

# EPIC CEO INTERVIEW: PHILIPPE BABIN

In this article, **Ivan Nikitski**, EPIC's Photonics Technology Program Manager, talks to **Philippe Babin**, CEO of AEPONYX, a Montreal-based developer of Photonic Integrated Circuits (PIC) for telecom, datacom and life science markets.

## IN What's the background to your appointment as CEO at AEPONYX?

PB After graduating with a BSc in Electrical Engineering from the University of Sherbrooke in Quebec, Canada, I joined C-Mac Microcircuits Inc. as a Process Engineer, and in 1999, I became Director of Manufacturing of production and process engineering for their print and laser departments. In 2001, I moved to Mediatrix Telecom Inc, a division of Media5 Corporation, where I worked first as R & D Director, and from 2006 as Director of product line management. Then in 2008, I was promoted to General Manager and VP Worldwide Sales of Media5 Corporation with responsibility for the management of all the operations of the company including Finance, Legal, Administration, R&D, Sales, and Production. In 2012 I set up my own consulting firm in international sales and marketing development of IT and telecommunication products, which led to my appointment as Vice-President Sales & Marketing at AEPONYX Inc., a VC backed start-up based in Montreal developing optical switching technologies. Two years later, I was asked to take over as AEPONYX's CEO.

## IN How has the company developed since then?

PB Our initial focus was on dense wavelength-division multiplexing (DWDM) type solutions for data centres and access networks that involved reselling products from South Korea. Then in 2014, we met two scientists who were developing silicon photonics and MEMS

that they wanted to combine into a single product. Their original idea was to work in medical applications, but we saw a great opportunity to use the technology to build our own tuneable transceivers and optical switches. To cut a long story short, we licensed the technology and started doing small proof-of-concepts in the University labs and then looked for micro-electro-mechanical systems (MEMS) foundries capable of manufacturing the products. With a workforce of around 40 and equity funding of 21 million Canadian dollars together with government grants and tax credits, the last 8 years have been focused entirely on R & D. We will launch our first commercial product later this year and will scale up in 2023.

## IN What products are you developing?

PB We have two high volume products in our pipeline. The first is our R.O.C.S. 2, a resource optical configuration system tool for use as an optical switch to go inside artificial intelligence (AI) and high-performance computing (HPC) data centres. This product provides a failover bypass functionality in the form of a low-cost, low energy optical circuit switch for applications at 400 Gbps and above. The second product is the R.O.C.S. 8, which has a slightly different application but has the same goals as R.O.C.S.2, in that it is designed to provide low latency between the graphics processing unit (GPU) and the central processing unit (CPU).

Our additional products include optical chips based on silicon nitride (SiN) photonics combined with planar MEMS on

a single chip for applications like tuneable transceivers and optical circuit switching for data centres and telecom. We are known for a tuneable optical filtering/switching (TOF/S) platform combining the low loss of silicon nitride (SiN) waveguides with a proprietary design for thermo-optically tuned wavelength selectivity. We are also launching a tuneable laser for telecom and sensing applications. For select customers we provide the chips for their end products

## IN Who are your foundry partners?

PB We've been able to use a nearby foundry called C2MI, the largest microelectronic systems research and development centre in Canada. C2MI has a fully industrial, automated MEMS line that we've used to create our first prototypes and the first chips. They also have an optical packaging facility and a full PCB line so we've been able to finalise and complete our product offering. C2MI is ideal for prototyping and qualification for low volumes of up to 500 wafers a year for a product. As we are seeing demand for much larger volumes, we've been working with a larger foundry outside Canada, which we have not yet made public, although we intend to announce it in 2023.

Working with these fabs to align processes has taken many years. Compared with traditional foundries which have standardised processes based on process design kits (PDKs), working with a MEMS foundry has been more difficult because in our case there are no PDKs. But we have many specialist fab

engineers on our team who understand MEMS processes, and we are now ready for production. We think this knowledge is extremely valuable and difficult to develop and obtain.

**IN Who are your main customers and what are the KPIs of your products?**

**PB** Currently, our main customers are in the US and Canada. The main advantages of our products for data centres are lower cost, lower energy and lower latency. As regards to low power, most datacentres operate between 50 and 100 Gbps. The trend we prepared for is towards 400 Gbps, which requires considerably more power. Whereas the power consumption of the switch part of a 100 Gbps is 2-3 Watts, it increases to 12 Watts for a 400 Gbps transceiver. As a result, conventional 400 Gbps transceivers on the market today are prone to overheating and need rebooting – a problem that our low energy products can overcome.

The other driver is the need for latency reduction for high performance. We're heading toward data centres with co-packaged optics, where the GPUs, CPUs and the components will all require optical circuit switching as in our R.O.C.S. 8 to reduce latency.

What we're doing in terms of strategy is to demonstrate our product applications allowing our customers to validate that there's a sizeable return on investment and then build our products to their preferred form factors.

**IN How do you see the future?**

**PB** 2023 will be an important year for us because after so many years in R & D, we'll be ready to fully commercialise the technology and scale up. This will also be a big challenge because scaling up from a few hundred devices to a few thousand devices and then to even larger quantities, will require more investment and a doubling of our workforce. We will remain fabless, which will mean finding the right fab partners to be able to scale up on chips and optical packaging as well as suppliers for components. We're not out of the global supply shortage yet, and with the recent geopolitical upheavals, there's a need to remain cautious and conservative in our approach.

**IN If you started again, what would you do differently?**

**PB** At a personal level, I'm very happy with my career but I wish I would have started as an entrepreneur

earlier. On the other hand, as the ship's captain, you never know how good you are until you encounter troubled waters. My previous experience has made me who I am, it taught me a lot and prepared me to be able to manage both the good and the bad times.

As regards to AEAPONYX, and this is advice I give to young entrepreneurs, I would ask for more investment in the beginning. As Mark Twain said "They did not know it was impossible, so they did it" - meaning that to succeed in life, you need to be brave and have confidence. When you go into something new it's impossible to predict what's going to happen in the future, and there's a tendency to underestimate how long it will take and how much you will need. In our case, the project has taken almost eight years to monetise. ☺



Philippe Babin  
CEO, AEAPONYX.

New Decade  
New Logo  
Same Mission

## UPCOMING EVENTS

<p><b>EPIC VIP Networking Reception at OFC</b> 8 March 2023. San Diego, CA, USA</p> <p><b>EPIC Members Run at OFC</b> 9 March 2023. San Diego, CA, USA</p> <p><b>EPIC Members Lunch at OFC</b> 7-9 March 2023. San Diego, CA, USA</p> <p><b>EPIC Online Technology Meeting on Micro LED for Automotive Applications</b> 13 March 2023. Online Event</p> <p><b>EPIC Annual General Meeting 2023</b> 29-30 March. Helsinki, Finland</p> <p><b>EPIC TechWatch at W3+Fair 2023</b> 30 March 2023. Wetzlar, Germany</p> <p><b>EPIC Meeting on Fiber Sensors at HBK FiberSensing</b> 19-20 April 2023. Porto, Portugal</p> <p><b>EPIC Online Technology Meeting on Photonics for Climate Change Monitoring</b> 24 April 2023. Online Event</p>	<p><b>EPIC Meeting on Photonics for AR/VR/MR: from Design to System Integration and Mass Production at Jabil Optics</b> 11-12 May 2023. Jena, Germany</p> <p><b>EPIC Online Technology Meeting on Additive Manufacturing</b> 15 May 2023. Online Event</p> <p><b>EPIC 20th Anniversary Celebration</b> 26 June 2023. Munich Germany</p> <p><b>EPIC Meeting on Micro-Optics at Laser World of Photonics</b> 27 June 2023. Munich, Germany</p> <p><b>EPIC Meeting on Ultrafast Laser Processing at LASER World of PHOTONICS</b> 28 June 2023. Munich, Germany</p> <p><b>EPIC CEO Exhibitor Breakfast at LASER World of PHOTONICS</b> 29 June 2023. Munich, Germany</p> <p><b>EPIC Meeting on LiDARs on Chips at LASER World of PHOTONICS</b> 29 June 2023. Munich, Germany</p>
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