



Thermally Integrated Smart Photonics Systems

Fact Sheet

Project Information

TIPS

Grant agreement ID: 644453

[Project website](#)

DOI

[10.3030/644453](https://doi.org/10.3030/644453)

Project closed

EC signature date

18 December 2014

Start date

1 February 2015

End date

31 July 2018

Funded under

INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)

Total cost

€ 5 230 041,25

EU contribution

€ 5 230 041,00

Coordinated by

UNIVERSITY COLLEGE CORK -
NATIONAL UNIVERSITY OF
IRELAND, CORK



Objective

The objective of this proposal is to develop and demonstrate a scalable, thermally-enabled 3D integrated optoelectronic platform that can meet the explosion in data traffic growth within ICT. The Thermally Integrated Smart Photonics Systems (TIPS) program will heterogeneously integrate micro-thermoelectric coolers (μ TEC) and micro-fluidics (μ Fluidics) with optoelectronic devices (lasers, modulators, etc.) in order to precisely control device temperature and thus device wavelength compared to commercially available discrete technology.

Data traffic is projected to increase sharply (40-80× by 2020) and this is driving an increase in network complexity and the requirement for scalable optoelectronic

integration. A major bottleneck to this large scale integration is thermal management. Active photonic devices generate extremely high heat flux levels ($\sim 1 \text{ kW/cm}^2$) that must be efficiently removed to maintain performance and reliability; furthermore, active photonic devices must be controlled at temperature precision better than $\pm 0.1^\circ \text{C}$. Today's thermal technology is at the limit and cannot scale with growth in the network. As a comparison, electronics produce lower heat flux levels ($\sim 100 \text{ W/cm}^2$) and have a less restrictive temperature requirement of $\leq 85 \pm 2^\circ \text{C}$. Integration of thermal management onto optoelectronic devices has not been addressed to date in academic or industrial investigations and therefore presents a significant knowledge gap that must be filled to enable impact and ensure the EU is at the forefront of optoelectronic technology. While the end goal is driven by telecom or datacom industrial requirements there are many scientific knowledge gaps that will be filled by the TIPS consortium. The application space for a thermally-integrated smart optoelectronic solution is large and spans multiple communication length scales from long reach to inter/ intrachip communications as well as other applications like sensors that seek to leverage silicon photonics platforms

Fields of science (EuroSciVoc)

[natural sciences](#) > [physical sciences](#) > [electromagnetism and electronics](#) > **[optoelectronics](#)**

[engineering and technology](#) > [mechanical engineering](#) > **[thermodynamic engineering](#)**

[engineering and technology](#) > [materials engineering](#) > **[coating and films](#)**

[engineering and technology](#) > [electrical engineering, electronic engineering, information engineering](#) > [electronic engineering](#) > **[sensors](#)**

[natural sciences](#) > [chemical sciences](#) > [inorganic chemistry](#) > **[metalloids](#)**



Programme(s)

[H2020-EU.2.1.1. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies \(ICT\)](#) MAIN PROGRAMME

[H2020-EU.2.1.1.1. - A new generation of components and systems: Engineering of advanced embedded and energy and resource efficient components and systems](#)

Topic(s)

[ICT-02-2014 - Smart System Integration](#)

Call for proposal

[H2020-ICT-2014](#) 

[See other projects for this call](#)

Sub call

H2020-ICT-2014-1

Funding Scheme

[RIA - Research and Innovation action](#)

Coordinator



UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK

Net EU contribution

€ 1 198 696,00

Total cost

€ 1 198 696,25

Address

WESTERN ROAD

T12 YN60 Cork

 **Ireland** 

Region

Ireland > Southern > South-West

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Participants (12)



III-V LAB

 France

Net EU contribution

€ 794 850,00

Address

1 AVENUE AUGUSTIN FRESNEL CAMPUS POLYTECHNIQUE
91767 Palaiseau Cedex 

Region

Ile-de-France > Ile-de-France > Essonne

Activity type

Other

Links

[Contact the organisation](#)  [Website](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost

€ 794 850,00



NOKIA IRELAND LIMITED

 Ireland

Net EU contribution

€ 550 500,00

Address

SUITE 3 ONE EARLSFORT CENTRE LOWER HATCH STREET
2 Dublin 

Region

Ireland > Eastern and Midland > Dublin

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

[Contact the organisation](#)  [Website](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost

€ 550 500,00



UNIVERSITY OF HAMBURG ⓘ

Germany

Net EU contribution

€ 0,00

Address

MITTELWEG 177
20148 Hamburg

Region

Hamburg > Hamburg > Hamburg

Activity type

Higher or Secondary Education Establishments

Links

- [Contact the organisation](#)
- [Website](#)
- [Participation in EU R&I programmes](#)
- [HORIZON collaboration network](#)

Total cost

No data



CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS

France

Net EU contribution

€ 572 162,50

Address

RUE MICHEL ANGE 3
75794 Paris

Region

Ile-de-France > Ile-de-France > Hauts-de-Seine

Activity type

Research Organisations

Links

- [Contact the organisation](#)
- [Website](#)
- [Participation in EU R&I programmes](#)

Total cost
€ 741 500,00

 THIRD-PARTY

INSTITUT NATIONAL DES SCIENCES APPLIQUEES DE LYON

 France
Net EU contribution
€ 19 337,50

Address
20 AVENUE ALBERT EINSTEIN
69621 Villeurbanne Cedex 

Region
Auvergne-Rhône-Alpes > Rhône-Alpes > Rhône

Activity type
Higher or Secondary Education Establishments

Links
[Contact the organisation](#)  [Website](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost
€ 19 337,50

 THIRD-PARTY

NANTES UNIVERSITE

 France
Net EU contribution
€ 137 125,00

Address
1 QUAI DE TOURVILLE
44000 Nantes 

Region
Pays de la Loire > Pays de la Loire > Loire-Atlantique

Activity type
Higher or Secondary Education Establishments

Links

[Contact the organisation](#)
[Participation in EU R&I programmes](#)
[HORIZON collaboration network](#)

Total cost
€ 137 125,00

 THIRD-PARTY

ECOLE CENTRALE DE LYON

 France
Net EU contribution
€ 12 875,00

Address
AVENUE GUY DE COLLONGUE 36
69134 Ecully 
Region
Auvergne-Rhône-Alpes > Rhône-Alpes > Rhône

Activity type
Higher or Secondary Education Establishments

Links
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[Participation in EU R&I programmes](#)
[HORIZON collaboration network](#)

Total cost
€ 12 875,00



UNIVERSITY OF LIMERICK

 Ireland
Net EU contribution
€ 471 708,75

Address
NATIONAL TECHNOLOGICAL PARK, PLASSEY
- Limerick 

Region
Ireland > Southern > Mid-West

Activity type

Higher or Secondary Education Establishments

Links

- Contact the organisation Website
- Participation in EU R&I programmes
- HORIZON collaboration network

Total cost

€ 471 708,75



LIONIX INTERNATIONAL BV

Netherlands

Net EU contribution

€ 472 625,00

Address

HENGELLOSESTRAAT 500
7521 AN Enschede



SME



Yes

Region

Oost-Nederland > Overijssel > Twente

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

- Contact the organisation
- Participation in EU R&I programmes
- HORIZON collaboration network

Total cost

€ 472 625,00



NOKIA NETWORKS FRANCE

France

Net EU contribution

€ 367 002,50

Address

SITE NOKIA PARIS SACLAY 12 RUE JEAN BART
91300 Massy 

Region

Ile-de-France > Ile-de-France > Paris

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

- [Contact the organisation](#) 
- [Website](#) 
- [Participation in EU R&I programmes](#) 
- [HORIZON collaboration network](#) 

Total cost

€ 367 002,50



COMMUNICRAFT LIMITED

 Ireland

Net EU contribution

€ 152 733,75

Address

Lombard Street West 46
8 DUBLIN 

SME 

Yes

Region

Ireland > Eastern and Midland > Dublin

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

- [Contact the organisation](#) 
- [Website](#) 
- [Participation in EU R&I programmes](#) 
- [HORIZON collaboration network](#) 

Total cost

€ 152 733,75



**LEIBNIZ INSTITUT FÜR FESTKÖRPER UND WERKSTOFFFORSCHUNG
DRESDEN EV**

 Germany

Net EU contribution

€ 480 425,00

Address

**HELMHOLTZSTRASSE 20
01069 Dresden** 

Region

Sachsen > Dresden > Dresden, Kreisfreie Stadt

Activity type

Research Organisations

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

€ 480 425,00

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European Union, 2025