RESEARCH AND DEVELOPMENT

Micro-optics one-stop shop

ACTMOST, a new initiative subsidized by the European Commission, looks poised to boost microphotonic innovation in Europe.

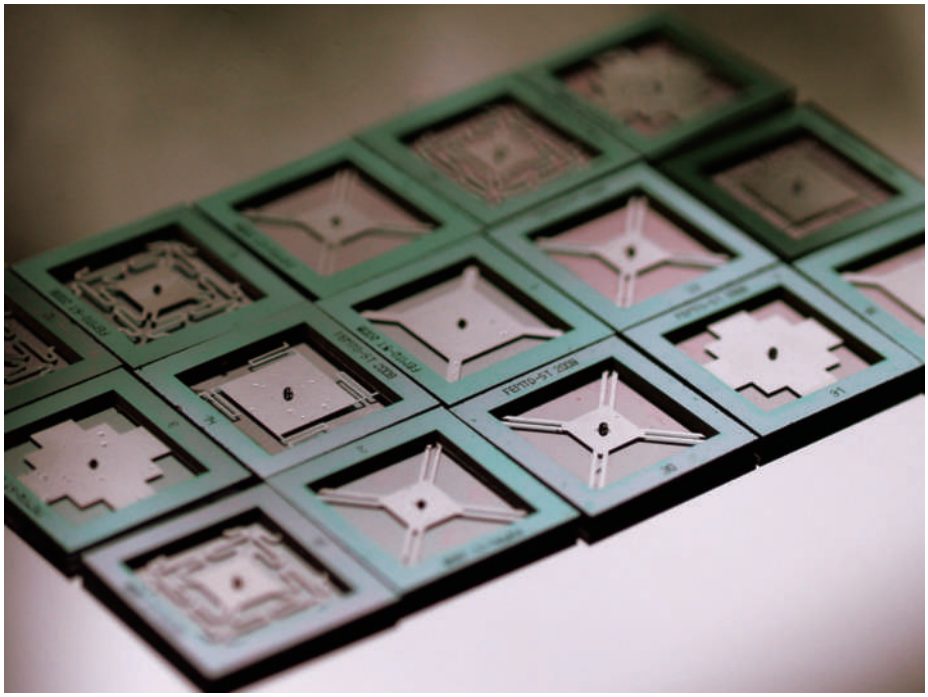
Rachel Won

Launched on 1 September 2010, ACTMOST (Access Centre to Micro-Optics Expertise, Services and Technologies; www.actmost.eu) is a new industry support model that aims to lower the technological barriers associated with producing microphotonics solutions by promoting European industry and encouraging product innovation. Financially supported by the European Commission (EC), ACTMOST is a joint effort between 14 high-tech research institutes and university laboratories from six European countries, and strives to provide complete solutions for companies through focused collaborations and the hands-on training of industry staff. ACTMOST aims to provide technology support throughout the entire chain of product development, ranging from the optical design, measurement, prototyping, replication and packaging stages, through to proof-of-concept demonstrations, reliability tests and pre-production-level fabrication.

Micro-optics is a key-enabling technology in many areas such as optical communications, displays, lighting, solar energy, healthcare, automotive engineering, security and materials processing.

"When it comes to product innovation in the field of micro-optics, we are in a very different ballpark than, for example, the development of photonic integrated circuits through standard foundry runs, such as those used to fabricate silicon photonic chips," said Hugo Thienpont from the Vrije Universiteit Brussel in Belgium, the coordinator of ACTMOST.

Micro-optics solutions often require a complete, customized and dedicated supply chain to tackle a particular technological challenge. Most companies either do not have such a supply chain in-house or cannot sustain a full, highly skilled photonics research and development team, and will therefore try to solve small parts of the challenge separately using different technologies. Unfortunately, these pieces often do not fit well together because of incompatibility issues. For example, the prototype technology might not be suited to mass-manufacturing, or the individual components might not be designed to allow proper integration and packaging. This kind of multi-technology shopping will almost always result in inefficient, second-rate solutions.



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ACTMOST aims to facilitate product innovation in the field of microphotonics among European companies.

"Such disappointment and discouragement may create the perception that photonic technologies are showstoppers for product innovation, rather than enablers," Thienpont pointed out.

Practical solutions can be found, however, if the innovation challenge is tackled with the support of a complete and well-structured supply chain of technology. Through this approach, experts team up at the beginning of the development process and work out a solution along the best possible technological route supported by equipment that is deeply integrated in a complete technology supply chain. This approach is cost-efficient, minimizes the time it takes for products to reach the market, and maximizes the chances of producing successful solutions.

It is this kind of full-chain service that ACTMOST aims to offer to all European companies, ranging from start-ups, spin-offs and small-to-medium-sized enterprises (SMEs), to large-scale companies or those that are considering pursuing microphotonics as innovation facilitators.

Any company that applies for ACTMOST support will be assigned a dedicated team of experts within two weeks. This saves the company from shopping for multiple technologies or scouting for experts.

This collaboration will also allow the 14 ACTMOST research labs to interact with a large number of European SMEs and large-scale companies, providing them with the opportunity to forge long-lasting collaborations and become more aware of the challenges faced by the photonics industry in Europe.

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Apart from being a 'one-stop shop' for providing cutting-edge microphotonic solutions to European companies, ACTMOST will also use its facilities for training company staff.

If a company accepts one of the proposed solutions, it can either continue to work with the ACTMOST team on a bilateral basis, in which case the company must finance the project itself, or it can apply to ACTMOST for financial support. Members of the ACTMOST technical coordination team will then decide whether the requested support is appropriate and whether it can be granted according to criteria agreed with the EC. One such criterion is that the project must be in the realm of pre-competitive research and development. The cost of the feasibility study can be waived up to a level of €60,000 for SMEs, while large-scale companies will have to match 50% of the cost and ACTMOST will match the costs up to a maximum level of €30,000.

The research laboratories will receive €1.2 million funding from the EC, with which they must manage the coordination and daily operation of ACTMOST, as well as provide support activities and intensive industry training.

"With funding from the EC, we believe we can assist around 30–50 companies during the 30-month test phase," Thienpont explained.

Because ACTMOST is funded with European tax payers' money, only European companies can take advantage of the ACTMOST subsidy model of technology support. "We can of course support companies outside Europe, but only when they can fully cover the cost of our effort without any subsidy from the EC," explained Thienpont.

ACTMOST will start serving European companies from January 2011 onwards. According to Thienpont, if ACTMOST can demonstrate during the test phase that its working method is successful and that it provides a solution to the real needs of the European photonics industry, the EC may consider expanding the concept into a new instrument for supporting economic growth and creating jobs in Europe.

"The ultimate outcome that both ACTMOST and the EC want to see is that this initiative lowers the technological barriers for European photonics companies, increasing their creativity and competitiveness to create more jobs and eventually to leverage the economic impact of Europe on the photonics world market," Thienpont emphasized.

The launch of this model is undoubtedly good news for European companies needing cost-effective and investment-free access to cutting-edge technology and knowledge in the field of microphotonics. Whether it is going to be a real success depends on the response of the companies themselves, which should by all means make the most of ACTMOST. ❐

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VIEW FROM... UQCC 2010

Quantum secure video

The demonstration of live video conferencing using quantum key distribution suggests that applications exploiting secure video communication may be just around the corner.

Noriaki Horiuchi

Quantum key distribution (QKD) exploits the quantum-mechanical nature of photons to achieve the ultimate form of secure communication. At the annual Updating Quantum Cryptography and Communications (UQCC) conference, held on 18–20 October 2010 in Tokyo, Japan, 330 experts from all over the world witnessed the first public demonstration of video conferencing using QKD technology. The demonstration used the Tokyo QKD Network, which consists of four relay stations in the Tokyo metropolitan area (Koganei, Otemachi, Hakusan and Hongo) connected by optical fibres longer than 200 km (Fig. 1). The video stream from each relay station was beamed live to giant screens in the conference centre, and when an eavesdropper in the system was detected, the communication channel was