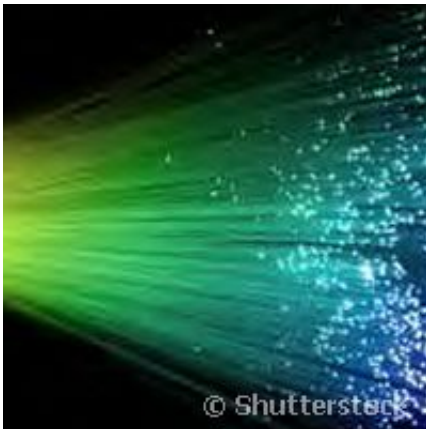


# Bridging the 'Valley of Death' for photonics SMEs

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While research projects often develop new devices - sensors, components, lasers, etc. - it can be difficult to turn these into products ready for market. An EU project has been working on bridging the gap between laboratories and businesses.

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.

NEXPRESSO, a continuation of 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 team then facilitated transfer of the evaluation results to potential end-users, assisting companies to access new markets and new applications.

Research\*eu results magazine asked project partners Tom Pearsall, of the European Photonics Industry Consortium (EPIC), based in France, and Peter Van Daele, of IMEC at the University of Ghent, Belgium, to tell us more about their work in the NEXPRESSO project.

## **What are the main themes and objectives of the project?**

First, we set out to demonstrate an efficient pathway for SMEs to transform innovative prototypes into commercial products, shortening time to market and thus increasing competitiveness. In addition, we identify or solicit prototype components and systems involving [photonic technologies](#) - lasers, LEDs, detectors, modulators, sensors, materials, etc. - and evaluate proposals for short-term development of prototypes.

The project also provided supervision and quality control of the funded proposals and helped provide direct access for researchers and students to pre-commercial photonic components. Finally, the project team has tried to develop and implement long-term sustainable funding to ensure continued operation after FP7 funding ends.

## **What is new or innovative about the project?**

NEXPRESSO is the first EU project to identify and address the 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 four-page 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.

## **What first drew you to work on this topic?**

We were interested in the innovation process, especially in the photonics area. We had heard about a project, supported by the National Science Foundation (NSF) in the United States, where university researchers would send in requests for prototype components based on modifications of existing products. The NSF project would then contact the appropriate company and negotiate the limited manufacture of some prototype components based on the design by the research organisation.

NEXPRESSO developed this idea of prototype exchange by focusing on the real obstacle that SMEs face in turning a prototype into a product that generates cash flow. In our project, the SME plays the deciding role by identifying the prototype component it wants to turn into a product.

## **What difficulties did you encounter, and how did you solve them?**

One of the main obstacles was 'transfer pricing': how to establish a price for a prototype component when the market does not exist yet? When prototype components are purchased from the SME, ownership is transferred to one of the NEXPRESSO project partners. The purchase is paid using public funds so this process must be transparent and justifiable.

In fact, an important part of the solution came from the Commission. The European Commissioner for Competition at that time, Neelie Kroes, developed and published helpful rules for state aid - specifying that state

aid to private companies for product development is allowed in cases where there is no working market for the product. We designed the NEXPRESSO project to conform to these rules.

In addition, transfer pricing was determined by a negotiation process with the SME. Our aim was to pay only for the manufacturing cost of the product and not, for example, overheads or engineering investment.

## **What are the concrete results from the research so far?**

During the lifespan of the project, NEXPRESSO brought several prototypes to maturity as products. In addition, several of the exchanges we supported resulted in a continued collaboration between the research group and the company - a collaboration which did not exist before. And overall, NEXPRESSO and its predecessor ACCORD funded over 25 exchanges that resulted in development assessment projects.

Also, we discovered that there is an optimum size or value for an exchange. We experimented with three kinds of offers: multiple units of an inexpensive component (for example, five units of a EUR 5000 laser), a single component with more functionality (for example, a smart camera with spectral recognition) at around EUR 25 , or a more complete system with high functionality, at EUR 50 000 or more.

We found that the best projects resulted from single prototypes costing about EUR 25 000 as they are usually more innovative. SMEs are much more cautious about negotiating an IP agreement for a more expensive un-marketed system, while multiple units of inexpensive components appear to result in development projects that have less overall impact.

## **What are the advantages of participating in such an**

## **EU project?**

The EU project enabled us to offer the NEXPRESSO exchange on a European scale. We have managed projects involving a company in France with a research organisation in Finland, and a research organisation in Scotland with a company in Spain, as examples. NEXPRESSO can contribute directly to greater mobility of European scientists and technologies. This is an important result because SMEs in the photonics business typically have no local market. Export is necessary and contacts at international locations are critical.

## **What are the next steps in the project, or next topics for your research?**

The two high-priority topics for the NEXPRESSO consortium are to establish sustainable operations by transferring the concept to an industry development authority, or creating a Europractice action funded by end-users, and to expand the context of NEXPRESSO from photonics to a range of advanced technologies, such as bio-medical, environmental, manufacturing, security, etc.

To encourage others in the EU research community to take up this concept and adapt it to their own areas of interest, the [project](#) has written a 'keys in hand' manual for creating and operating a prototypes exchange programme like [NEXPRESSO](#). We call it a 'Copy Kit'. It is available at no cost to anyone who would like the information.

**More information:** [www.nexpresso.eu/](http://www.nexpresso.eu/)

Provided by CORDIS

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