Photonics in Europe – From Science to Market
Burgdorf, 27 June 2013

EU Photonics in Horizon 2020

Bart Van Caenegem
Project Officer, Photonics Unit
DG CONNECT, European Commission
EU 2020 Strategy & Photonics

Policy actions

Key Enabling Technologies

Research & Innovation actions

Green Paper on SSL

Photonics Clusters

Photonics in Horizon 2020
Photonics R&I projects 2007-2012: 96 projects, ~355 M€

<table>
<thead>
<tr>
<th>Areas</th>
<th>Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical data Communications</td>
<td>24 IP, 20 STREPs, 1 NoE, 1 ERANET+</td>
</tr>
<tr>
<td>Lasers and Manufacturing</td>
<td>5 STREPs of which 4 from FoF PPP</td>
</tr>
<tr>
<td>Biophotonics</td>
<td>4 IPs, 11 STREPs, 1 NoE, 1 ERANET+</td>
</tr>
<tr>
<td>SSL Lighting, Displays, &amp; OPVs</td>
<td>6 IPs, 6 STREPs, 2 CIP SSL pilots</td>
</tr>
<tr>
<td>Sensors for safety &amp; security</td>
<td>1 IP, 15 STREPs</td>
</tr>
<tr>
<td>Technology Integration Platforms &amp; Nanophotonics</td>
<td>3 IPs, 6 STREPs, 2 CSA, 1 NoE</td>
</tr>
<tr>
<td>Cross-cutting Support Actions</td>
<td>Education and training, Roadmapping, Coordination between regional/national clusters, Coordination of the Photonics research constituency, Access to advanced technologies, Support to SMEs</td>
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An Overview of Calls for proposals

**ICT Obj. 10.1**
"EU-Japan research and development Cooperation"

*Photonics: 1,5M€ of 9M€
One STREP (Optical communications)*

**PPP FoF Obj. 7.2**
"Equipment assessment for sensor and laser based applications"

*15-20 M€ of 33.5 M€*

**ICT Obj. 3.3**
"Heterogeneous Integration of KETs"

*Photonics + OLAE: 20-25 M€ of 64 M€*

**ICT Obj. 3.4**
"Advanced computing, ... systems"

Optical interconnect in target outcome

*Photonics: Part of IP*

**ICT Obj. 3.2**
"Photonics"

*61M€*

<table>
<thead>
<tr>
<th>Call</th>
<th>DDL Date</th>
<th>Projects</th>
</tr>
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<tbody>
<tr>
<td>EU-Japan</td>
<td>29 Nov 12</td>
<td>1 project</td>
</tr>
<tr>
<td>FoF</td>
<td>4 Dec 12</td>
<td>2 projects</td>
</tr>
<tr>
<td>10</td>
<td>15 Jan 13</td>
<td>5 projects + 1 PCP project in SSL</td>
</tr>
<tr>
<td>11</td>
<td>16 Apr 13</td>
<td>20 projects</td>
</tr>
</tbody>
</table>

*projects either under negotiation or to be negotiated*
EU Photonics - Funding per country - FP7 ICT Calls 1-9
Total ~355 M€
Photonics S&T Challenges: Bio-photonics

Understanding, Preventing, Treating Diseases
- high sensitivity, selectivity, resolution, depth of penetration

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

Manipulate living cells without damaging them

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

Measure contact-free, fast, and precisely

Oncology: In-vivo fluorescence diagnosis
Ophthalmology, sepsis, ...

New Drugs, Regenerative medicine

Courtesy Kishan Dholakia / SUPA
Biophotonics funding 2007-2013

19 projects 76 M€
- 4 IPs, 13 STREPs, 1 NoE,

10 M€
- 11 proposals received. Under evaluation

15 M€
- 26 proposals received. Under evaluation

TRL
- Basic Principles Observed
- Technology Concept Formulated
- Experimental Proof of Concept
- Technology Validation in lab
- Tech valid. in relevant environment
- Demonstration in relevant environment
- Demonstration in operational environment
- System complete and qualified
- Successful mission operations

Technological Research Pillar 1
KET Pilot Line and demonstrator projects Pillar 2
Manufacturing & KET Deployment Project Pillar 3
CIP pilot actions: Biophotonics solutions for diagnosis, monitoring or treatment of disease

Funding Instrument: Pilot B – 3-4 actions for up to 10 M€ in total

Focus and outcomes:
- Demonstrate in real application settings innovative biophotonics based solutions for the diagnosis, monitoring or treatment of disease.
- Further develop, improve and assess the solutions under a sufficient range of realistic conditions and disease profiles.
- Outcome: solutions which have been evaluated by professional end-users and which demonstrated significant advantages with respect to current approaches, with the ultimate goal being their introduction into the market place.
ERANET+

15 M€ Cofunded by European Commission and Germany, Israel, Tuscany (Italy), United Kingdom, Flanders (Belgium), Catalonia (Spain), Latvia

Scope

Line A. Translation into practical applications
- primary funding line (use of the about 80 % of the available funds);
- addresses end-user-oriented industrial research projects.

Line B. Investigation on new tools or methods
- secondary funding line (use of up to 20 % of the available funds);
- smaller projects only (up to 1 M€ total costs);
- addresses projects at an early stage of industrial research.
Horizon 2020
R&I in the EU: 2014-2020

EC proposal: 80 B€

- **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

http://ec.europa.eu/research/horizon2020
Creating Industrial Leadership & Competitive Frameworks

Leadership in enabling and industrial technologies

<table>
<thead>
<tr>
<th>Category</th>
<th>Budget (B€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT</td>
<td>8</td>
</tr>
<tr>
<td>- A new generation of components and systems</td>
<td></td>
</tr>
<tr>
<td>- Next generation computing</td>
<td></td>
</tr>
<tr>
<td>- Future Internet</td>
<td></td>
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<tr>
<td>- Content technologies and information management</td>
<td></td>
</tr>
<tr>
<td>- Advanced interfaces and robots</td>
<td></td>
</tr>
<tr>
<td>- Micro- and nano-electronics and photonics</td>
<td>1.6</td>
</tr>
</tbody>
</table>

- Nanotechnologies
- Advanced Materials
- Advanced Manufacturing and Processing
- Biotechnology
- Space

~30% to cross-cutting KETs

KETS 5.9 B€
Implement Photonics in Horizon 2020 through a PPP

- The proposed Horizon 2020 legal text foresees a potential PPP for Photonics
- ~1.6 B€ foreseen for both photonics and micro- and nano-electronics
Article 19: Public-Private Partnerships

1. **Horizon 2020 may be implemented through PPPs** where all the partners concerned commit to support the development and implementation of R&I activities of strategic importance to the Union’s competitiveness and industrial leadership or to address specific societal challenges.

2. Involvement of the Union in those partnerships shall make use of the pre-existing and lean governance structures and may take one of the following forms:
   b) entering a contractual agreement between the partners ..., which specifies the objectives of the partnership, respective commitments of the partners, key performance indicators, and outputs to be delivered, including the identification of research and innovation activities that require support from Horizon 2020.

3. Public-private partnerships shall be identified in an open and transparent way based on all of the following criteria:
   a) the added value of action at Union level
   b) the scale of impact on industrial competitiveness, job creation, sustainable growth and socio-economic issues, including societal challenges
   c) the long-term commitment from all partners based on a shared vision and clearly defined objectives;
   d) the scale of the resources involved and the ability to leverage additional investments in research and innovation
   e) a clear definition of roles for each of the partners and agreed key performance indicators over the period chosen.
Photonics PPP and Horizon 2020

Major Objectives
- Address the full Innovation and Value Chain
- Strategic Alliances across the value chain
- Bridge the Valley of Death

Strategic R&I Roadmap

Materials → Equipment → Components & Devices → Integrated Systems → Products & Solutions

TRL 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9
- Basic principles obtained
- Technology concept formulated
- Experimental proof of concept
- Technology validated in lab
- Technology validated in demonstration environment
- System validated in demonstrator
- System validated in demonstrator
- System validated for industrial operations

Materials, Equipment, Componenets & Devices, Integrated Systems, Products & Solutions

R&I Ecosystems
- Academia
- Technology Suppliers
- Research Institutes
- Professional Users, End-users
- System Integrators

Brussels, 29-30 April 2013
Commitments of the Private Partner:

- To invest in growth & jobs (in Europe)
- To operate in open & transparent set-ups (no “closed shops”): representativeness – openness – transparency ➔ Governance!
- To provide data at regular periods on KPIs & milestones for monitoring progress or exploitation in Europe (as a sector and individually)

Commitments of the Public Partner (EC):

- To invest on the PPP [ceiling budget over the PPP lifetime]
- To propose for decision an annual WP agreed within the PPP
- To use transparent accounting methods to measure contribution of the private partner

Other Issues:

- Member States can be involved in a PPP
- Coordination with national / regional levels
  (smart specialisation under the new Cohesion policy)
Photonics PPP
What will it mean for you?

WHAT DOES CHANGE

■ Long-term commitment from the EC
  (overall indicative budget for the PPP)
■ Long-term commitment by industry to invest + demonstrate it!
■ The definition of the R&I priorities for the work-programmes of Horizon 2020
■ KPIs and their monitoring

WHAT DOES NOT CHANGE

■ The rules for participation ➔ those of Horizon 2020
■ Final responsibility for Work Programme stays with EC and is subject to comitology
■ Implementation remains with the EC
  (selection of proposals, negotiation, review of progress and payments)
R&D: Roadmap-based and disruptive R&D

Innovation:
- **TRLs 5-8**: Pilot manufacturing lines; Large scale demonstration activities; ...
- Innovative SMEs: open schemes; access to technology and support services
- Support Actions: Inducement prizes; Procurement of Research and Innovation; Support to inter-cluster collaboration

Coordination & Networking
- Coordinated R&I Activities with national and regional programmes (e.g. ERANETs)
- Networking / Attracting / Educating people: Road-mapping and Networking, Education, Training and skills development; Outreach, ...
Photonics PPP
A Leverage Effect for European Growth!

Regional Specialisation Strategies

Photonic Clusters

Societal Challenges

Excellent Science

Industrial Leadership

Structural Funds

Skills

VC, EIB Loans, ...

PPP is at the core of an industrial strategy for Europe
## Photonics PPP – Work programme 2014

| RTD | 1. Optical communication technologies for data centres  
2. Beam delivery chain for high power lasers for manufacturing  
3. Biophotonics for low-cost screening of diseases  
4. Photons for immersive visualisation systems  
5. Cost-effective mid-infrared  
6. Electronic-Photonic Integration  
7. Disruptive Research  
8. Pilot deployment of ubiquitous broadband  
9. Large-scale deployment of SSL  
10. Pilot line(s) for III-V / dielectric devices  |
| --- | --- |
| Innovation | 1. Networking, Coordination and Support Actions  
2. Inducement prizes  |
| ERANETs | Actions with the Member States  
Other Actions | 1. Networking, Coordination and Support Actions  
2. Inducement prizes  |

## Photonics PPP – Work programme 2015

| RTD | 1. Optical data communication technologies for SW defined optical petabit networks  
2. Optical data communication technologies for ubiquitous broadband fibre access networks  
3. Photonic device and circuit technology for PICs  
4. Assembly and packaging technologies  
5. Pilot deployment ubiquitous broadband  
6. Access services to SMEs  |
| --- | --- |
| Innovation | 1. ICT-KET integrated platforms for healthcare and well-being  
2. Pilot line for OLEDs on flexible substrates  
3. Pilot line for analytical mid-infrared (MIR) micro-sensors  
4. Pilot line for Silicon photonics  |
| ERANETs | Actions with the Member States  
Other Actions | 1. Networking, Coordination and Support Actions  
2. Inducement prizes  |

## 2014 WP on Cross-Cutting KETs

| RTD | 1. New materials and devices for OLEDs and displays  
2. Open system architectures for SSL  |
| --- | --- |
| Innovation | 1. ICT-KET integrated platforms for healthcare and well-being  
2. Pilot line for OLEDs on flexible substrates  
3. Pilot line for analytical mid-infrared (MIR) micro-sensors  
4. Pilot line for Silicon photonics  |

## PPP Factories of the Future

| RTD | 1. Zero-defect manufacturing  
2. Additive Manufacturing and laser printers  |

*Work in progress!*
Roadmap towards Photonics PPP

**Nov 2012 – Feb 2013**
- Photonics Multiannual Strategic Research and Innovation Agenda (SRIA)
- **Open consultation** on PPP objectives, SRIA, governance, ...

**March – June 2013**
- Final version of SRIA
- Establishment of the PPP legal entity
- Formal submission of the PPP proposal
- Drafting of H2020 WP

**July – Dec 2013**
- Evaluation of PPP proposal
- Establishment of the PPP
- EC staff working paper on PPPs
- Signature of the PPP Contractual Agreement

**Preparation of Horizon 2020 WP 2014-15**

**29-30 April**
- Annual Assembly of Photonics21

**DRAFT**
- H2020 WP 2014-15

**H2020 Regulation**
- First Calls
Final Issues

- 25 June 2013: press release on conclusion of negotiations on Horizon2020
  (http://ec.europa.eu/research/index.cfm?pg=newsalart&year=2013&na=na-250613)

- H2020: from Science to Market

- The PPP and role of clusters

- ICT event 2013 in Vilnius (06-08 November)

Photonics in FP7-ICT - see:
http://cordis.europa.eu/fp7/ict/photonics/