Photonics
a key enabling technology
– towards H2020 –

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Photonics in H2020 - Outline

- **Facts and figures about photonics**
- **Photonics public-private partnership (PPP)**
- **Photonics in H2020**

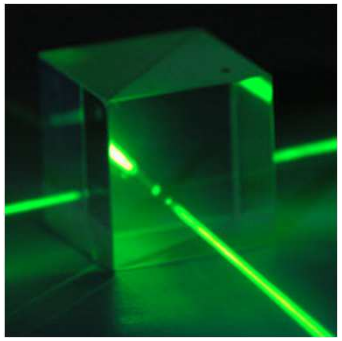
Photonics: Some figures

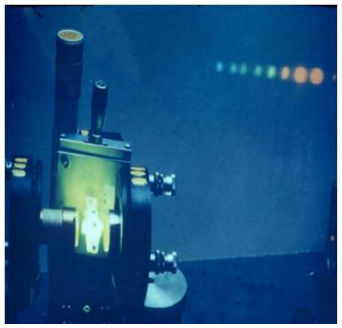
- **Photonics global market: ~300B€**
- **European overall total share: 20% (in some sectors, e.g. lighting, up to 40% share)**
- **Direct employment in Europe: 290,000 jobs**
- **5000 SMEs in Europe**
- **Compound annual growth rate: 8%**
- **Photonics leverage in Europe: 20-30% of the economy and 10% of the workforce depend on photonics**

http://ec.europa.eu/enterprise/sectors/ict/files/kets/photonics_final_en.pdf

Photonics is everywhere

- Communications
- Health
- Materials processing
- Industrial production
- Lighting
- Photovoltaics
- Consumer products (DVD players, mobile phones…)





European KETs
(Key Enabling Technologies)

- **Industrial Biotechnology**
- **Micro & Nanoelectronics**
- **Advanced Manufacturing**
- **Advanced Materials**
- **Nanotechnology**
- **Photonics**

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 30.09.2009
COM(2009) 512 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

"Preparing for our future: Developing a common strategy for key enabling technologies in the EU"

{SEC(2009) 1257}

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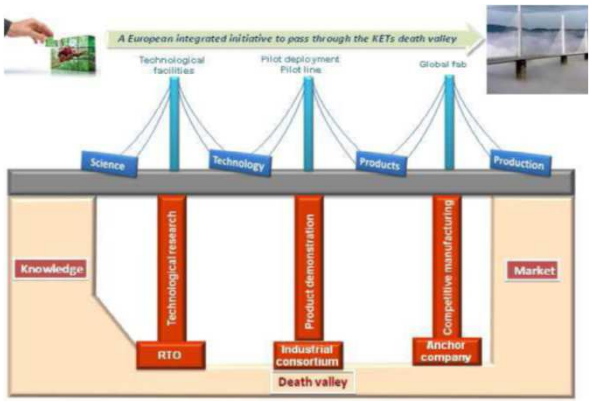
Photonics in H2020:
A Public-Private Partnership (PPP)

Major objectives:

- Address the full innovation and value chain
- Forge strategic alliances across the full value chain
- Bridge the valley of death



The dual challenge to address for Europe is to both *lead in photonics technology innovation* and to *exploit the results* through successful commercialisation

Photonics PPP:
What does it mean for you?

- **What does NOT change?**
  - Rules for participation (H2020)
  - Work programme definition by the EC and subject to committology
  - Implementation remains with the EC (proposal selection, negotiation, progress review and payments)

Photonics PPP:
What does it mean for you?

- **What changes?**
  - Long-term commitment from the EC
  - Long-term commitment from industry to invest and demonstrate
  - KPIs and their monitoring
  - The definitions of the RDI priorities for the work programmes of H2020

Industry commits to a 4-fold leverage of public funding to achieve a total investment of 7B€ (1.4B€ public + 5.6B€ private)

Photonics PPP:
Main activities

- **Disruptive and roadmap-based core photonic technologies**
- **Demonstration**
- **Photonics manufacturing platforms**
- **Innovative photonics SMEs**
- **Strengthening photonics foundations**

Roadmap-based and disruptive technologies

- **Roadmap-based research to drive development and innovation in strategic areas (e.g. areas identified in the photonics21 working groups). Emphasis on broad collaboration across the value chain**
- **Breakthrough advances in nanophotonics, quantum information, etc., pursued complementing roadmap-based research in support of future European leadership**

Demonstration

- **Deployment programmes to demonstrate social innovation**
- **Provide the European photonics industry with a first-mover advantage in the global market**

Photonics manufacturing platforms

- **Improve photonics manufacturing infrastructure in Europe**
- **Make best use of existing excellence in research institutes to support industry, especially innovative SMEs**
- **Establish pilot production facilities with joint involvement of industry and research institutes**

Innovative photonics SMEs

- **Establish a fast-track funding vehicle for SMEs within the Photonics PPP**
- **Increase synergies with and among regional innovation clusters**

Strengthening foundations

- **Supporting measures on:**
  - Education
  - Training and skills development
  - Standardisation
  - International cooperation
  - Outreach

The Photonics21 multiannual strategic roadmap 2014-2020

- **Document arises from the photonics community (more than 300 experts involved), in preparation of H2020 and the photonics PPP**
- **Contributions and participation open to all interested parties**

http://www.photonics21.org/download/Brochures/Photonics_Roadmap_final_lowres.pdf

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Horizon 2020
R&I in the EU: 2014-2020

EC proposal: 80 B€

SEVENTH FRAMEWORK PROGRAMME

cip

eit European Institute of Innovation & Technology

Horizon 2020

- **Societal challenges**
  Health & Ageing, Energy, Transport, Resource Efficiency, Climate Challenge, ..
- **Industrial Leadership**
  Leadership in Enabling Technologies (ICT, Nanotechnology materials, Biotechnology, Production Technologies, ..)
- **Excellent Science**
  ERC, Marie Curie actions, FETs, Research infrastructures

Photonics

http://ec.europa.eu/research/horizon2020

H2020: What's new?

- **A single programme (FP7 + CIP + EIT)**
- **Strong focus on societal challenges**
- **More innovation**
  - Reach out to non-traditional actors
  - More risk taking
  - Additional support for high-tech SMEs
- **Overall budget ~70B€**

Centre of gravity for ICT (and photonics) is in the LEIT (Leadership in Enabling and Industrial Technologies) pillar

http://ec.europa.eu/research/horizon2020

ICT


ICT 4 b€?
Excellent Science
Industrial leadership
ICT 8 b€?
Societal challenges
ICT 4 b€?

Leadership in enabling & Industrial Technologies

Creating Industrial Leadership & Competitive Frameworks

Leadership in enabling and industrial technologies — 13.8 B€

- **ICT** — 8 B€
  - A new generation of components and systems
  - Next generation computing
  - Future Internet
  - Content technologies and information management
  - Advanced interfaces and robots
- Micro- and nano-electronics and photonics → 1.6 B€
- Nanotechnologies
- Advanced Materials → 3.8 B€
- Advanced Manufacturing and Processing
- Biotechnology → 0.5 B€
- Space

~30% to cross-cutting KETs

KETS 5.9 B€

Outlook for 2014-2015: some possible R&I actions

- **Application-driven core photonics technologies for biophotonics screening of diseases, and sensing for safety and security**
- **Disruptive approaches for sensing**
- **Optical communication for data centres**
- **High-throughput laser-based manufacturing**
- **Photonic Integrated circuits technologies**

Outlook for 2014-2015: possible innovation actions

- **Development and validation of LED and OLED-based intelligent lighting systems**
- **Pilot deployment of software-defined optical networking technologies to NRENs**

Outlook for 2014-2015: possible Coord and Support actions

- Coordination and networking of photonics21 stakeholders with other relevant communities
- Information sharing among cities to promote wider uptake of SSL technologies
- Outreach and promotion of photonics to the public at large
- Open access of researchers and SMEs to advanced design, fabrication and characterization facilities
- Cooperation among photonic clusters and national technology platforms

Excellent science

- **World-class science as foundation for tomorrow's technologies, jobs and well-being**
- **Develop, attract and retain research talent**
- **Access to the best infrastructures**

ERC (Frontier research by individual teams): 13B€

FET (Collaborative research in new fields): 3B€

Marie Curie (Training and career development): 6B€

Research Infrastructures: 2.5B€

Societal challenges

- **Breakthrough solutions come from multi-disciplinary collaborations, including social sciences & humanities**
- **Promising solutions need to be tested, demonstrated and scaled up**

Health, demographic change and well-being: 8B€

Food safety, sustainable agriculture: 4B€

Secure, clean and efficient energy: 6B€

Smart, green and integrated transport: 7B€

Climate, resource efficiency and raw materials: 3B€

Inclusive, innovative and secure societies: 4B€

Summary

- **H2020 and the Photonics PPP have enhanced emphasis on growth, jobs and competitiveness, also include funding for innovation**
- **There are important changes compared to FP7. Start preparing for them now! Calls to be published on Dec 11, 2013**
- **Photonics21 is open to all relevant stakeholders: join the community and contribute to the future strategy!**