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BRUSSELS PHOTONICS TEAM

Vrije Universiteit Brussel

Photonics KET for Flanders

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PHOTONICS 21

Photonics – The Science and Technology of Harnessing Light

Photonics is the science and technology of the harnessing of light.

Photonics encompasses the generation of light, the detection of light, the management of light through guidance, manipulation and amplification, and most importantly its utilisation for the benefit of mankind .

Photonics bears the same relationship to light and photons as electronics does to electricity and electrons.

The future generation will rely on energy efficient lighting solutions © Philips

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Photonics will Impact Most Areas of our Lives

▶ Healthcare

- Early diagnosis through new detection methods
- Minimal invasive surgery

▶ Energy Efficiency

- LEDs, OLEDs and intelligent networks can save 2/3 of electricity for lighting

▶ Safety & Security

- Smart sensors for automotive safety; IR detection systems

▶ Manufacturing

- Lasers enable new lightweight structures
- Laser drilling: 25,000 holes per second for efficient solar cells

▶ Inclusion

- High speed fibre networks with multi-terabit capacity are backbone for web 2.0 & 3.0 products & internet of things

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Sustainable Products - Triple Win with Green Photonics

Ecology

Less CO_2 emissions:

- LED/OLED can save an additional 30% energy in lighting by 2030
- Limit growth of energy consumption of ICT
- Sensors will enable reduction of power consumption during production and increase environmental safety

Economy

Additional growth:

- Disruptive photonic technologies as key driver for profitable growth
- Save hundreds of billion Euros on global energy bill
- New market segments
- Driving force for more jobs
- Laser enable profitable production

Society

Lower cost & higher quality of life:

- Energy saving saves money
- Sensor networks for safety
- Green technology & emotion
- More comfort
- Faster communication
- Higher safety (automobiles)
- No hazardous materials

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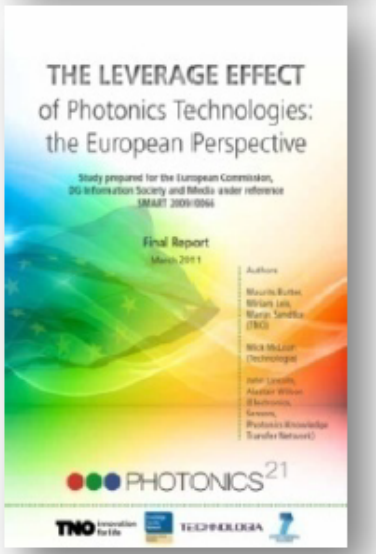
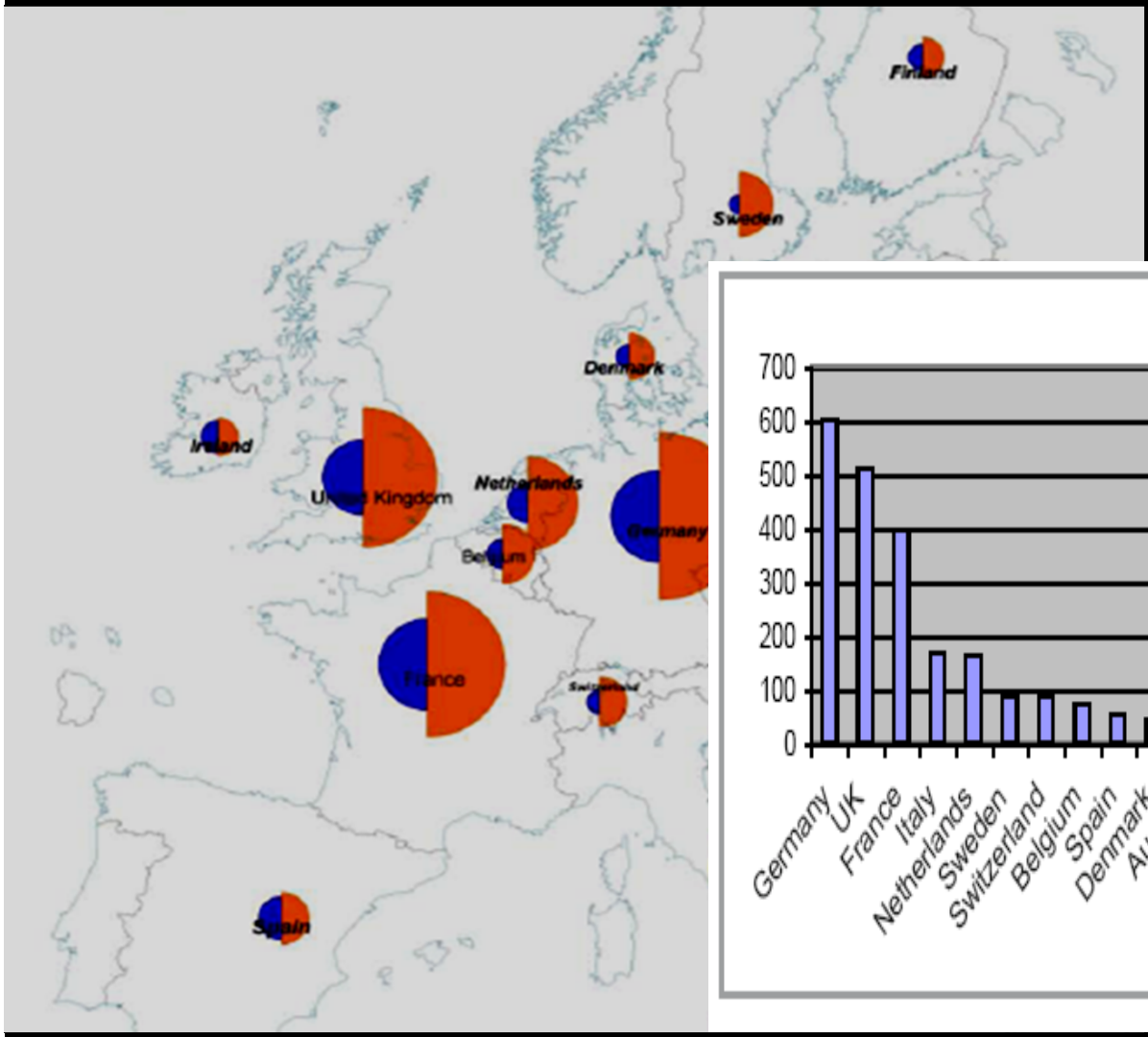
Photonics – A Key Enabling Technology with Enormous Economic Potential

- Total Direct Photonics market ~ € 300 bn
  - even larger leverage effect along the value chain
- European Photonics market ~ € 60 bn
- Estimated annual growth rate ~ 8-10%
- **Estimated market size in 2015 ~ € 480 bn**
- Many market-leading industrial players
- **> 5000 SMEs / > 1000 research institutes**
- **Leading market shares of European companies**
  - Lighting 40%
  - Production technology 45%
  - Optical communication 24%
- **~ 300,000 employees directly**

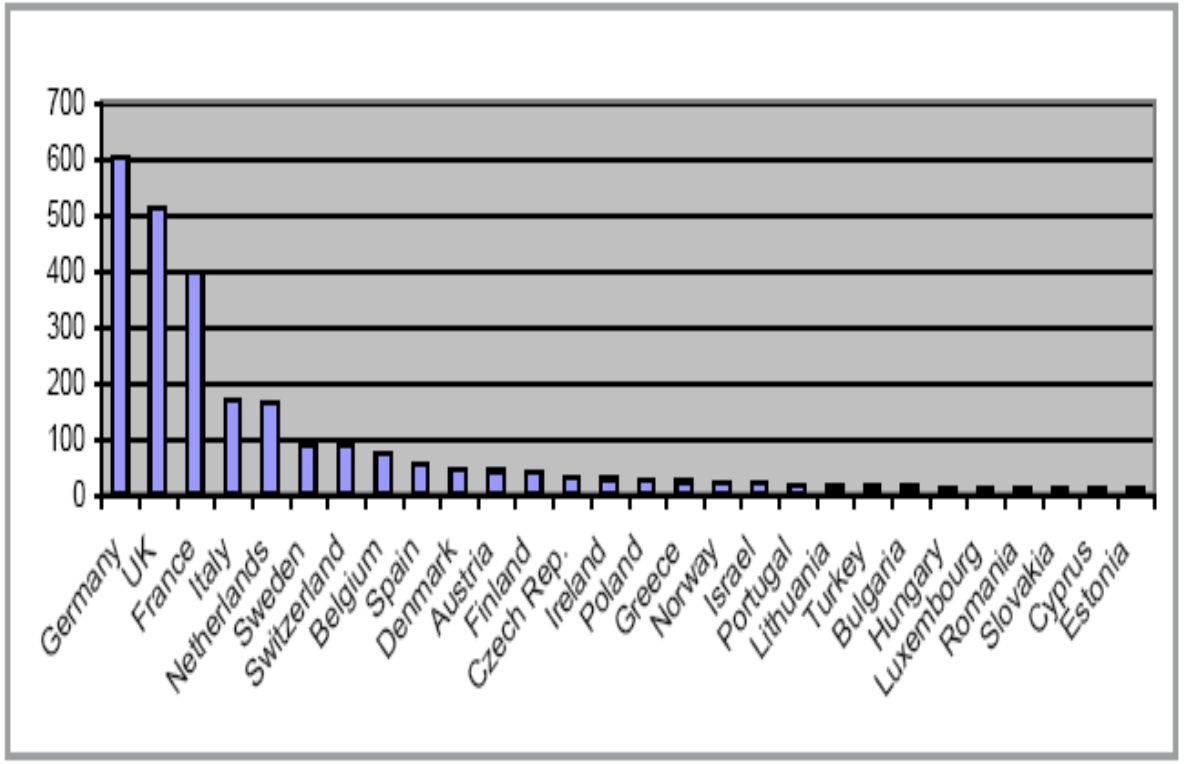


Flanders is very strong in photonics innovation and industry



Belgium: **62 companies**
15 research institutes

Netherlands: 150 companies
25 research institutes



EU report: Photonics: key-enabling technology for Europe 2010
The leverage effect of photonic technologies 2011

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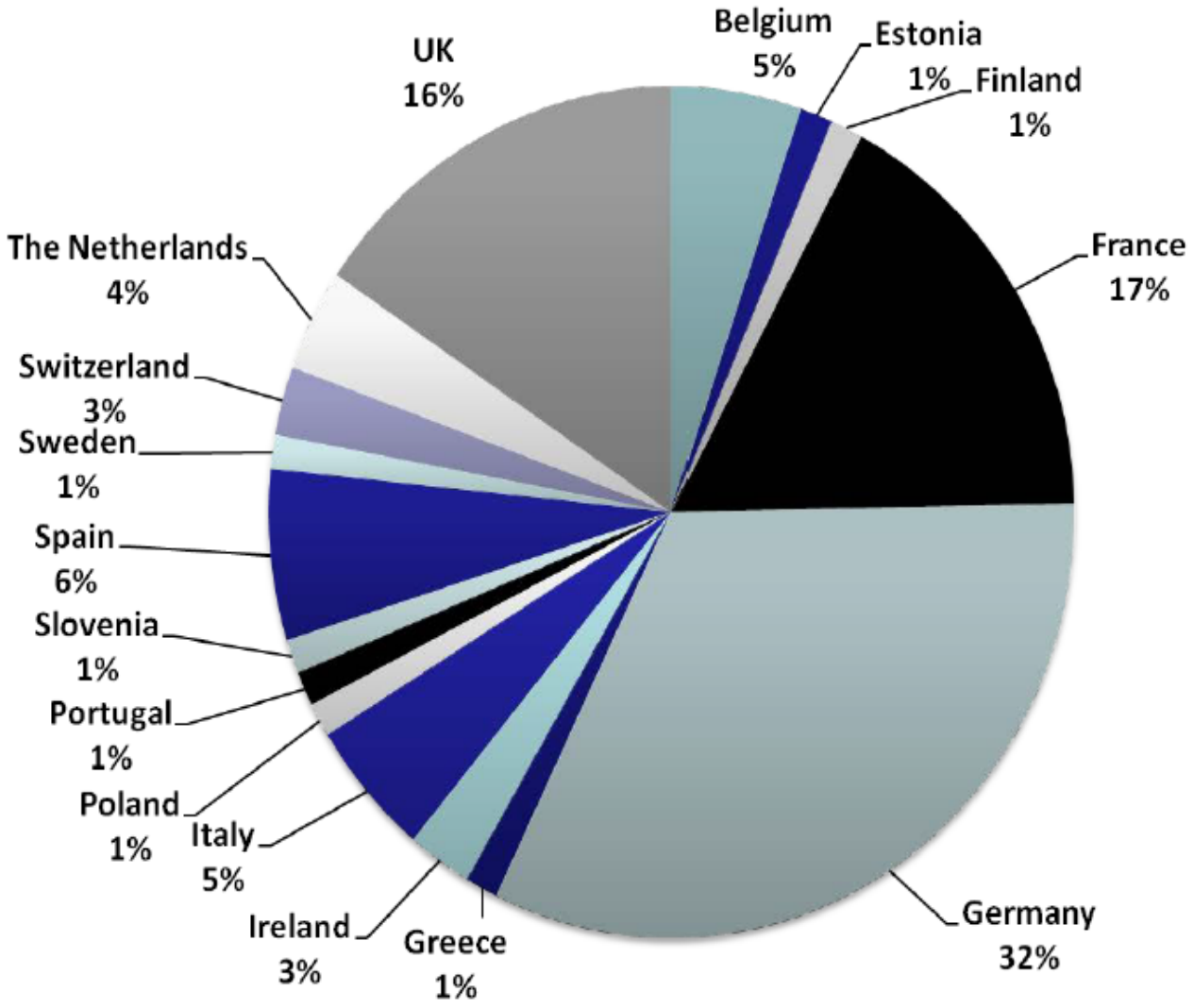
Photonics21 Board of Stakeholders – Members by Country



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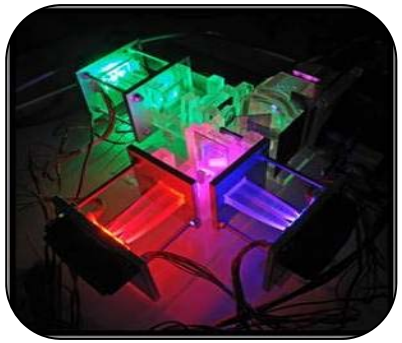
B-PHOT supports a variety of Flemish and European companies to meet their innovation challenges

Infrared nightvision for safety and security

umicore

Optical fiber sensors for smart structures

FBGS
DRAW TOWER GRATINGS

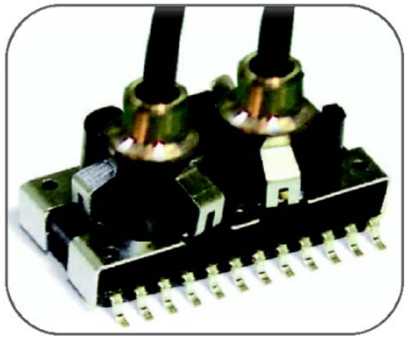


3-Dimensional displays and projectors

BARCO

Freeform micro-optics

umicore

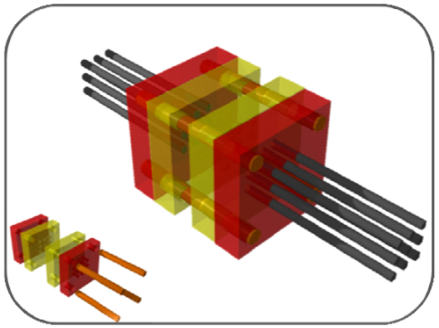


Opto-electronic chips for automotive

Melexis
Microelectronic Integrated Systems

Optical engines for food-sorting

BEST
GETS EVERYTHING SORTED



Optical interconnects for Local Area Networks

TE connectivity

High-efficiency lighting applications

PHILIPS

All topics contribute to solving societal challenges and are priorities of the EC

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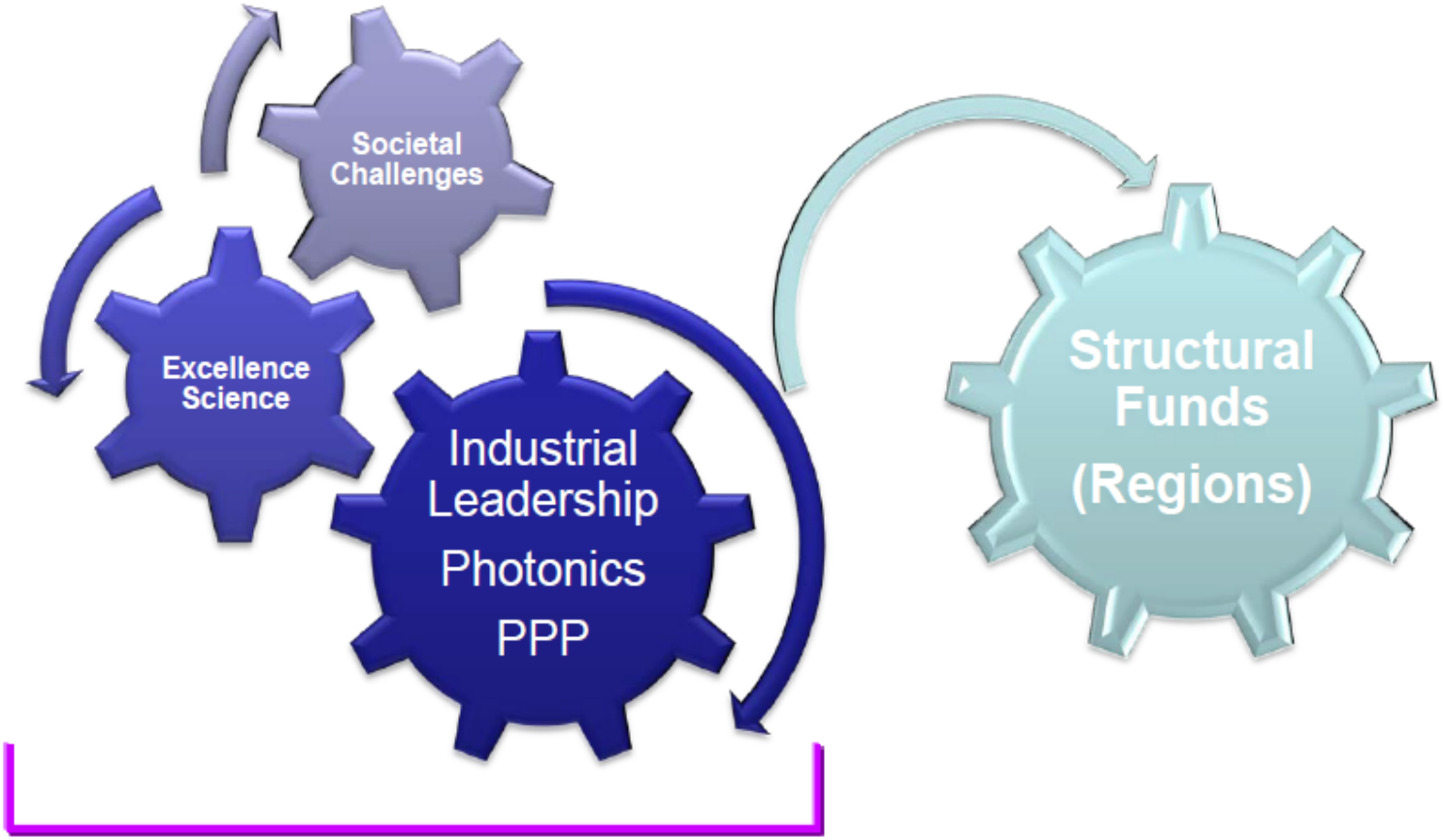
Changes on the Horizon - *Horizon 2020 is not "FP8" !*

Photonics: A Leverage for European Growth!



For more information, see: http://ec.europa.eu/research/horizon2020/index_en.cfm

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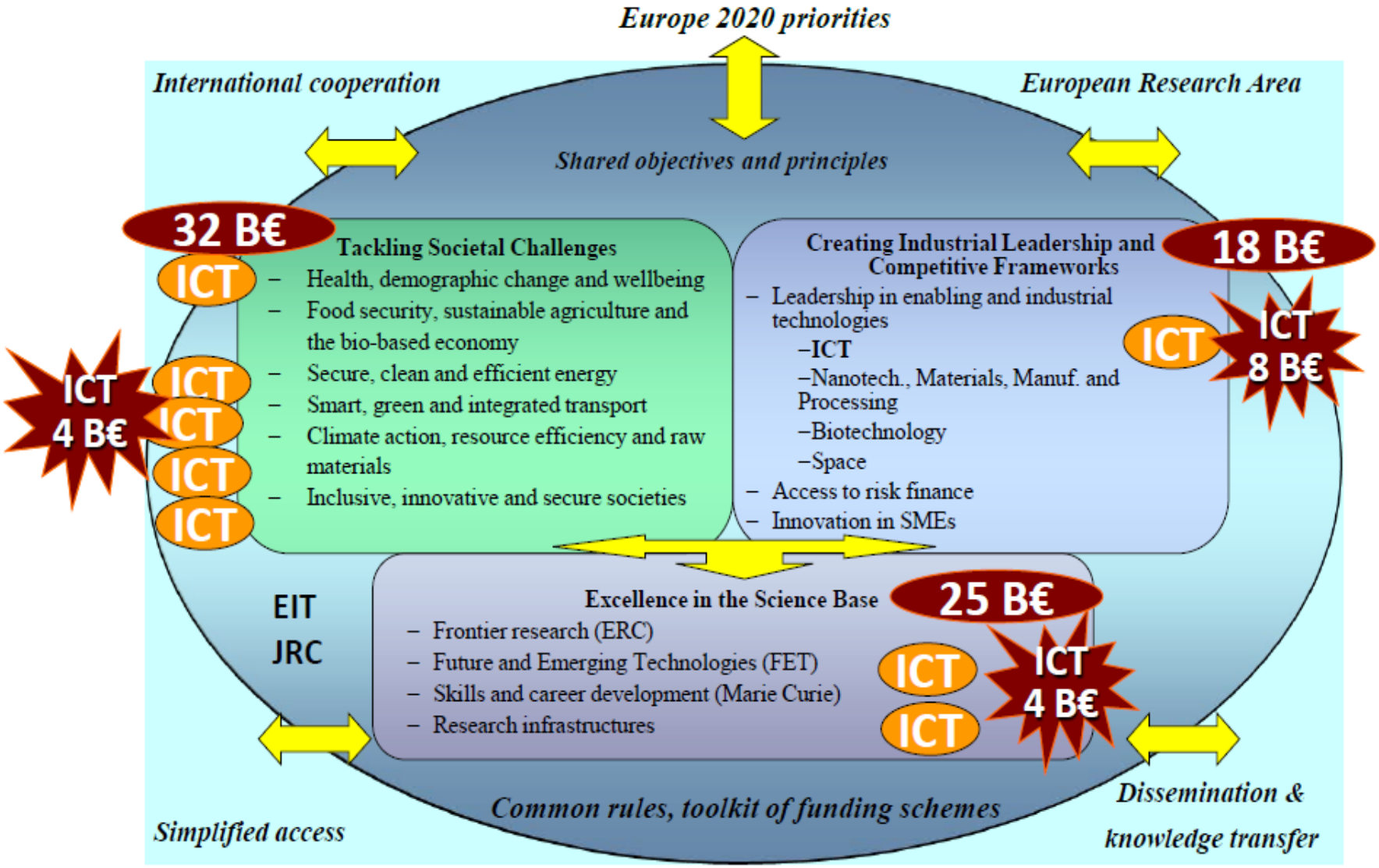
EC's Proposal for Horizon 2020: Objectives & structure



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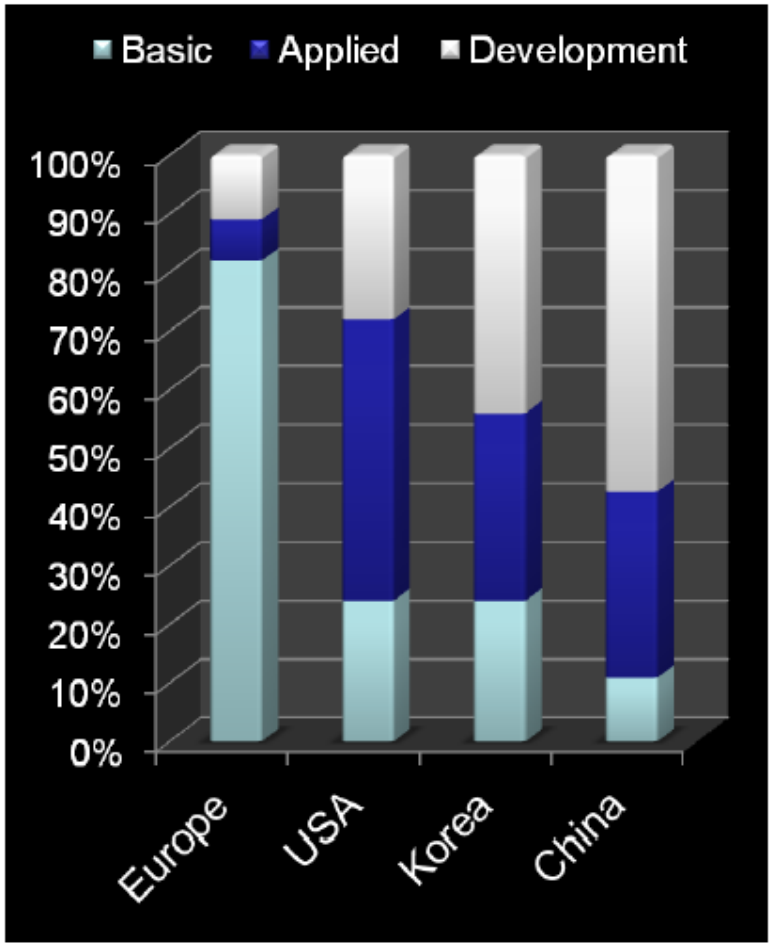
Our Analysis: Europe is lagging funding along the Value Chain



Source: KET Report: Strategic focus on applied research and development

Benchmarking

- Many of Europe's competitor nations have a focus on translating basic science via technology building blocks into advanced processes, products and systems

Our Recommendations

- Excellent R&D results – we have a world leading position

→ **Continue – stay at the forefront**

- Our weakness – "Valley of Death"
  - slow transition from photonic inventions to industrial deployment
  - not sufficiently materializing on our scientific success & excellence

→ **The Challenge – include Value Chain**

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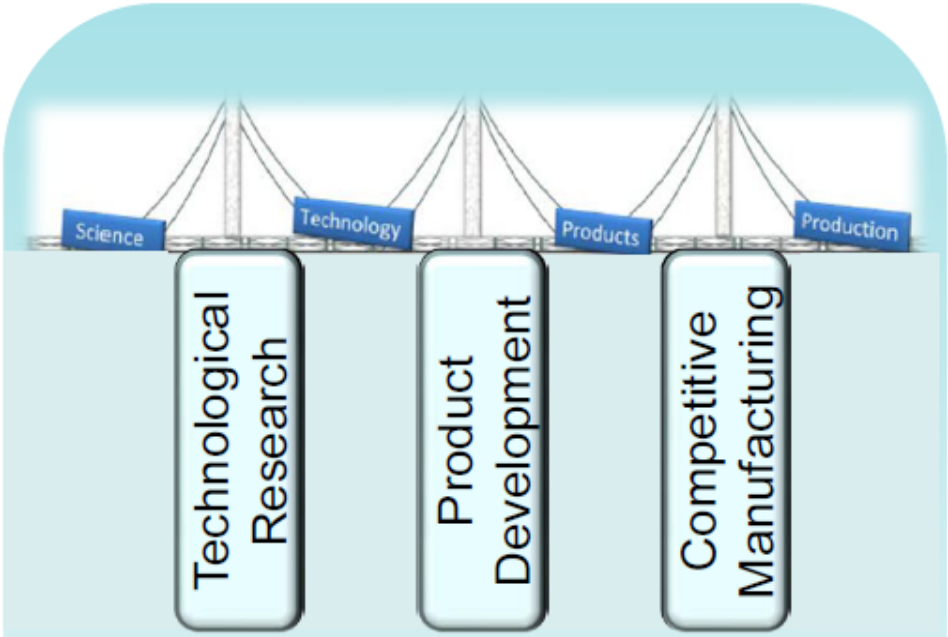
Recommendations: A 3-Pillar Bridge across „Valley of Death“



According to: High Level Expert Group on Key Enabling Technologies – Final Report, July 2011

- **Technological Research**
- making technologies competitive on world level
- arising from basic research & scientific excellence
- protected by a single and efficient EU patent

- **Product Demonstration**
- making products competitive on global level
- putting pilot lines & prototype facilities
- enabling fabrication of a significant quantity

- **Competitive Manufacturing**
- making advanced manufacturing competitive on global level
- master solutions tackling societal challenges
- scale up for progress on learning curve enabling competitive price

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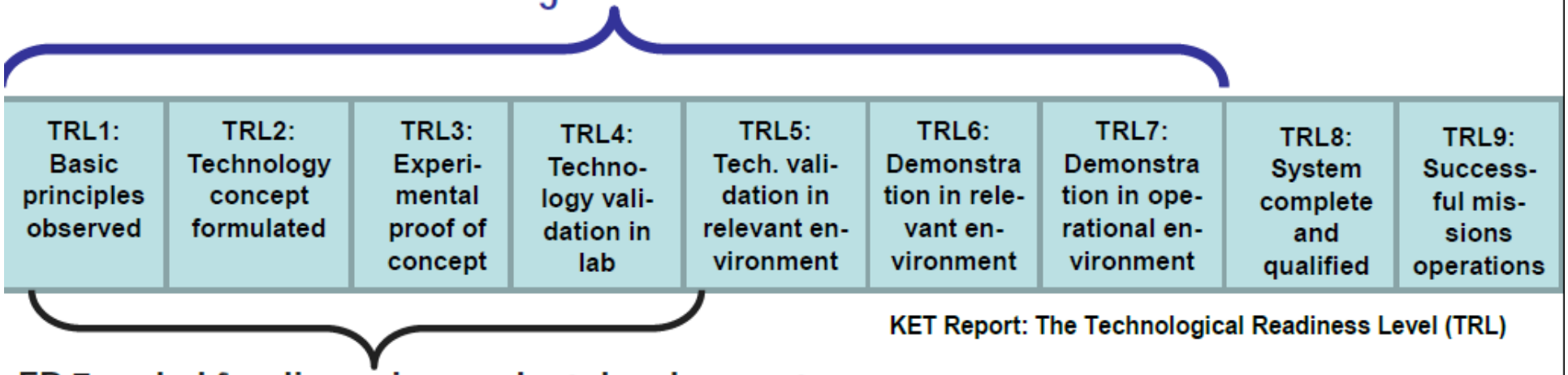
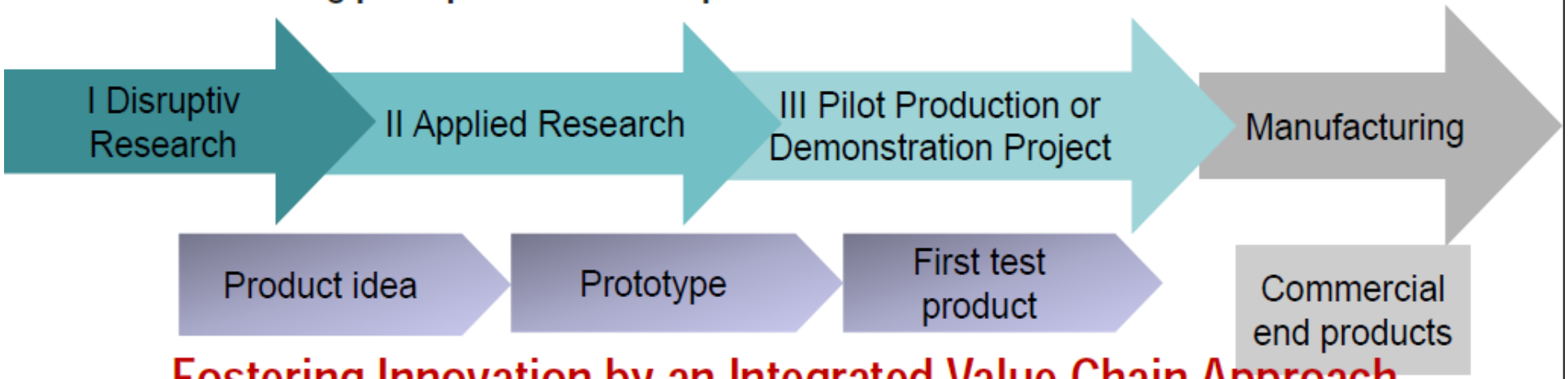
Message was heard: Horizon 2020 extends Scope of Funding

Horizon 2020 foresees funding towards market readiness and commercialization



KET Report: The Technological Readiness Level (TRL)

FP 7 ended funding prior product development



Fostering Innovation by an Integrated Value Chain Approach

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Our Integrated Approach in a PPP to bridge the Innovation Gap

- **Disruptive and Road-Map based Core Photonic Technologies**
  - Roadmap-based research – value chain approach, involvement of end users
  - Disruptive technology - breakthrough advances for disruptive research
- **Demonstration Programmes**
  - Deployment programmes to leverage EU infrastructure to create jobs..
  - Coordinated market pull/push measures seed and accelerate market penetration
- **Photonics Manufacturing Platforms – Manufacturing in Europe**
  - Generic photonic foundries – improve infrastructure for photonics manufacturing
  - Establish public-private pilot production facilities for industry/research
- **Innovative Photonics SMEs**
  - "Light touch' open schemes
  - Fast-track funding allowing prototyping & short-term commercialization
- **Support Actions**
  - Education, training and skills development
  - Standardization & International Cooperation & Outreach.

Photonics in Horizon 2020
A Public Private Partnership?

Implement Photonics in Horizon 2020 through a PPP

- **The proposed Horizon 2020 legal text foresees a potential PPP for Photonics**
- **~1.8 B€ foreseen for both photonics and micro-and nano-electronics**

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Founding a Photonics PPP in Horizon 2020 – Our Targets

What we expect and advocate

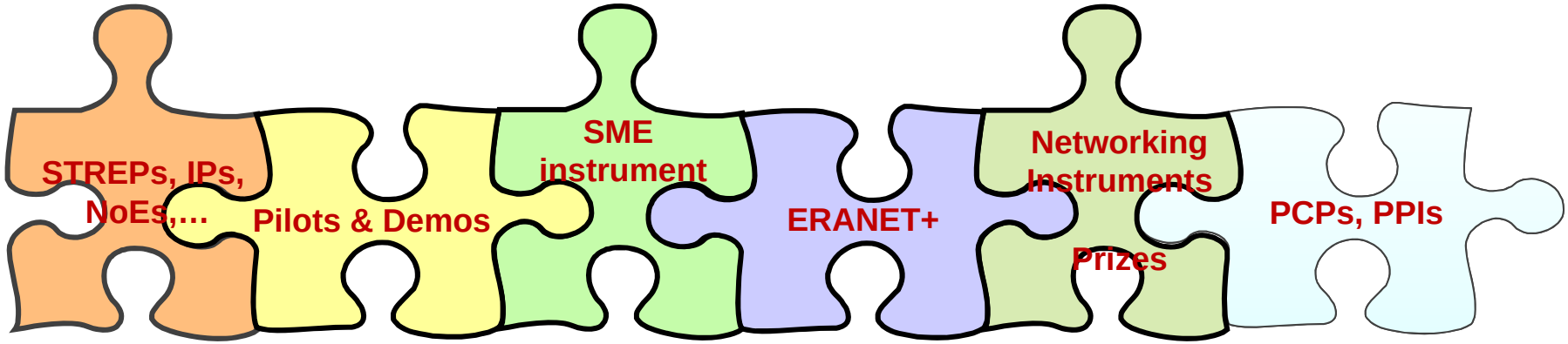
- Long-term commitment in funding
- Partnership at eye level
- Significant budget that reflects the means of Photonics as a KET
- Lean, simple and efficient structures

What we offer

- Investing in Europe's long-term competitiveness and growth
  - 4:1 leverage EU funding by private investment → ~ 7 bn Euros
  - 70,000 – 100,000 additional jobs in Europe
- Measure success by Key Performance Indicators (KPIs)

Photonics PPP

A large set of R&I Measures & Instruments



- **Disruptive and Roadmap based R&D**
- **Pilot manufacturing lines; Large scale demonstration activities**
- **Innovative SMEs:** light touch open schemes; access to technology and support services
- **Innovation Support Actions**: Inducement prizes; Pre-commercial procurement actions & public procurement initiatives; Support to collaboration among and with innovation clusters
- **Coordination with national programmes** (e.g. through ERANET+)
- **Coordination and support actions**: Education, training and skills development; Standardization; International Cooperation; Outreach, …

PHOTONICS in FLANDERS

STRENGTHS

- Belangrijke en aktieve industriële sector
  - innovatie in lijn met prioriteiten van de EU
  - aktief in PHOTONICS 21
  - verschillende bedrijven betrokken bij EU projecten
  - Spin-offs, KMO's en grote bedrijven

- Kritische massa aan uitstekende onderzoeksinstellingen
  - basis en toegepast onderzoek
  - industriëel onderzoek
  - toonaangevend en leidinggevend in PHOTONICS 21
  - verschillende bedrijven betrokken bij EU projecten
  - technologieplatformen

- Samenwerking "Fotonica"-bedrijven en kennisinstellingen

- Sterke zichtbaarheid/impact Fotonica Vlaanderen bij EU

- Sterke track-record/aandeel Vlaanderen in projectwerving bij EU

- Toekomstverkenningen Fotonica in Vlaanderen veelbelovend

- Opportuniteiten in high-end high-tech productie

- Opportuniteiten in cross-sectional innovation (multi-KETs)

- Opportuniteiten smart specialisation

- Ondernemersgeest /spin-off opportuniteiten

WEAKNESSES

- weinig bekende sector bij beleidsmakers

- niet prominent aanwezig op Vlaamse agenda

- geen platform voor fotonica in Vlaanderen

- competentiepolen nog te weinig op de hoogte

- geen onderzoeksinstituut zoals bvb. VIB

- te weinig funding voor zware infrastructuur

- samenwerking KMO's en onderzoeksinstellingen

- instrumenten die PPP's mogelijk maken

- ....

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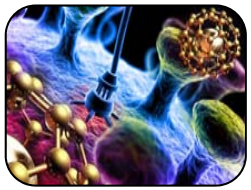
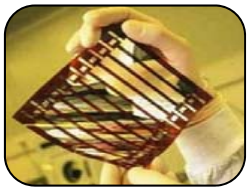
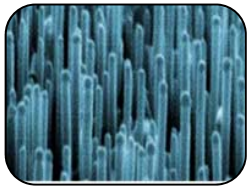
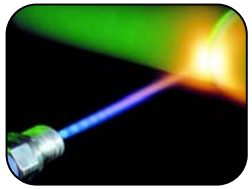
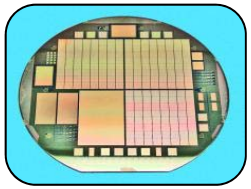
“Baanbrekende micro-fotonische systemen”
gebaseerd op de combinatie van 6 sleuteltechnologieën*


Biotechnology


Advanced Materials

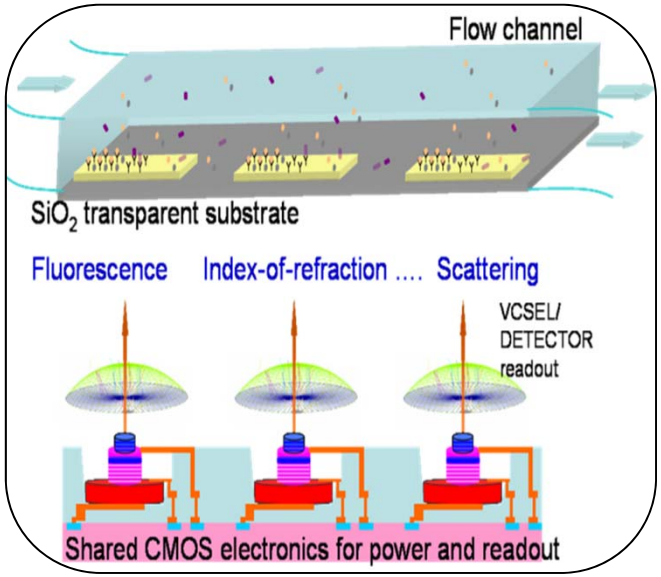

Nanotechnology


Photonics

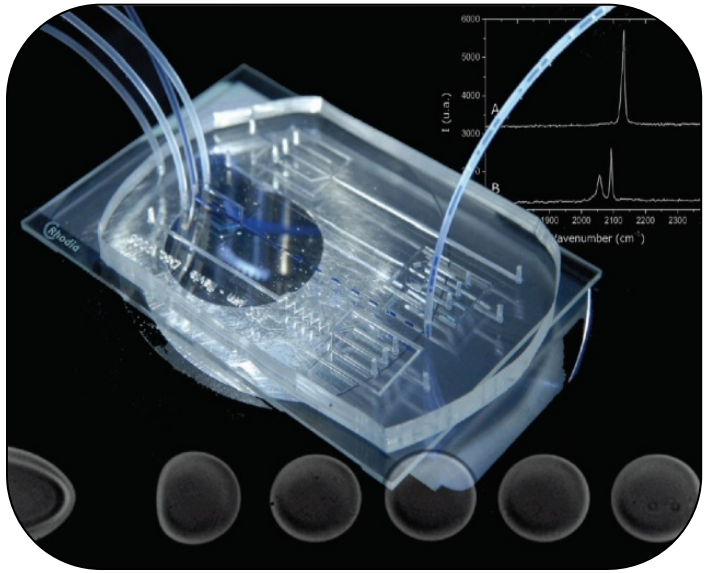

Nanoelectronics


Advanced Manufacturing

“Low-cost lab-on-a-chip”



Basisprincipe en concept



Multifunctioneel micro-systeem
Massaproduceerbaar en goedkoop

Water en voedselcontrole
veiligheid en gezondheid

Photonics Strategy in Horizon 2020

A public private partnership in Photonics

➔ A long-term commitment between the EC and the Photonics Stakeholders to invest in Europe with the aim to:
Secure EU's industrial leadership in those application areas where photonics is driving innovation and Europe is strong or where there is potential for creating new markets

Objectives

- Address and strengthen the full innovation and value chain in photonics
- Reinforce excellent cooperation of photonics stakeholders in Europe to accelerate the development of new technologies, the innovation process and the time to market
- Mobilise, pool and leverage public and private resources to provide successful solutions for the major societal challenges facing Europe

Support R&I activities based on a business-driven Strategic R&I Agenda

Photonics in FP7 ICT Theme

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Lighting & Displays

Communications

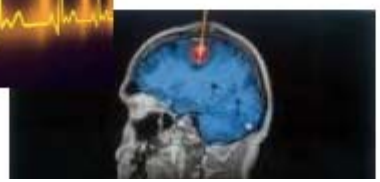
Safety & Security

~500 M€ of EU funding
> 100 R&D Projects

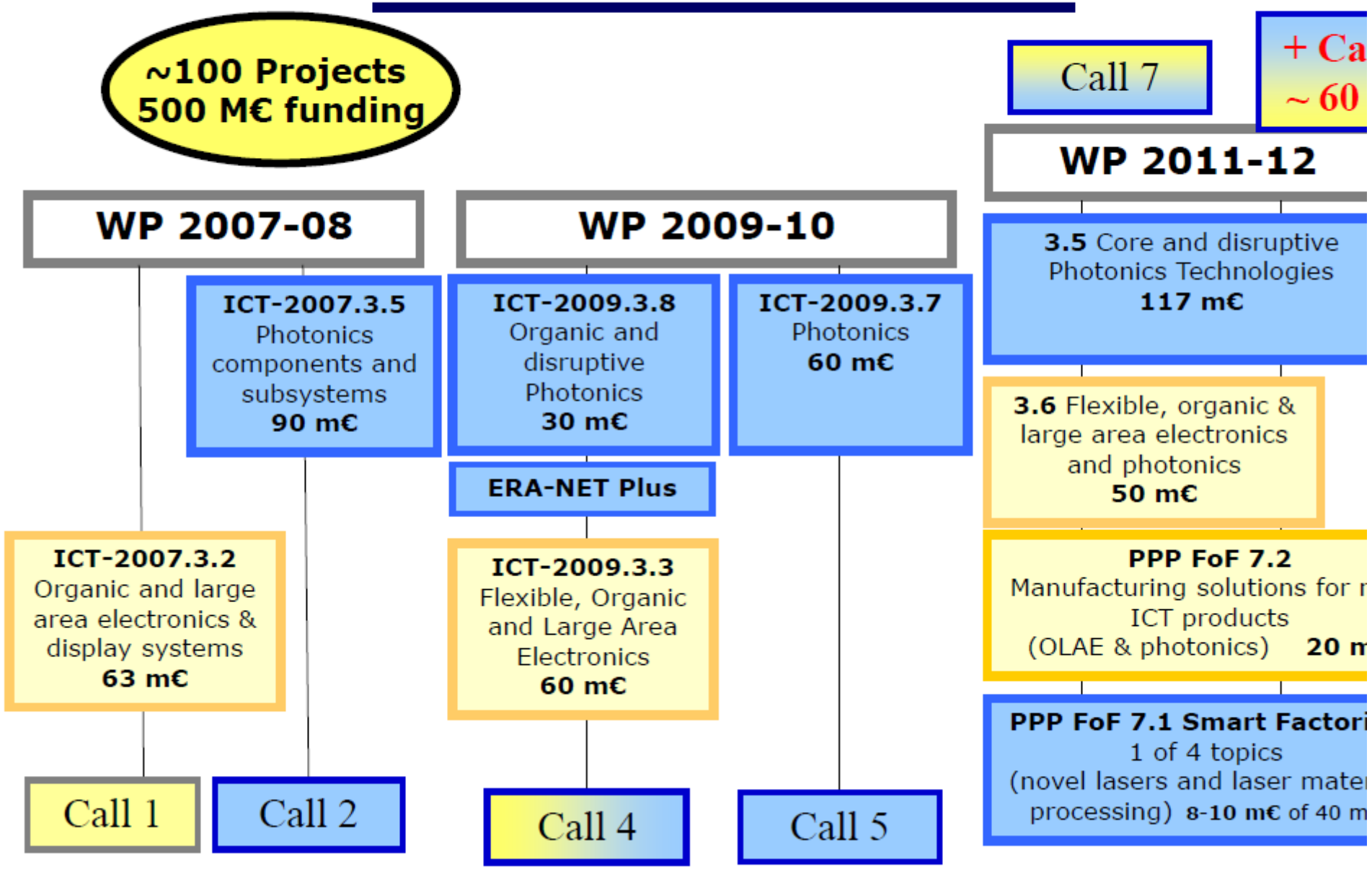
Manufactur

Organic Photovoltaics

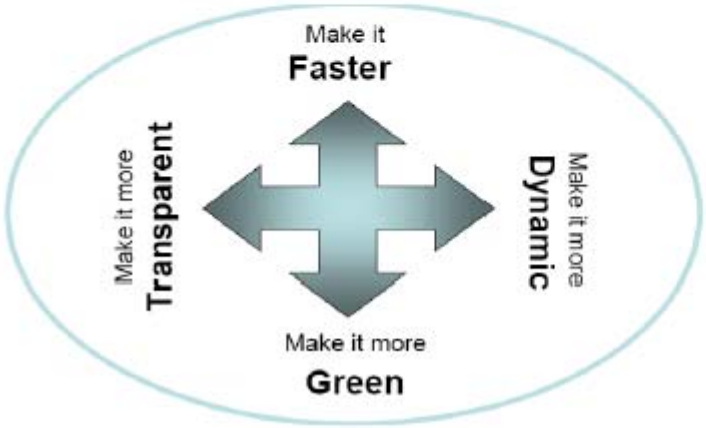
Biophotonics

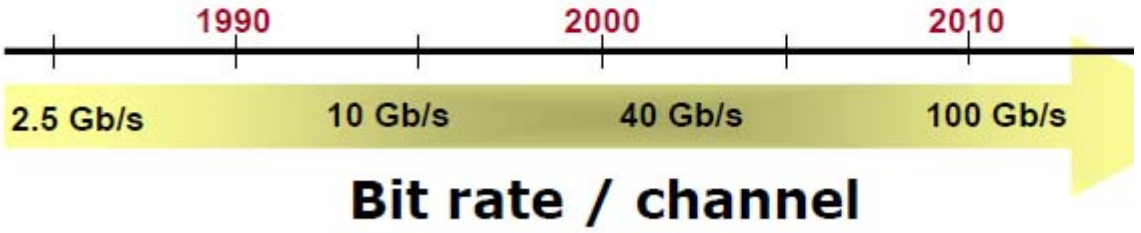


European funding in Photonics & OLAE under FP7-ICT



Optical Communications





SEVENTH FRAMEWORK PROGRAMME

R&D: Towards all optical networks

- increased transmission capacity and *last-mile* optical soluti
- optical interconnects
- "Greener" networks

Digital Agenda for Europe

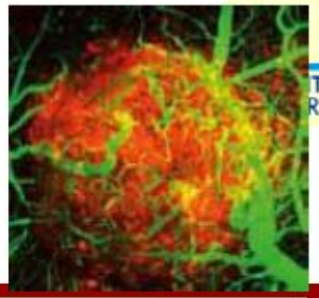
Connecting Europe Facility

Large scale Broadband Deployment

EU Targets for Internet access by 2020:

- ≥ 30 Mbps for all Europeans

Bio-photonics



Understanding, Detecting, Treating Diseases
➔high sensitivity, selectivity, resolution, depth of penetration

Light is the key to observe and understand life on a cellular level

Measures contact-free, fast, and precisely

Manipulate living cells without damaging them

Oncology: In-vivo fluorescence diagnc

Ophthalmology, sep

...

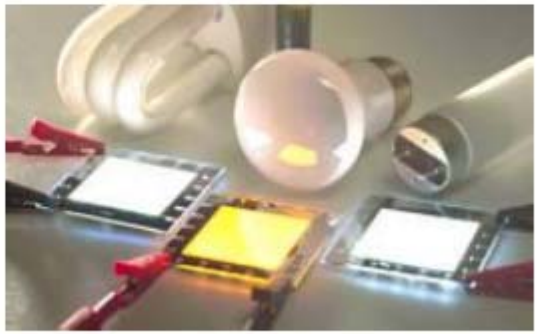
Point-of-care diagnostics
involving low cost & disposable solutions

New Drugs,

Regenerative medici

Solid State Lighting


© OSRAM Opto Semiconductors



R&D: LED & OLED

- high quality, high efficacy, high brightness, large area – large uniformity, long lifetime, reduced cost
- intelligent light management

Green Paper on Solid State Lighting

[COM(2011)889 of 15 DEC 11]

Digital Agenda for Europe

Large scale deployment of SSL in Europe

Lasers for industrial processing

Structuring nano/micro materials

Laser marking

Laser welding

Fibre-coupled diode laser

Cutting & weldir automotive comp

SEVENTH FRAMEWORK PROGRAMME

R&D priorities

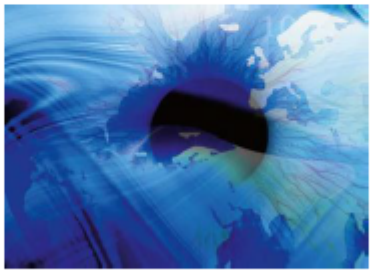
- High power lasers with improved performance in power, beam properties and efficiency
- Widely tuneable lasers with new wavelengths
- Adaptive beam shaping, reconfigurable beam delivery

Efficient, sustainable, adaptable, cost effective manufacturing in Europe

➔ Lightweight structures, energy efficiency,

Photonics Sensors for Safety & Security



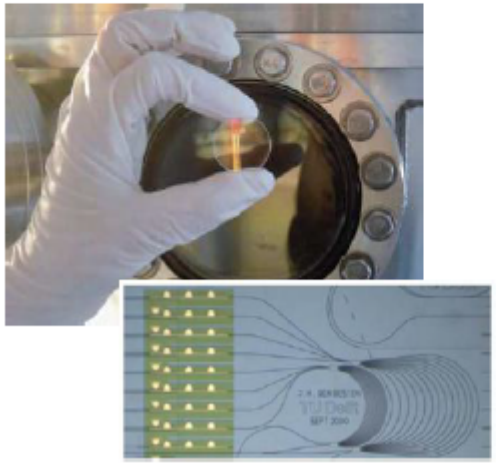



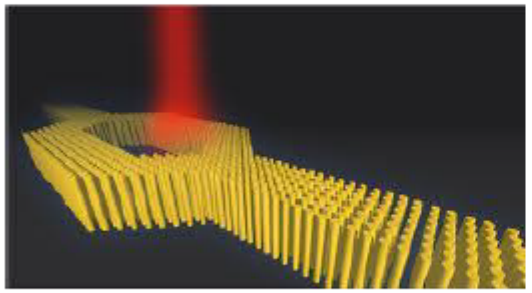
R&D priorities

- High-performance mega-pixel image sensors, single photo detectors and multi-feature detector arrays integrating sma pixel concepts
- Compact, cost effective, widely tuneable, high-performanc photonic sources

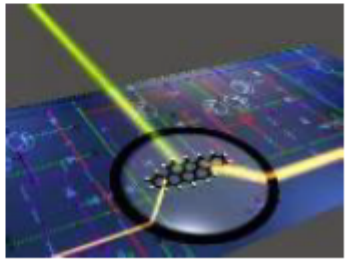
Safety and security of people, goods and physical environme

Photonic Integrated Circuits and Nanophotonics





Active plasmonics
© Kings College London



An artist view of a photonic circuit
molecular building blocks (Credit: Robe

PICs

- Integrating electronics & photonics
- Increasing integration density within different platforms
- Packaging and automation
- Power consumption, Yield, Cost

Nano-photonics

- (Meta)materials - Nano-struct
- Nano-scale Quantum optics
- All optical routing
- Scalable nano-fabrication of P
- ...

Huge opportunities for further growth!

Photonics PPP: Rationale

Strong foundation:

- Close cooperation with community and within community
- Strong and visible community (1150 companies and institutions in Photonics21)
- Industry oriented strategy

What the PPP brings:

- Formalise with a real partnership
- Long term commitment from both public and private side
- Greater impact on innovation and leverage effect on complementary sources of financing

More partnership, more commitment and more leverage!

PPP Implementation: What will a PPP mean for you?

WHAT DOES NOT CHANGE

- The financial rules are those of Horizon 2020
- Final responsibility for Work Programme stays with European Commission and is subject to comitology
- Implementation remains with the Commission: selection of proposals, negotiation, review of progress and payments

WHAT DOES CHANGE

- Long-term commitment from Commission to process and budget
- Long-term commitment by industry to invest, with a need to demonstrate its fulfilment
- Greater focus on innovation activities with economic growth and job creation as overall goal
- Evidence based and monitoring of performance ➔ KPIs and their monitoring
- Large potential to leverage financing from other sources such as structural funds and the EIB

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Photonic will Impact Most Areas of our Lives

- **Future internet infrastructure**, high speed fiber networks with multi-terabit capacity are backbone for web 2.0 & 3.0 products & internet of things
- **New laser-based manufacturing processes** will allow mass customization, rapid manufacturing and zero-fault production
- **New approaches in healthcare** moving from cost-intensive treatment after onset, to detection and prevention of disease at earliest possible stage
- **Intelligent lighting** based on LEDs, OLEDs, sensor networks and microprocessor management provides lowest energy consumption
- **Organic (hybrid) photovoltaics** and digital lighting control systems enable 'energy-positive' buildings
- **Photonic sensing and imaging** can monitor production processes, control power consumption and enable higher levels of security and safety
- **Integrated Components & Systems** are decisive for developing smart technologies for cost-effective manufacturing

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How Photonics can contribute to a more Sustainable Economy

- **Eco Efficient Design**
  - Light weight construction – laser processing
  - Material savings – precision laser cutting

- **Eco Efficient Products**
  - Solid State Lighting
  - Optical Fiber Network
  - Organic Photovoltaics

- **Eco Efficient Production**
  - Environmental monitoring – smart sensors
  - Enhanced safety and security – smart sensors

- **Eco Efficient Materials**
  - Organic electronics
  - Nano structured materials

An industry-compatible technology supply chain is a great research tool and facilitates innovation with companies

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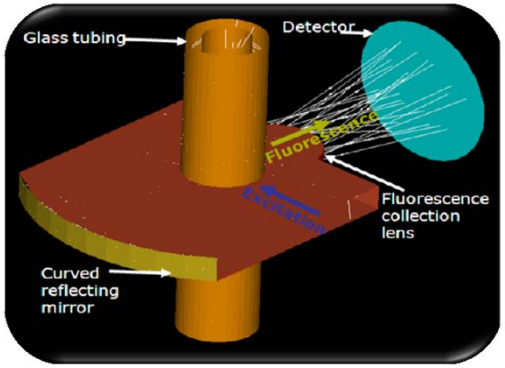
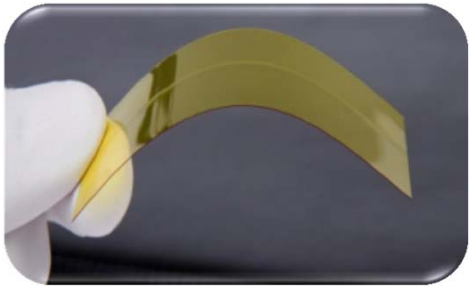
Optical Measurement and Characterization

Mastering and Prototyping Technologies

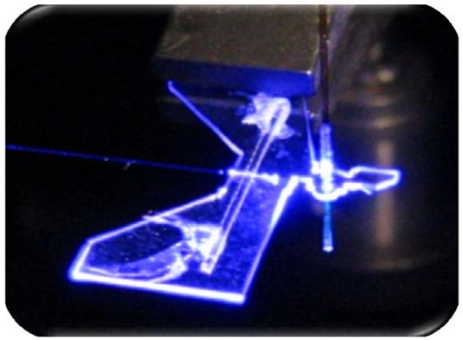
Low-Cost Low-Volume Replication



Optical Modelling



Advanced Materials



Demonstrators and Prototypes

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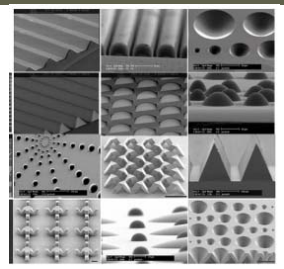
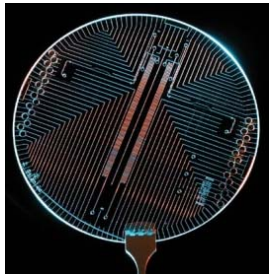
Soon we will open...
VUB-B-PHOT's innovation centre

B-PHOT verkreeg zijn zware infrastructuur in open competitie met andere universiteiten (3.000.000 Euro in 2010)

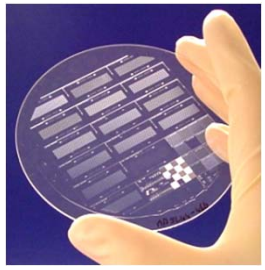
B-PHOT heeft onlangs in open competitie met andere groepen 3M Euro aan zware infrastructuur binnengehaald voor de aanschaf van een high-tech prototypeerlijn



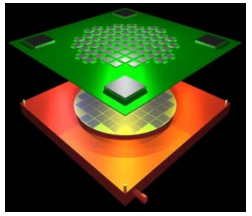
Micro- Nano structuring



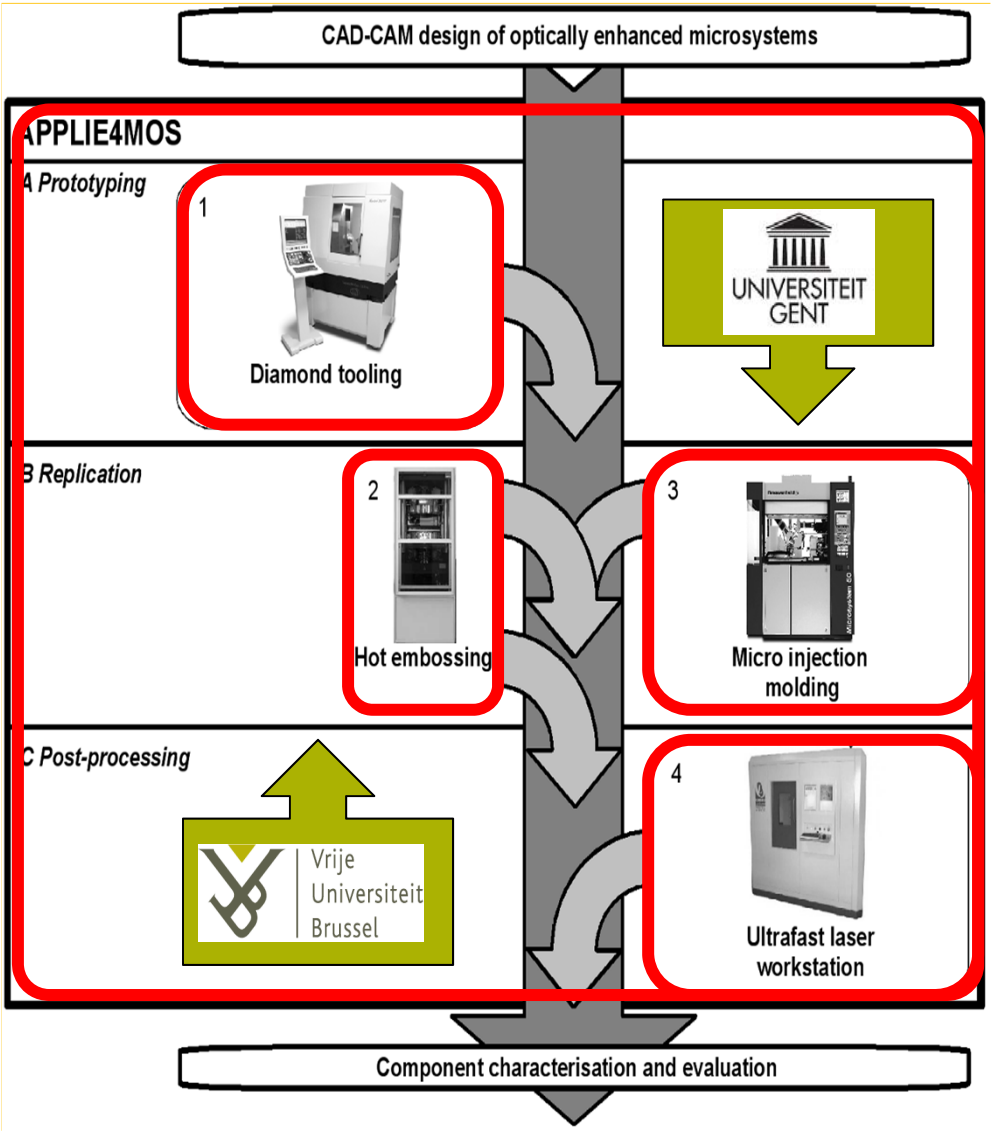
Wafer-scale fabrication



Wafer-scale replication
2 ½ D

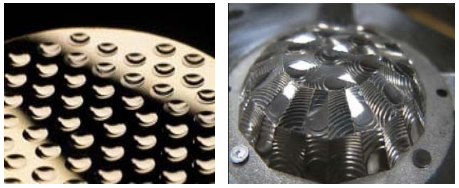


Wafer-scale
heterogeneous integration

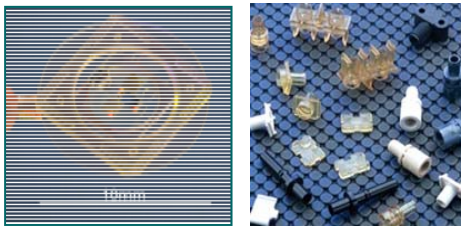


Compatibility with mass-manufacturing technologies is essential in support of closing the innovation gap

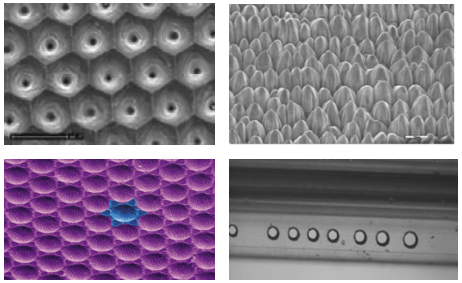
Freeform 3-D microoptics and components



Freeform 3D metal micromolds



3D polymer microparts mass manufacturable



Non contact
surface texturing and post processing

PHOTONICS 21

Photonics21 Executive Board

President: To be elected soon

Vice Presidents:
Giorgio Anania, Chairman Cube Optics
Jaap Lombaers, Managing Director Holst Center, TNO
Malgorzata Kujawinska, Warsaw University of Technology
Bernd Schulte, COO Aixtron

Work Group Chairs:

Information & Communication	Industrial Production/ Manufacturing & Quality	Life Science & Health	Emerging Lightin Electronics & Displays
Alfredo Viglienzoni, Head New Business Development, Product Area IP & Broadband Ericsson	Eckhard Meiners, CEO Trumpf Laser Marking Systems	Stefan Trager, Vice President Life Science Division, Leica Microsystems	Klaas Veg CTO Philips L

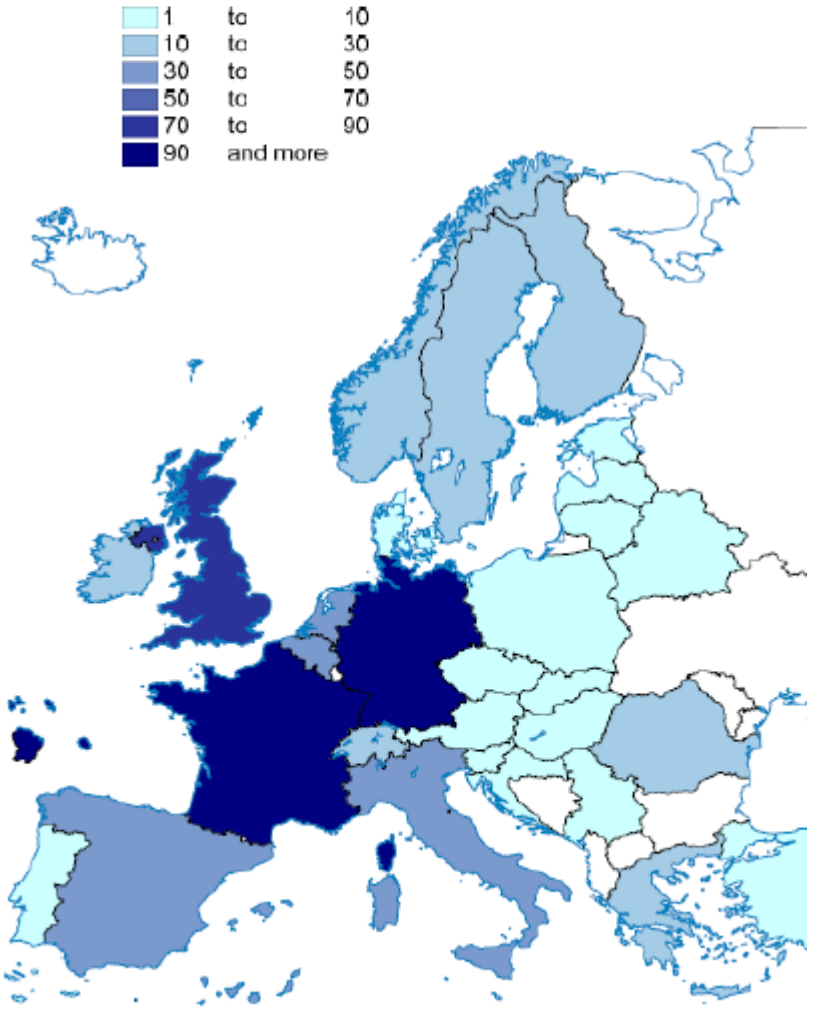
Security, Metrology & Sensors	Design & Manufacturing of Components & Systems	Photonics Research , Education & Training
Peter Seitz, Managing Director Hamamatsu Photonics –	Mike Wale, Director Active Products Research Oclaro	Roberta Ramponi, Professor Politecnico di Milano

PHOTONICS 21

Our Members - Representatives from Industry, Academia and Politics

Photonics21 members represent leading photonics stakeholders along the whole economic value chain throughout Europe.

- More than 2000 members from all the EU countries
- Broad, representative membership composition
  - University, science and industry-associations
  - Multiple markets (telecommunication, lighting, manufacturing, health)
  - Throughout the value-chain (components-systems)
  - Most main industrial companies



PHOTONICS 21

Our Core – The Photonics21 Work Groups & Workshops

Our target:

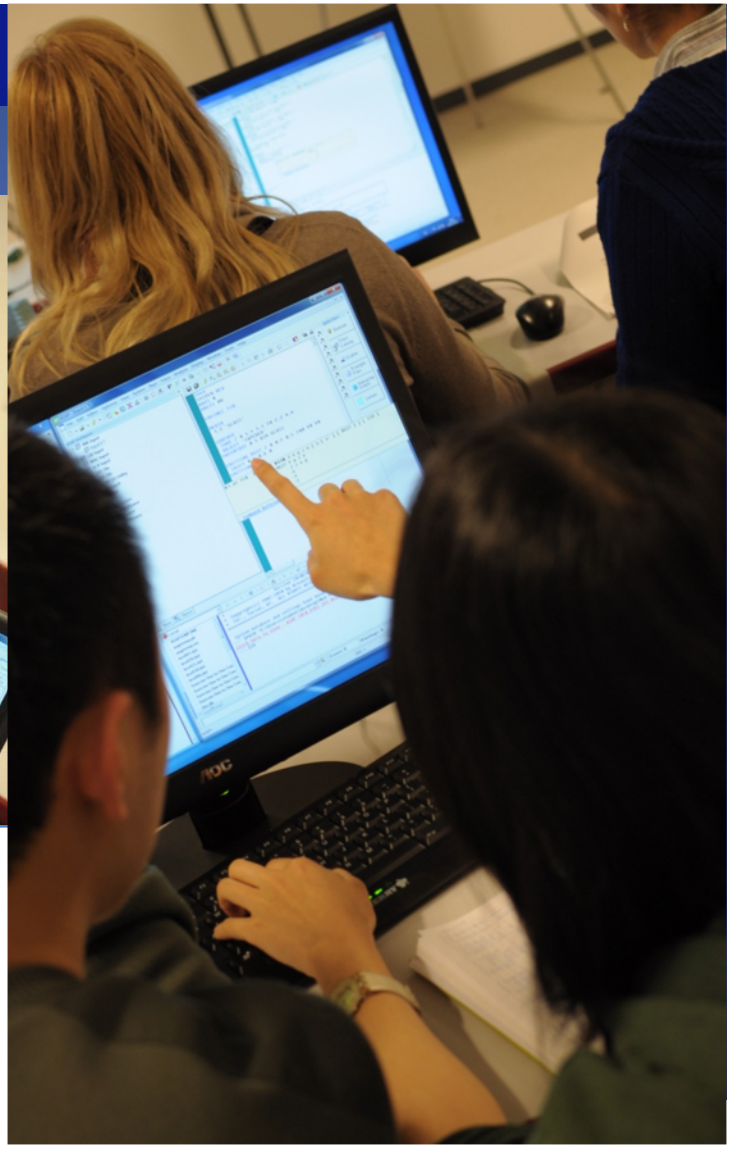
- Discuss & agree about photonics research and innovation topics and priorities as well as on political recommendations
- Provide input to the European Commission's Framework Programme & the different work programmes by updating the Photonics21 Strategic Research & Innovation Agenda and the Vision Papers
- Provide networking opportunities for the European photonics community

Our set up

The seven Photonics21 Work Groups focus on photonics application areas (1-4) & on cross-sectoral issues (5-7):

- ▶Work Group 1: Information & Communication
- ▶Work Group 2: Industrial Manufacturing & Quality
- ▶Work Group 3: Life Science & Health
- ▶Work Group 4: Emerging Lighting, Electronics & Displays
- ▶Work Group 5: Security, Metrology and Sensors
- ▶Work Group 6: Design & Manufacturing of Components & Systems
- ▶Work Group 7: Photonics Research, Education & Training

Technology coaching at EU level to inspire industrial innovation



SMETHODS stands for SMEs Training and Hands-on Practice in Optical Design and Simulation. We organize 5-day hands-on training sessions in four different domains

- Imaging Optics
- Non-imaging Optics
- Wave Optical design
- Diffractive Optics

SMETHODS

SMETHODS teams up 7 European academic institutions that are leaders in optical design to provide top-experts as instructors for the different course modules.

Thanks to the support of the EU we can provide these training sessions for free!

TU Delft

Vrije Universiteit Brussel

ITMO

INSTITUT d'OPTIQUE GRADUATE SCHOOL

POLITÉCNICA

UNIVERSITY OF EASTERN FINLAND

Access to
Micro-Optics
Expertise,
Services &
Technologies

WWW.ACTMOST.EU

Some examples of photonics innovation show-stoppers for European companies

in-house experts
and photonics expertise
are missing

supporting an
in-house R&D team
is too expensive

identifying external experts
is often
a shot in the dark

dedicated task forces
for photonic solutions
are almost nonexistent

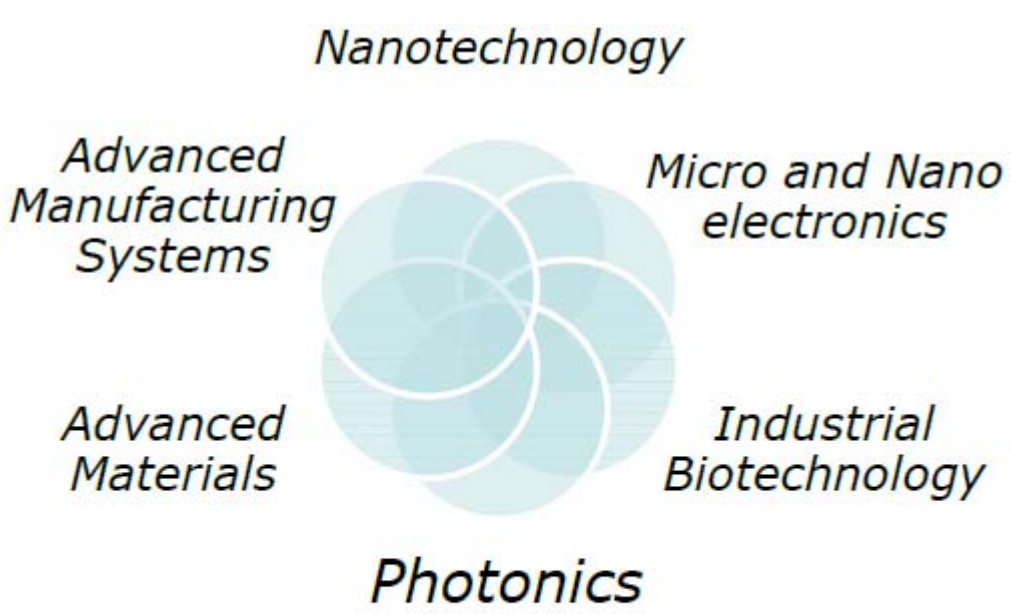
in-house cutting-edge
photonics technology
is missing

investment risk
is too high or
financially irresponsible

multiple-stop technology
shopping fails
partial solutions
are often incompatible

single-stop shop
technology supply chains
are almost nonexistent

Key Enabling Technologies (KETs)



Strategic along the value chain

Any region can find its particular niche

Building upon existing assets & linking into European value chains

Analysing the whole value chain – upstream & downstream including all its actors

Enhancing regional eco-systems (clusters)

PHOTONICS 21

Photonics – the Technology of the Harnessing of Light

Photonics comprises the

- **generation**
- **amplification**
- **transmission**
- **modulation**
- **detection**

of light

Lighting
(LEDs, displays)

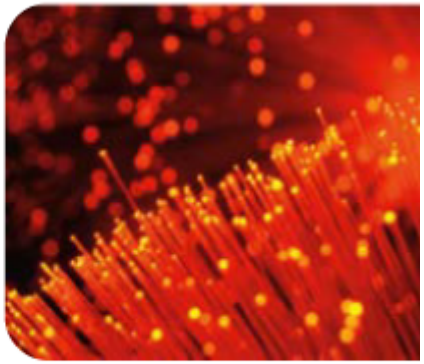
Manufacturing
(high power lasers)

Telecommunication
(fibers, components, systems)

Medicine
(lasers, microscopes)

Sensor technology
(optical sensors)

LED light bulb



glass fibers

Photonics bears the same relationship to light and photons as electronics does to electricity and electrons.

PHOTONICS 21

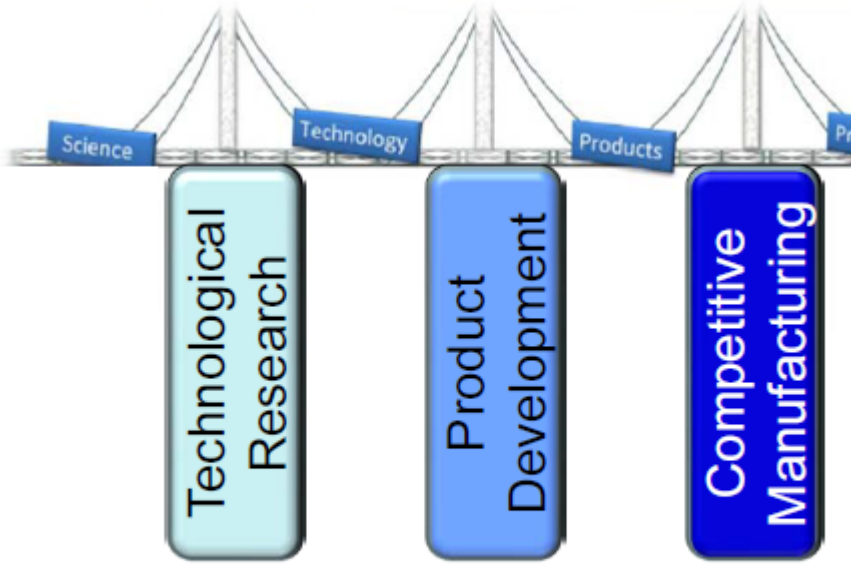
Final KET Report: It is all About Overcoming the Valley of Death

Key messages:

- KETs are crucial to sustainable European economic growth
- Europe is failing in efforts to turn science into products, market share and jobs
- Refocus and rebalancing of EC Research and Innovation budget necessary

A three pillar approach to bridge the valley of death:

- From basic science to technology
- From technology to products
- From products to large scale production



According to: High Level Expert Group on Key Enabling Technologies – Final Report, July 2011

PHOTONICS 21

Young People Excellence – The Photonics21 Student Innovation Awar

Four times Photoncis21 has awarded young people for Excellent Research

Our Targets

- Honor excellent photonics research with a high industrial impact
- Promote photonics training & education within Europe
- Motivate and engage young people for photonics
- Draw attention from industry to young talents

PHOTONICS 21

Photoncis21: Our Milestones towards Horizon 2020

- Photonics21 input implemented into strategic documents
- Meetings with European Commission and Parlamentarians

Vision Document

April

Leverage Study

May

Final KET Report

June

Ph21 PPP-Proposal

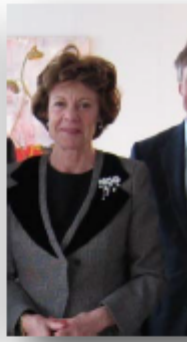
June

Green Paper Horizon 2020

July

Parlamentarian **Luncheon** Event

September



Meeting Neelie Kr

March

3 Executive Board subgroups to work out details of P
strategic objectives - industry commitment - governan

Towards Horizon 2020

2011 2013

PHOTONICS 21

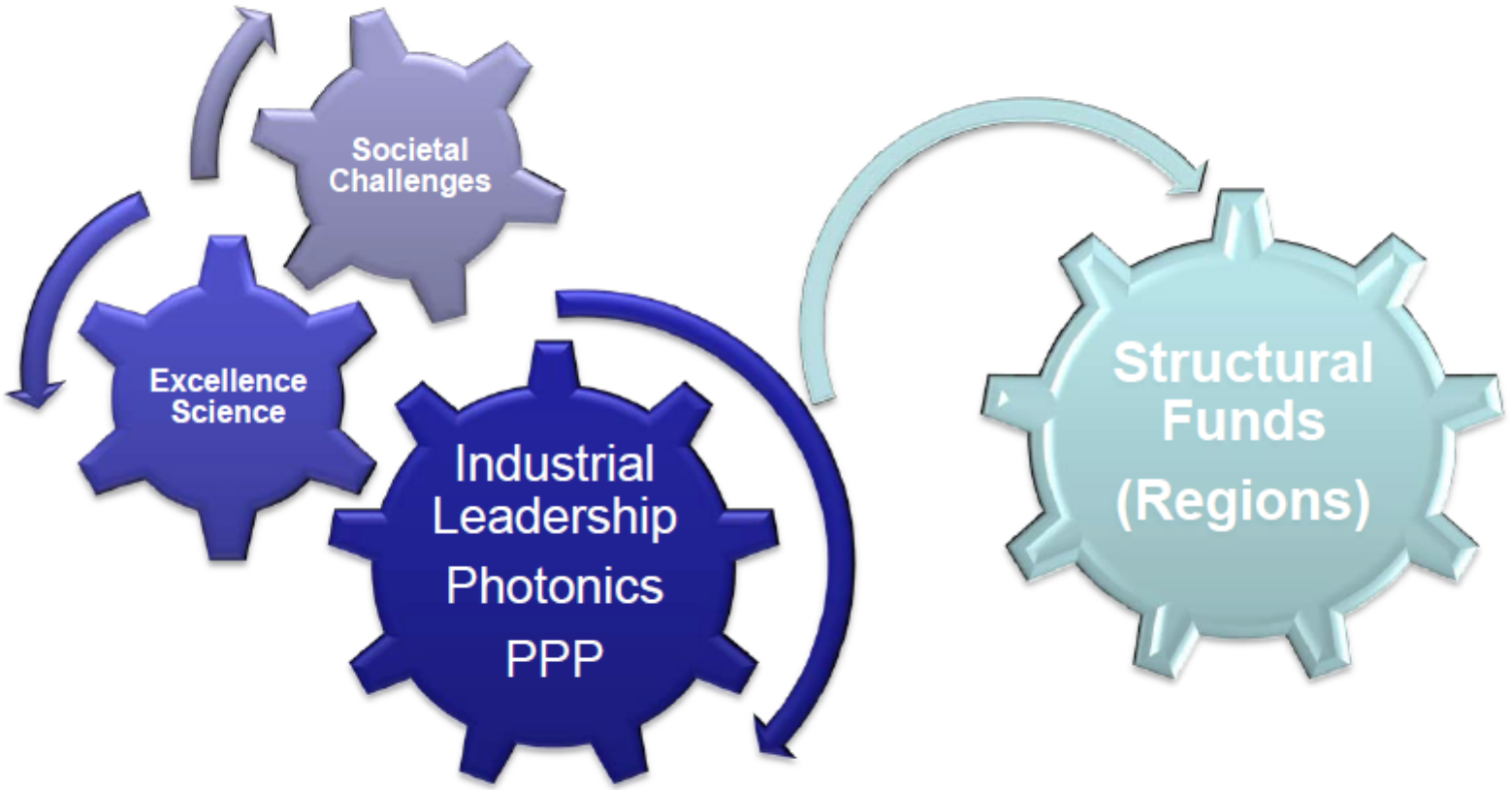
Horizon2020: Our Recommendations and Input

Our input ⟶ in Horizon2020

- **Focus**: Clear priorities for „Key Enabling Technologies“ ✓
- **Speed to market**: Inclusion of the entire value chain ✓
- **Simplification:** Reduced administrative burdens ✓
- **Know-How:** Highly skilled workforce ✓
- **Critical mass:** Funding budget that makes a difference
- **Innovators:** Access to venture capital & SME support ✓

PHOTONICS 21

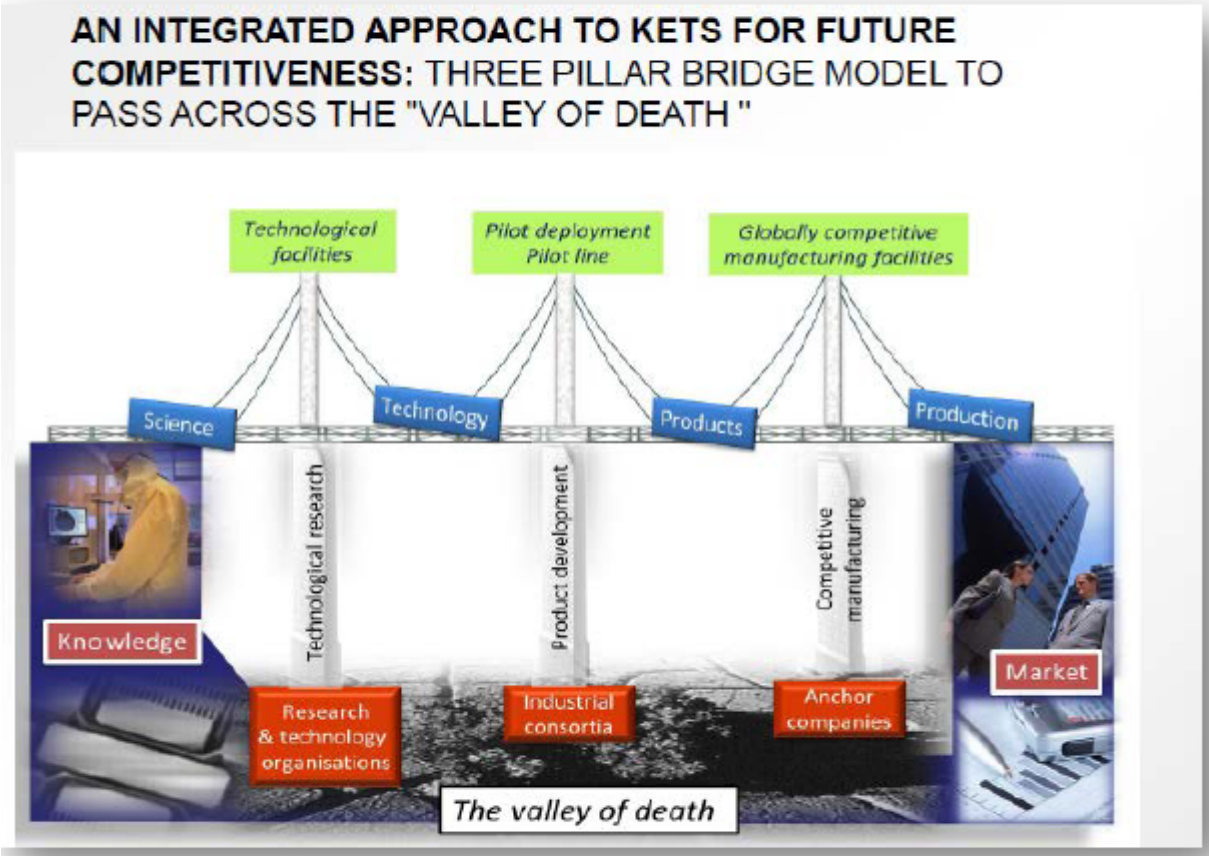
A Photonics PPP – Our Hub for reaching out to EU Programmes



- Photonics PPP aims to be the platform to reach out to multiple sources
- Make Photonic a dedicated priority in European funding programs
- Allow the combination of EU funding programmes and Initiatives

PHOTONICS 21

Analysis: What it is all about – Overcoming the „Valley of Death“



Source: High Level Expert Group on Key Enabling Technologies – Final Report, July 2011

Analysis

- Europe has an excellent resea base
- Europe lags ability to quickly tu inventions into innovations
- Only marketable products will create jobs and wealth

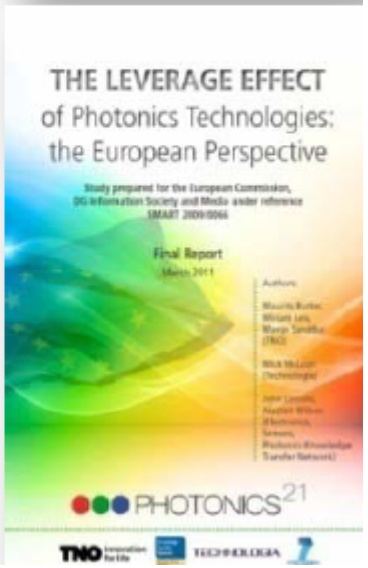
Integrated Approach

- Cover the full innovation chain
- Addressing basic and applied research, demonstrators, standardization measures, deployment and market acces
- All at the same time
- Significantly
- In a logical joined-up manner.

PHOTONICS 21

Photonics – A Key Enabling Technology with Enormous Economic Potenti

- The current global photonics market is estimated to be €300 billion. Europe's share is ~ €60 billion - representing 20% of the total market.
- The European photonics industry has many market-leading industrial players and more than 5000 highly innovative SMEs.
- Photonics employs ~ 300,000 employees directly, with subcontractors employing many more.
- Between 2005 and 2008 this rapid growth resulted in more than 40,000 new jobs being created in Europe
- The estimated annual growth rate is ~ 8-10%. – estimated market size in 2015 is ~ € 480 bn according the KET-Report
- A EU commissioned study "The Leverage Effect of Photonics Technologies" estimates, that photonics positively impacts 10 % of the European economy
- Photonics contributes to the solution of many societal challenges like ageing society, energy efficiency and the knowledge society



PHOTONICS 21

Photonics – A Key Enabling Technology of Europe with enormous economic potential

Economic Potential of Photonics:

- Photonics global market estimated to be € 300 billion, Europe has an overall share of 20%
- Photonics companies employ 290000 people in Europe, sector is largely based on SME
- A EU commissioned study "The Leverage Effect of Photonics Technologies" estimates, that photonics positively impacts 10 % of the European economy
- Photonics contributes to the solution of many societal challenges like ageing society, energy efficiency, knowledge society

In 2009 Photonics was recognized as a Key Enabling Technologies of Europe and is part of the European Commission's KET initiative

PHOTONICS 21

Our Members - Representatives from Industry, Academia and Politics

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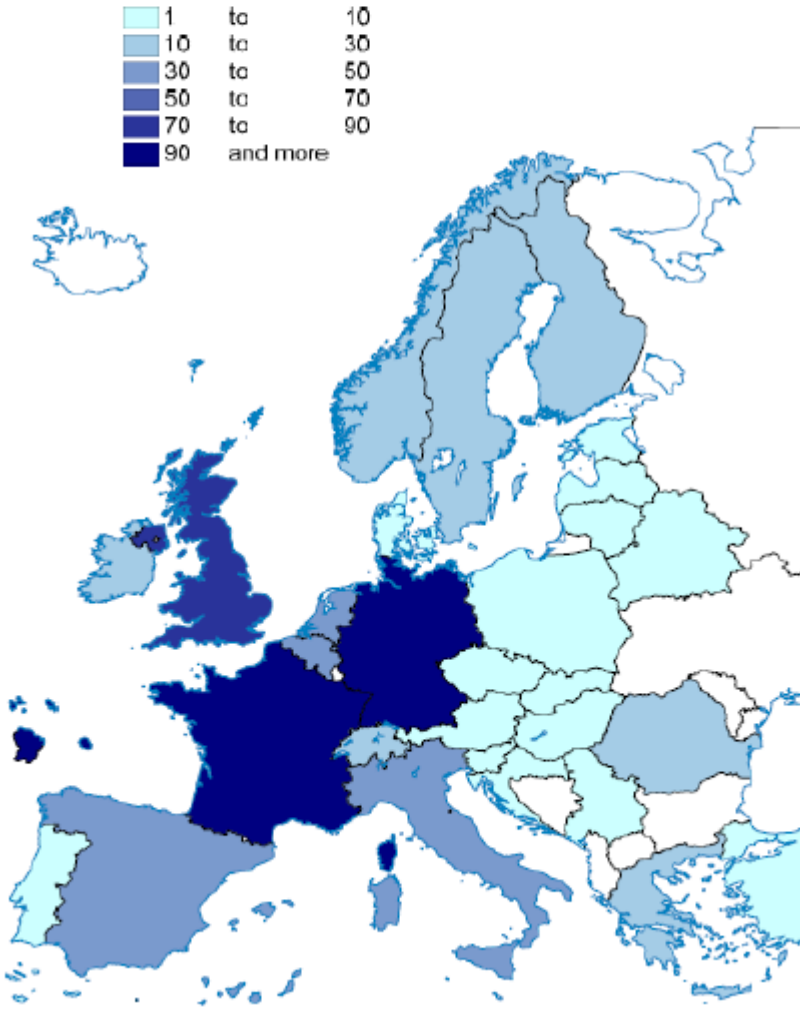

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Laser assisted industrial food-sorting, quality and safety control, and plastic recycling

BEST n.v.
Belgian Electronic Sorting Technology

IVT

Low-cost plastic fiber connectors for Fiber-To-The-Home

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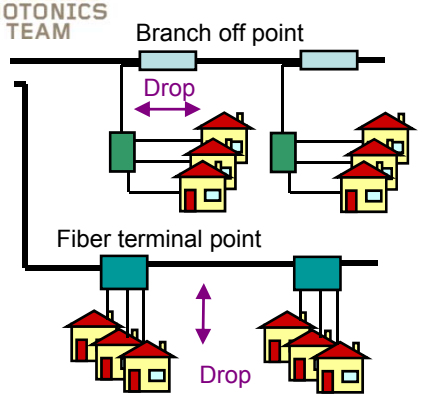
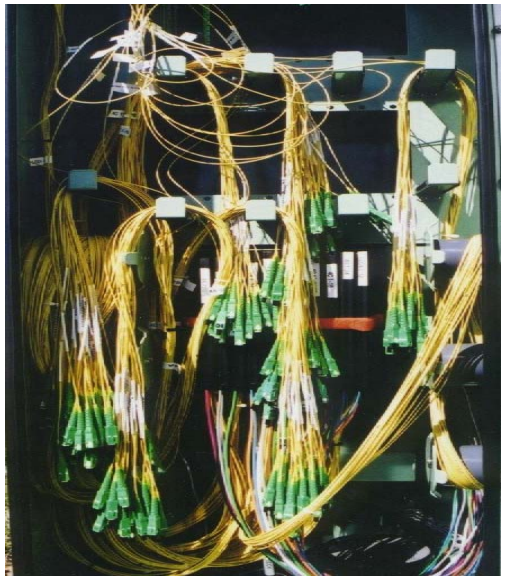
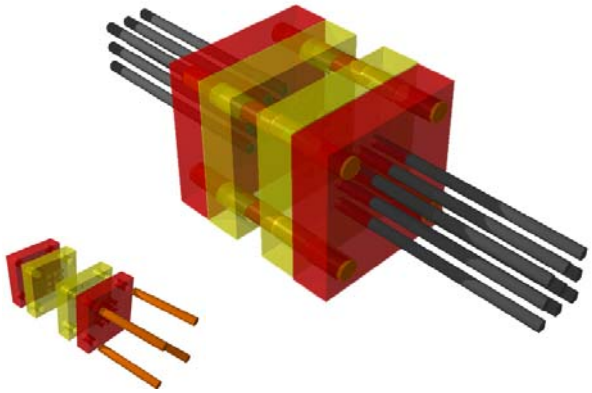
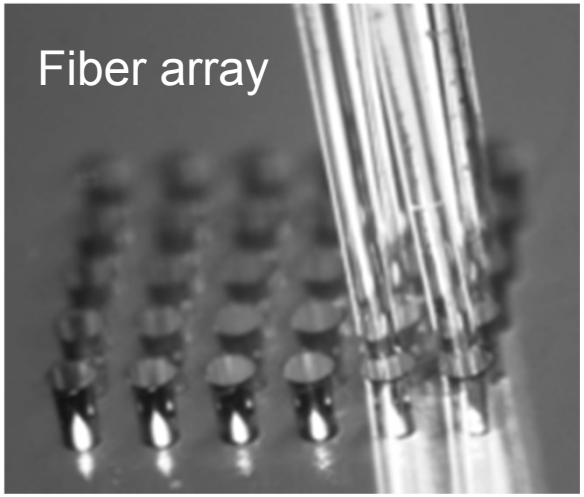
TE connectivity



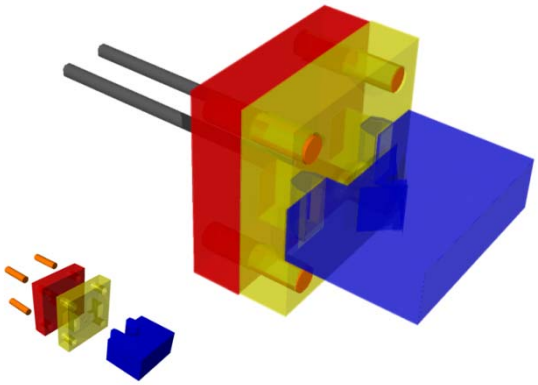




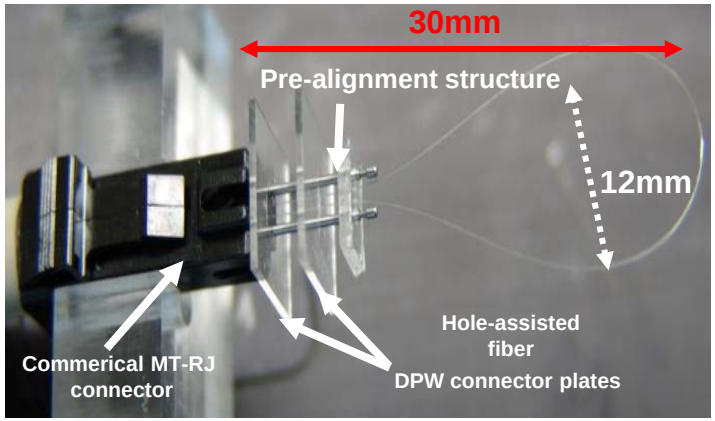
2-D SM fiber array connector



Diameter accuracy = 1.2μm
Positioning accuracy = 0.6μm
Average losses = 0.15dB @ 1550nm



180° butt-coupling connector



Development of a high-resolution 1200 dpi print engine

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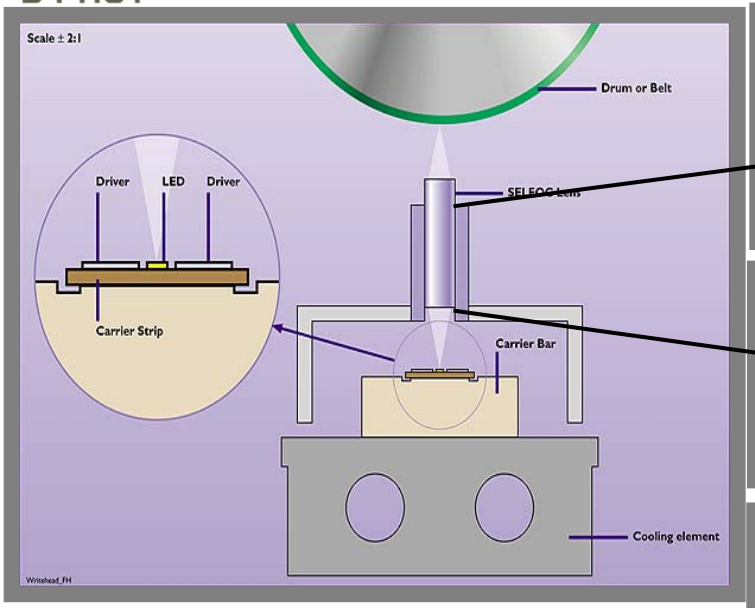
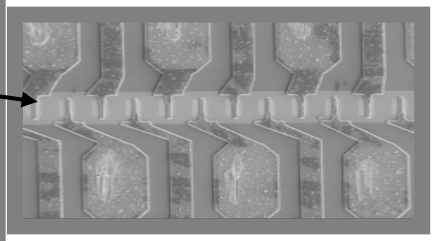
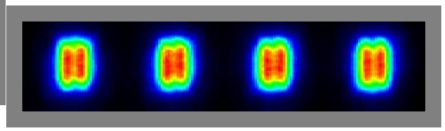
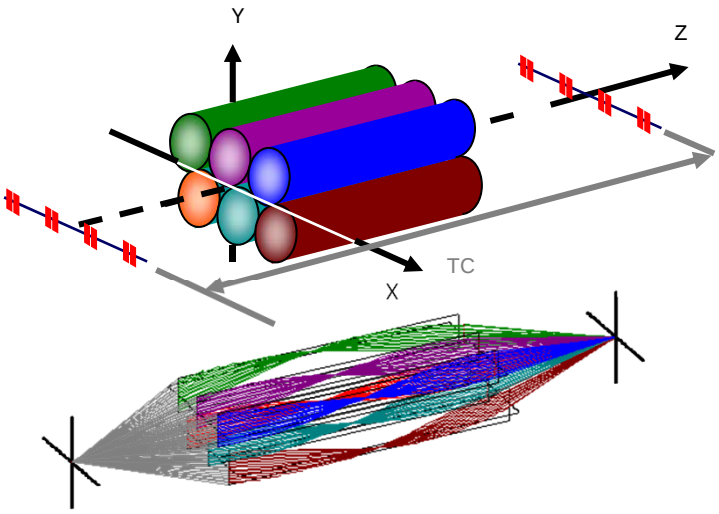
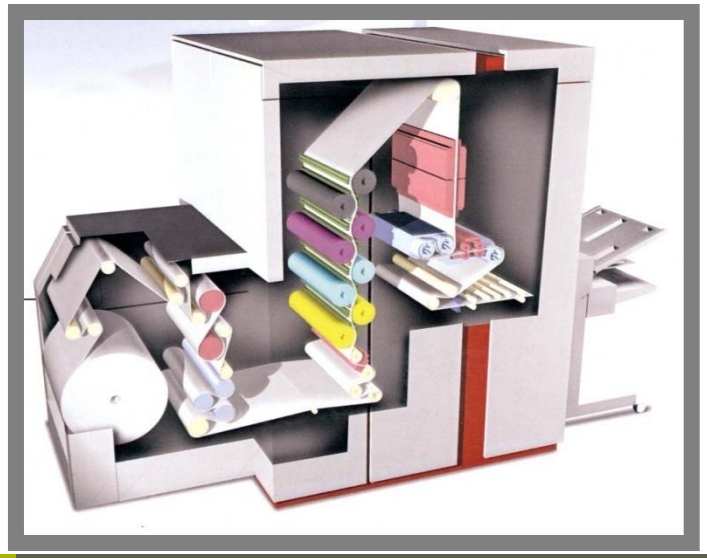
PUNCH graphix











150 MBit/s POF datacom transceiver for the automotive

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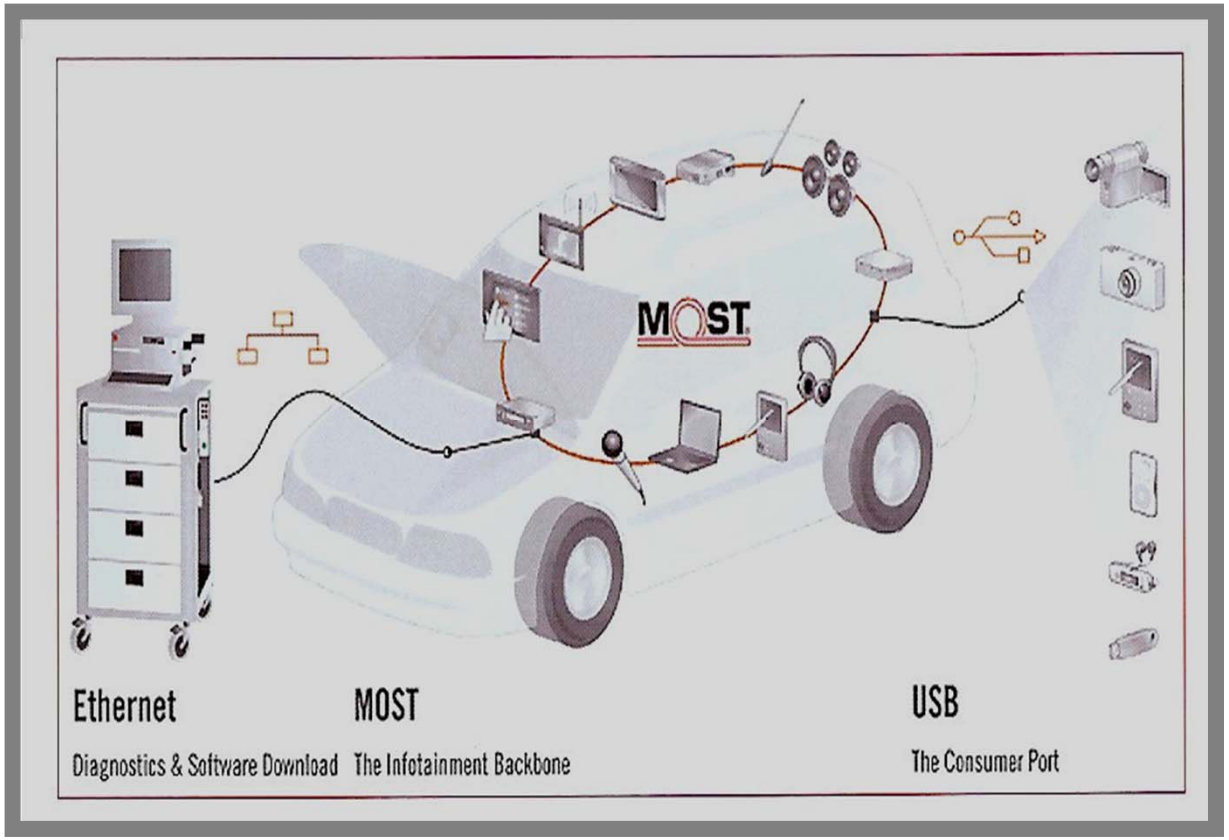
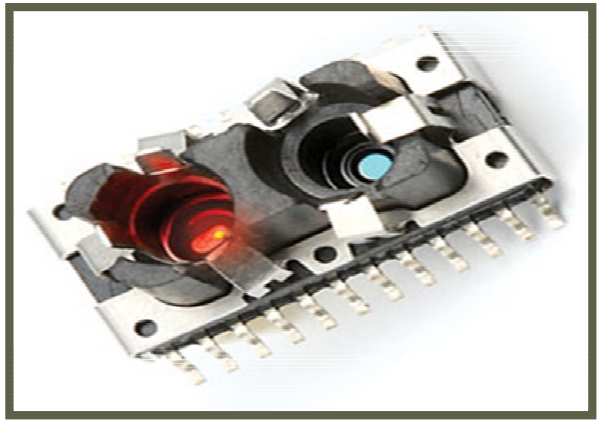
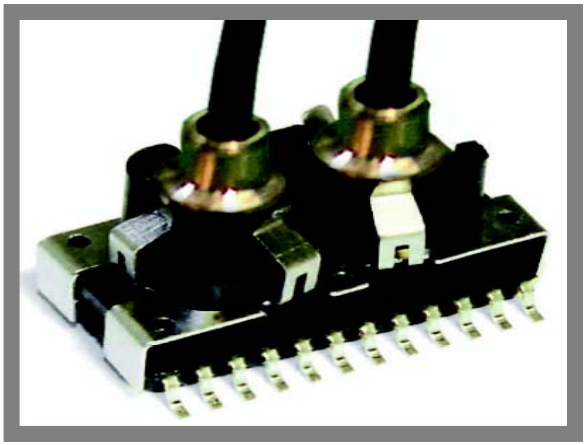
Melexis Microelectronic Integrated Systems

Power budget, tolerancing analysis, automotive specs.







(Product release MLX75605)

High-end LED-walls for visual performance

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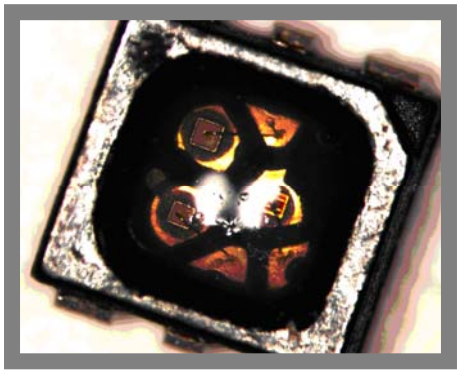
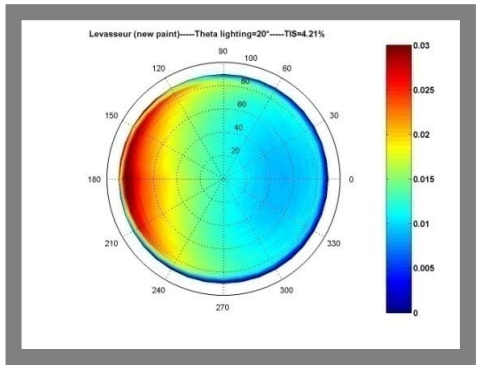
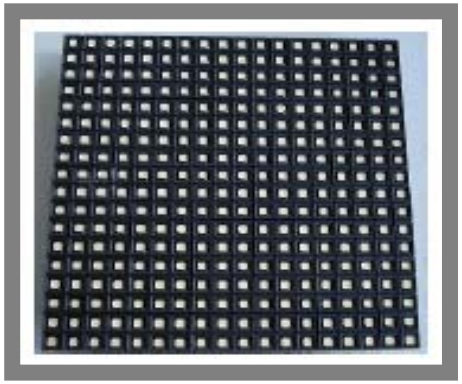
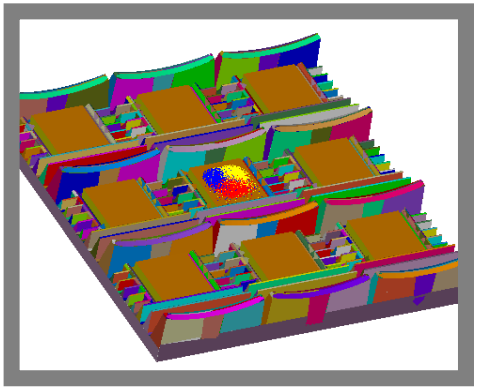
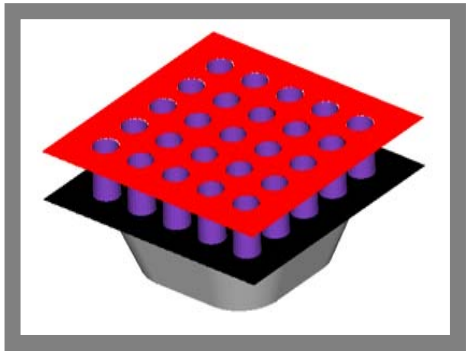
BARCO
Visibly yours

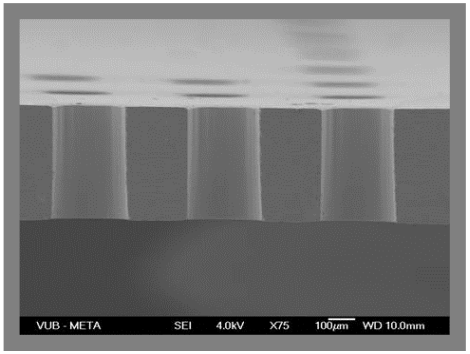












Freeform optics for LED-based luminaires

B-PHOT
BRUSSELS PHOTONICS TEAM

PHILIPS
sense and simplicity