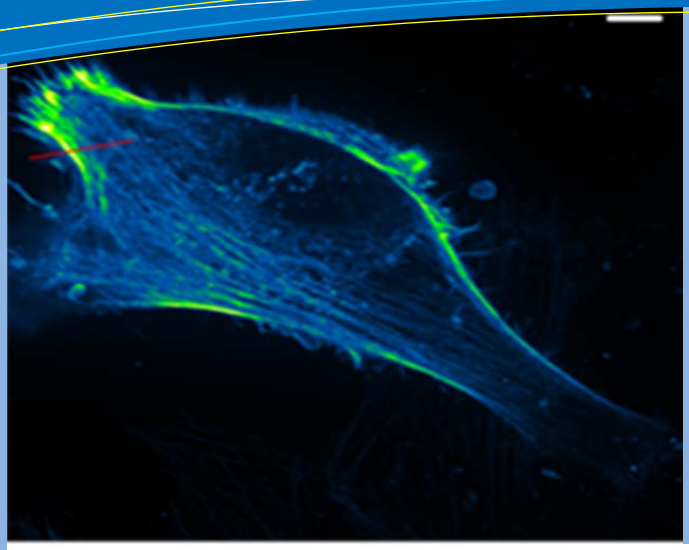
NEXPRESSO



Publishable
Executive Summary

About NEXPRESSO

NEXPRESSO, is the "Network for EXchange and PRototype Evaluation of photonicS componentS and Optical systems".

NEXPRESSO's objectives are to:

- Purchase at marginal cost pre-competitive photonic devices from innovative European companies and put them in the hands of European researchers and students, at no net cost to the university or to the company that furnished the devices and
- Facilitate transfer of device evaluation results to potential end-users, assisting companies to access new markets and new applications.

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 258178.

NEXPRESSO

A Unique Tool to Bridge the "Valley of Death"

Sometimes, when research produces a new device, a spin-out company is formed for exploitation, but it takes a lot of work to turn the invention into a product: testing, optimising the components for specific applications, putting it in a package and complying with standards, etc. No grants cover this activity and investors typically only get involved once there is a market.

This gap is called the 'Valley of Death', because many start-ups fail during this phase.

The FP7-project "NEXPRESSO", a continuation of the FP6-project "ACCORD", set out to put pre-competitive photonic components and systems in the hands of researchers and students — at no net cost to the university or to the company that furnishes the prototypes. The NEXPRESSO-project then facilitated transfer of the evaluation results to potential end-users, assisting companies to access new markets and new applications.

NEXPRESSO is the first EU project to identify and address this so-called 'Valley of Death'. This refers to the absence of funding support (either private or public) in the gap between the public support for precompetitive research — where EU funding usually takes place — and private investment for development and exploitation of existing products.

The project benefits the company by providing cash flow to fund further development, providing focused evaluation and feedback from the R&D project at the premarket stage, and creating a link between students who perform the research and the employment needs of the company seeking to launch the prototype as a product

As far as we know, the NEXPRESSO project is the first anywhere to focus on creating a bridge between advanced prototype development and product launch. The project has been successful in recommending design changes, creating employment opportunities, and stimulating the first commercial sales.

In a nutshell, NEXPRESSO sends out a call for prototypes, and SMEs respond with a description of a prototype they would be willing to furnish, along with some of their needs concerning testing, evaluation or adaptation to a specific application. NEXPRESSO publishes this list, and sends out a call to R&D organisations (typically universities) to respond with a short proposal for a six-month project on a specific prototype.

These proposals are ranked by an independent panel of reviewers and the NEXPRESSO team then awards the project according to ranking and financial limits. In so doing, the project brings the SME and the research organisation together as a team — including agreements on intellectual property and other aspects.

NEXPRESSO then negotiates a transfer price with the SME, purchases the prototype, and lends the prototype to the research organisation for the duration of the project (three to nine months). If the R&D organisation completes its task successfully, it can keep the prototype, and NEXPRESSO will transfer ownership.

The different types of call in the NEXPRESSO Project

Type 1

This is a continuation of the ACCORD mechanism. Manufacturers register pre-market components on which they would like researchers to conduct experiments. These components are displayed on the NEXPRESSO web site and Researchers are asked to propose projects with a selected component. The proposals are assessed and the best are selected to enter contract negotiations. NEXPRESSO purchase the component and offer it to the researcher to undertake the proposed project.

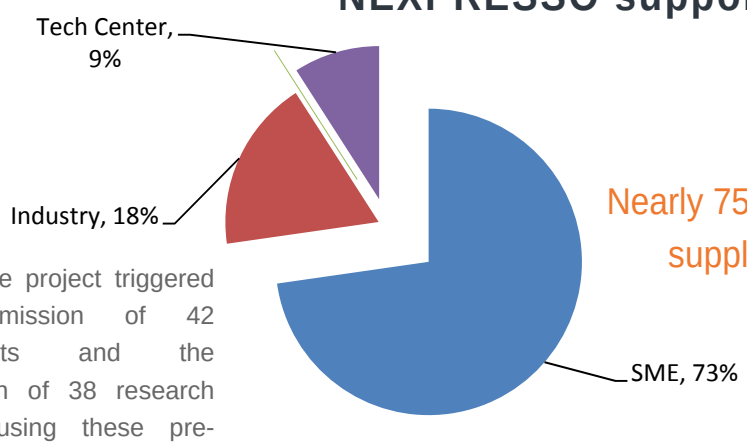
Type 2

Under this mechanism researchers can ask for a component not currently available in the market in order to progress their research. Manufacturers can then propose components nearing market launch. As in Type 1, NEXPRESSO will purchase the component and provide it to the researcher.

TYPE 3

In this mechanism an "End-User" can suggest a research project using a component not yet on the market. The Researcher and component supplier have to be identified. Once this has been achieved NEXPRESSO buys the component and provides it to the researcher.

NEXPRESSO supporting SMEs

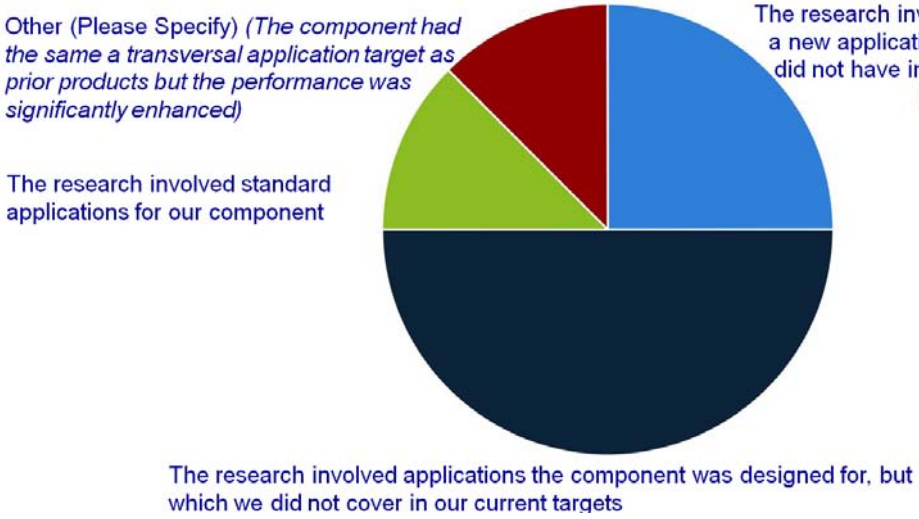


Nearly 75% of component suppliers were SMEs.

In total the project triggered the submission of 42 components and the submission of 38 research projects using these pre-commercial photonic components. Out of these projects, spread over several calls, the NEXPRESSO-project awarded 11 projects with a total financial support of nearly 250 000 euro spent on buying these pre-competitive photonic components and offering them for free to these research groups. About 75% of these awarded projects used components originating and submitted by SMEs in Europe.

Over 75% of component suppliers discovered new market applications through NEXPRESSO

Besides the pure involvement of SMEs, "bridging" the gap" also implies that support is given to these SMEs to further develop their products and business and to broaden their market scope. Both aspects have been tackled successfully by NEXPRESSO. Most of the component suppliers indicated that the application envisaged by the research project was either new or unexplored by the component supplier, or improved the performance of the component.



How much a tool like NEXPRESSO can have an impact on the business of an SME is best illustrated by a quote from one of the component supplier (Thierry Gonthiez, CEO Resolution Spectra Systems):

"In 2012 we delivered a prototype of a spectrometer to a laboratory that we didn't know before, since then our company has an ongoing R&D collaboration with them. With our product they could develop a new laser source. The prototype has become a product that was a Prism Award finalist in 2013 and used today by customers in the US, in Europe, in Japan and soon in China. The NEXPRESSO model is really good and has helped our company facilitate our technology development and commercial expansion."

NEXPRESSO Projects

Institut Curie (France)
"Adaptive Optics in Spinning Disk microscopy (AOSD) of living samples"
COSINGO-Imagine Optic (Spain).

The Institute of Photonic Sciences (Spain)
Compact STED CW sources emitting in the yellow range
Solus Technology Ltd

The Institute of Photonic Sciences (Spain)
Super Resolution Multimodal Microscopy with Ytterbium Laser Systems
Time-Bandwidth Products AG

CNIT (Italy)
Toward Integrated photoNicaSsisted fully-dIgital raDar transceiver (INSIDE)
Selex Sistemi Integrati SpA (Italy)

ENSTA Paris Tech (France)
"Laser Beam and Tissue Characterisation for Ultrashort Pulse Laser Eye Surgery" and "Direct Imaging of Intense Pulsed Terahertz Beams
ALPhANOV (France)

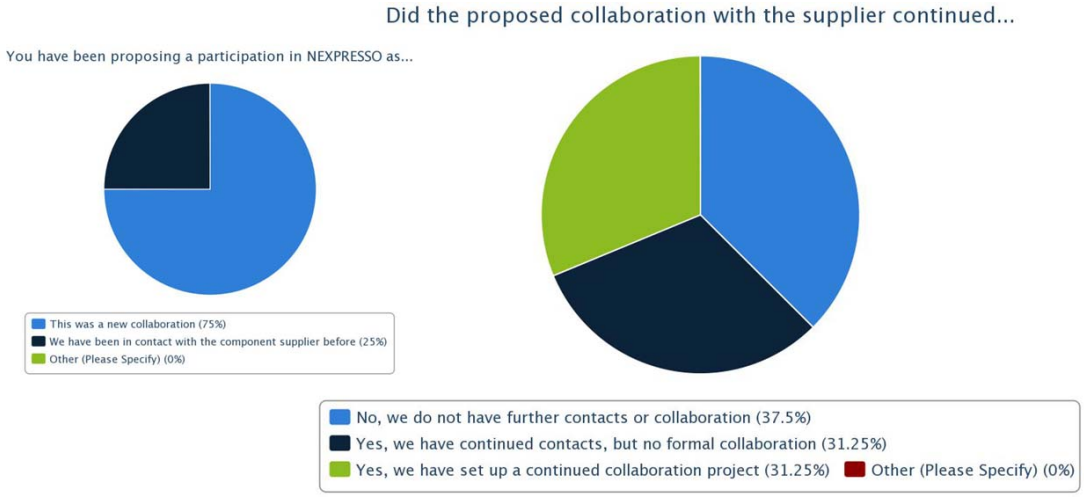
University of Dundee 2 (UK)
Generation of THz Radiation from Quantum Dot Photomixers
Innolume

Institut de Physique de Rennes UMR6251 CNRS/Université Rennes 1 (France)
Tunable high resolution Ti:Sa dual frequency laser for CW THz oscillator
Resolution Spectra Systems

Medical University Vienna (Austria)
Next Generation Multi-Functional Optical Coherence Tomography for Enhanced Ophthalmic Imaging and Diagnosis
Exalos (Switzerland)

UMI2958 Georgia Tech – CNRS (France)
Development of Vertical GaN-Based LEDs Wafer Bonding to Conducting Substrates by means of a Sacrificial ZnO Template Layer & Chemical Lift-off from GaN Substrates
Nanovation SARL

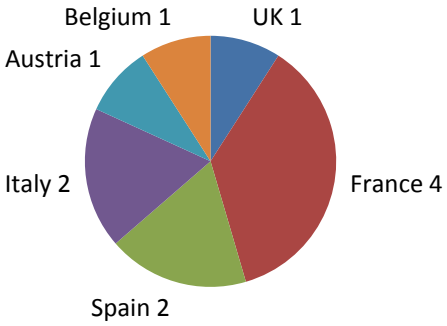
NEXPRESSO triggering a continued and cross-border collaboration



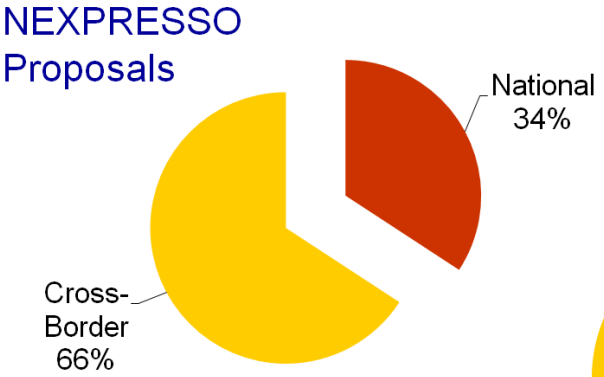
In 75% of the projects, the component supplier and the Academic Research Group did not know each other before NEXPRESSO and in 67% of the cases the collaboration continued in one form or another.

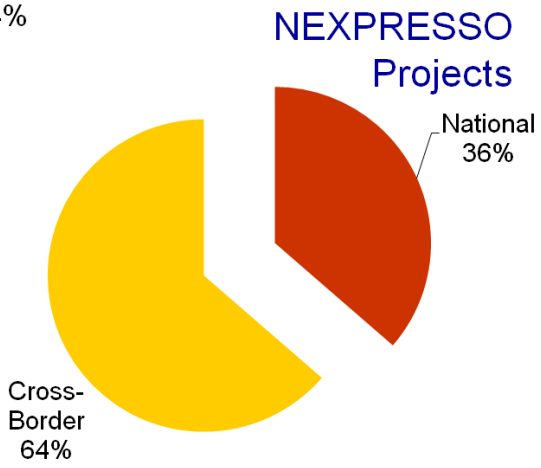
And in addition to this, this collaboration was mostly international, triggering new and cross-border collaborations and support for the SMEs, which would not have been possible without a tool like NEXPRESSO and without its European dimension.

Geographical distribution of R&D groups with an awarded NEXPRESSO project



International aspect





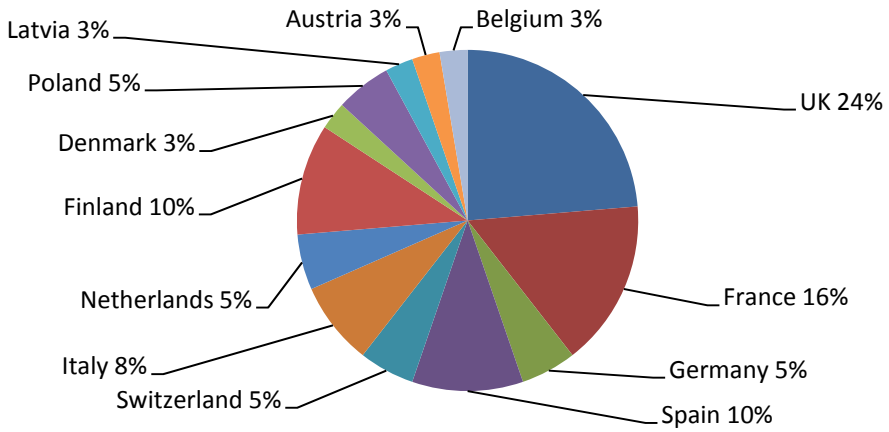
NEXPRESSO Projects

Type 2 project:

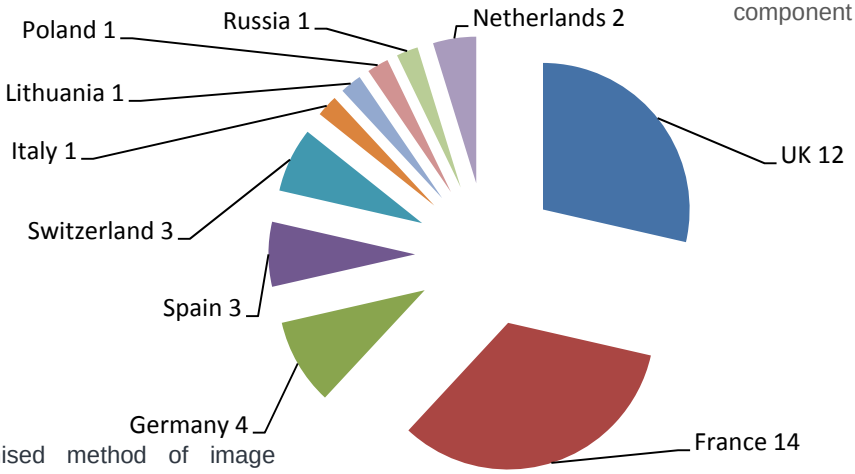
University of Parma (Italy)
Short-Pulse High-Speed Fiber Laser Cutting of Multilayer Materials
Innolight Innovative Laser & Systemtechnik

Type 3 Project

HoWest (Belgium)
OLED lighting applications in outdoor conditions
Philips



Geographical distribution of R&D groups submitting a project proposal to NEXPRESSO (top) and component suppliers (bottom)



optimised method of image acquisition, studied the spatial profiles generated by the non-linear crystals for optical parametric generation and optical parametric amplification and investigated the stability of the system.

Sustainability

The NEXPRESSO model has been documented for other organizations to implement, a detailed ‘copy kit’ is available. EPIC has already confirmed that it will implement the model among its 150 members distributed over 24 countries.