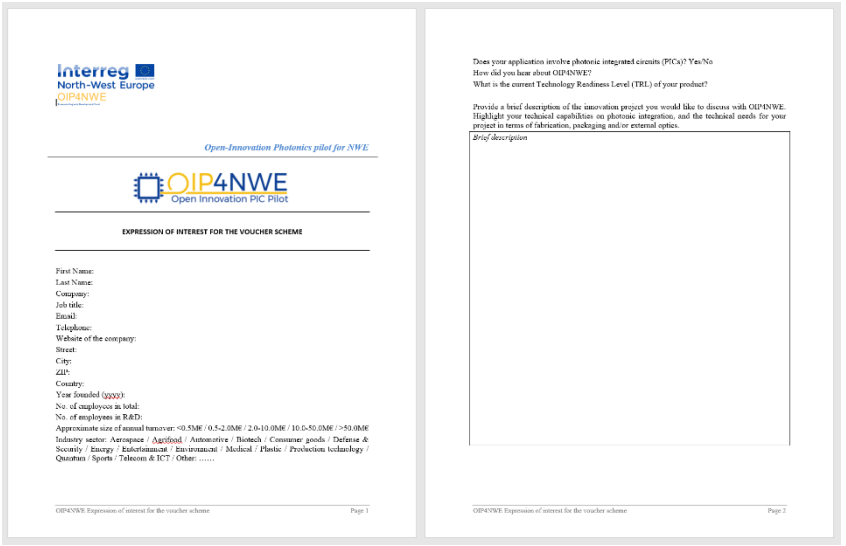
OIP4NWE
Open Innovation PIC Pilot

Requirements for application

1. The applicant should be a **small or medium-sized entreprise (SME)**, according to the European definition, which can be found at https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition
2. The applicant should be **based in the North-West Europe** region, as defined on https://www.nweurope.eu/about-the-programme/the-nwe-area/
3. The applicant should have demonstrated the technical feasibility of their application proposal, i.e. the applicant should have a PIC design ready and preferably a validated prototype. This means that the technology readiness level **(TRL) of their current PIC should be 4 or higher**. Proposals for proof-of-concept type demonstrators are not eligible.
4. The applicant should **demonstrate a business case** for scale-up to volume production and/or how the funded project will positively **impact** their future business, either through increased revenues or through the creation of new jobs.
5. The applicant should **comply with the minimis criterion for state aid** and provide a self-declaration to that end. A "De Minimis" award letter will be issued by the OIP4NWE consortium when complying.
6. The applicant should **submit a fully completed "Voucher application form"** and should **sign a "Proxy NDA"** to allow evaluation of the proposal by the OIP4NWE voucher selection committee.
7. Voucher recipients should **agree to collaborate on documenting their use case**. This is to be used as dissemination material to attract other users of the pilot line, during as well as after the project.

Application procedure

→ Fill out a pre-registration "**expression of interest**" form to allow early follow-up and eligibility check prior to preparing a full proposal. Send the form to voucher@oip4nwe.eu


Open-Innovation Photonics pilot for NWE

EXPRESSION OF INTEREST FOR THE VOUCHER SCHEME

First Name:
Last Name:
Company:
Job title:
Email:
Telephone:
Website of the company:
Street:
City:
ZIP:
Country:
Year founded (yyyy):
No. of employees in total:
No. of employees in R&D:
Approximate size of annual turnover: <0.5M€ / 0.5-2.0M€ / 2.0-10.0M€ / 10.0-50.0M€ / >50.0M€
Industry sector: Aerospace / Agrifood / Automotive / Biotech / Consumer goods / Defense & Security / Energy / Entertainment / Environment / Medical / Plastic / Production technology / Quantum / Sports / Telecom & ICT / Other: .....

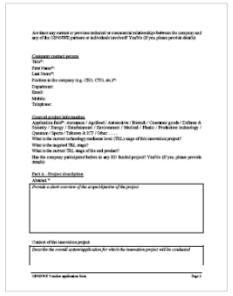
Does your application involve photonic integrated circuits (PICs)? Yes/No
How did you hear about OIP4NWE?
What is the current Technology Readiness Level (TRL) of your product?

Provide a brief description of the innovation project you would like to discuss with OIP4NWE. Highlight your technical capabilities on photonic integration, and the technical needs for your project in terms of fabrication, packaging and/or external optics.

Brief description

→ Fill out application form and send it to voucher@oip4nwe.eu before the call closure (15/04/2021)


1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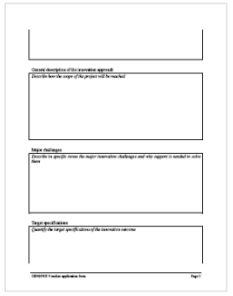
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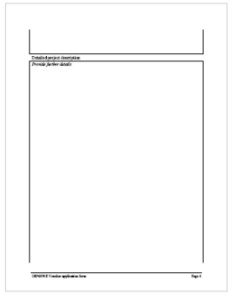
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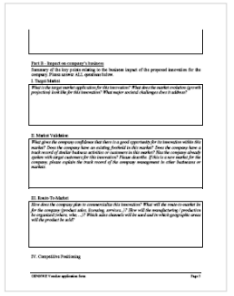
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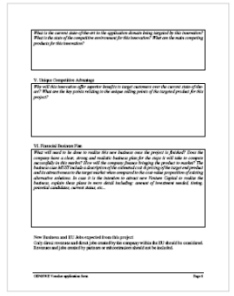
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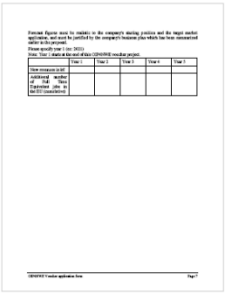

7

Application form

Open-Innovation Photonics pilot for NWE

VOUCHER APPLICATION FORM

Note that fields marked with an asterisk (*) will be used in public communications about OIP4NWE and the company should be aware of this in advance.

Company Information *

Company name:
Company type:
Main industry sector of the company:
Street:
City:
ZIP:
Country:
Website:
Year founded (yyyy):
No. of employees in total:
No. of employees in R&D:
Size of annual turnover:
First time photonics innovation with PICs? Yes/No
Is there any cause for concern over potential conflicts of interest between the company and any of the OIP4NWE partners or individuals? Yes/No (If yes, please explain)

Are there any current or previous technical or commercial relationships between the company and any of the OIP4NWE partners or individuals involved? Yes/No (If yes, please provide details)

Company contact person

Title*:
First Name*:
Last Name*:
Position in the company (e.g. CEO, CTO, etc.)*:
Department:
Email:
Mobile:
Telephone:

General project information

Application field*: Aerospace / Agrifood / Automotive / Biotech / Consumer goods / Defense & Security / Energy / Entertainment / Environment / Medical / Plastic / Production technology / Quantum / Sports / Telecom & ICT / Other: ……
What is the current technology readiness level (TRL) stage of this innovation project?
What is the targeted TRL stage?
What is the current TRL stage of the end product?
Has the company participated before in any EU funded project? Yes/No (If yes, please provide details)

Part A - Project description

Abstract *

Provide a short overview of the scope/objective of the project

Context of the innovation project

Describe the overall system/application for which the innovation project will be conducted

Application form

General description of the innovation approach

Describe how the scope of the project will be reached

Major challenges

Describe in specific terms the major innovation challenges and why support is needed to solve them

Target specifications

Quantify the target specifications of the innovation outcome

Detailed project description

Provide further details

/

Application form

Part B - Impact on company's business

Summary of the key points relating to the business impact of the proposed innovation for the company. Please answer ALL questions below.

I. Target Market

What is the target market application for this innovation? What does the market evolution (growth projection) look like for this innovation? What major societal challenges does it address?

II. Market Validation

What gives the company confidence that there is a good opportunity for its innovation within this market? Does the company have an existing foothold in this market? Does the company have a track record of similar business activities or customers in this market? Has the company already spoken with target customers for this innovation? Please describe. If this is a new market for the company, please explain the track record of the company management in other businesses or markets.

III. Route-To-Market

How does the company plan to commercialize this innovation? What will the route-to-market be for the company (product sales, licensing, services...)? How will the manufacturing / production be organized (where, who, ...)? Which sales channels will be used and in which geographic areas will the product be sold?

IV. Competitive Positioning

What is the current state-of-the-art in the application domain being targeted by this innovation? What is the state of the competitive environment for this innovation? What are the main competing products for this innovation?

V. Unique Competitive Advantage

Why will this innovation offer superior benefits to target customers over the current state-of-the-art? What are the key points relating to the unique selling points of the targeted product for this project?

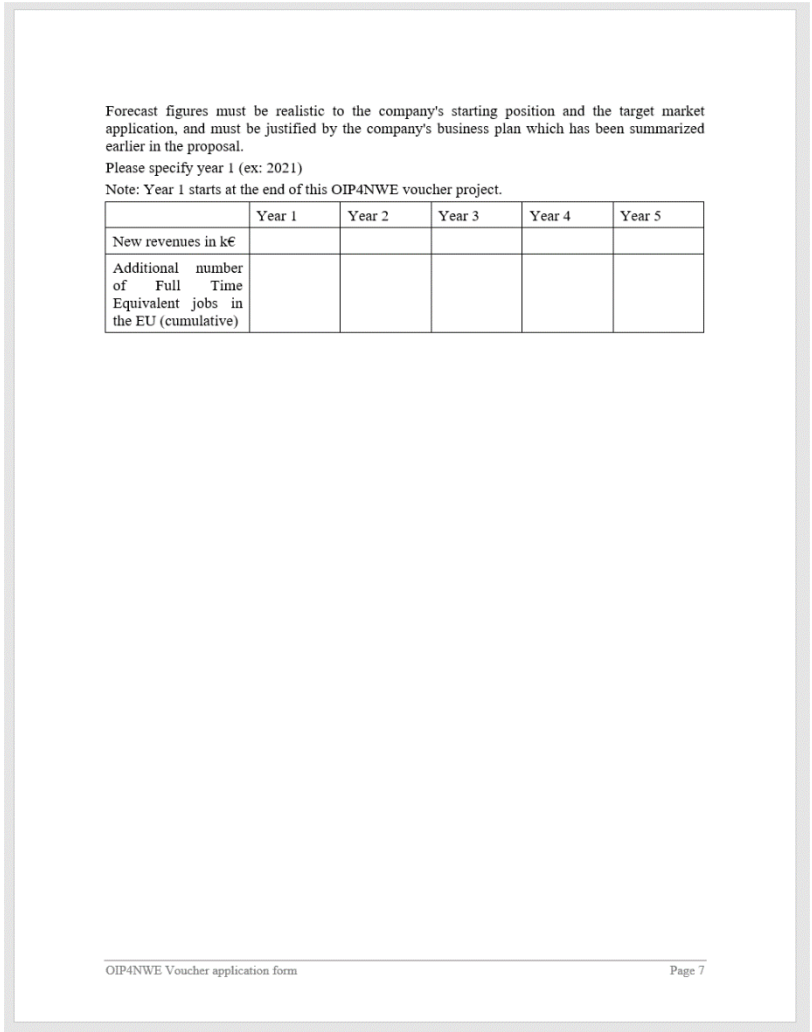
VI. Financial Business Plan

What will need to be done to realize this new business once the project is finished? Does the company have a clear, strong and realistic business plan for the steps it will take to compete successfully in this market? How will the company finance bringing the product to market? The business case MUST include a description of the estimated cost & pricing of the target end product and its attractiveness to the target market when compared to the cost-value proposition of existing alternative solutions. In case it is the intention to attract new Venture Capital to realize the business, explain these plans in more detail including: amount of investment needed, timing, potential candidates, current status, etc...

New Business and EU Jobs expected from this project

Only direct revenues and direct jobs created by the company within the EU should be considered. Revenues and jobs created by partners or subcontractors should not be included.

Application form



Forecast figures must be realistic to the company's starting position and the target market application, and must be justified by the company's business plan which has been summarized earlier in the proposal.

Please specify year 1 (ex: 2021)

Note: Year 1 starts at the end of this OIP4NWE voucher project.

	Year 1	Year 2	Year 3	Year 4	Year 5
New revenues in k€					
Additional number of Full Time Equivalent jobs in the EU (cumulative)					

Selection criteria

Evaluation criteria and associated weight:

1. **The innovative character of the project (weight 1)**:
   Is the proposed solution new to the marked?
   Is the project creating valuable knowhow?
   Are PICs key enabling elements in this project?
2. **Technical feasibility and quality of the project plan (weight 1)**:
   Compatibility with the OIP4NWE pilot line?
   Current TRL level of the PIC?
   How should the PIC be interfaced with the outside world?
   Is the proposed technological approach in line with the project goals?
3. **Credibility and level of commitment of the company (weight 2)**:
   Level of financial commitment?
   Does the company have a proven track record of bringing new products/solutions to the market?
   Does the company have a proven track record of successfully completing public or public-private funded project?
4. **Added value on the business case and potential impact (weight 2)**:
   The target market (target customers/segments, purchasing decision-makers, ...)?
   The market validation (experience and relationship of the company with these customers; is the target market an existing one or a new one?)?
   The route to market (what channels will the company use to sell and deliver its products to its target customers?)
   The value proposition (competitive positioning and unique selling point)?
   Financial aspects of the business plan (increase in revenues or new jobs created)?

Each criterion is scored with a value from 0 (strongly underperforming) to 5 (excellent). The score is multiplied with the weight.
The individual score of each criterion should be at least 2,5/5.
The total score should be at least 20/30.

The selection committee will take into account **geographical distribution in the NWE region** as well as **distribution over different application sectors** of the voucher grantees.

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→ Contact voucher@oip4nwe.eu

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Thank you!

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Thank you!