



Ontario Centres of
Excellence

Where Next Happens

One Chip will Create Buzz with Internet Speed Demons

"This is an example of Ontario innovation at its finest: the idea, the academic expertise and the help from the Ontario Centres of Excellence to bring it all to market."

**Valery Tolstikhin, President and CEO,
OneChip Photonics Inc.**

E-business, high-definition TV, video on demand or just home surfer, Internet speed demons come in many forms with one thing in common – the faster it goes the more they like it!

Since the Internet world is so young, most remember the switch from dial-up to DSL and the way that high-speed opened up new worlds. The next big thing in Internet speed is FTTH PONs, the technical term for Fiber To The Home Passive Optical Networks that will bump Internet speed to up to 1,000 times faster than DSL.

To make this happen, a new approach is needed for design and manufacturing of the optical components enabling Internet at a speed of light to be delivered to every home.

With assistance from the Ontario Centres of Excellence (OCE) Market Readiness Program, that speed revolution is being supported by an enterprising group of Ottawa photonics experts called, appropriately, OneChip Photonics.

OCE's Market Readiness Program provides funding and expertise in bringing an idea to market, supporting Ontario's innovation vision of being the first out of the gate with a new idea, turning that idea into a product, and bringing people and institutions together in a partnership that benefits the consumer.

OCE has been supporting innovation for

nearly 20 years, enabling collaborative relationships between industry and research academics that result in leading edge solutions and the development of bright minds, helping great ideas become part of the Ontario economy in a way that feeds its competitiveness and improves quality of life.

The OneChip effort involves all three: collaboration with the University of Ottawa, funding and market readiness expertise from OCE and federal institutions such as Canadian Microelectronics Consortium. These partners came together to support the development of a component for PONs that will change the marketplace. OCE has provided OneChip with critical seed capital funding in the form of a \$100,000 grant from its Market Readiness Program.

Why the one chip moniker? Inside the PON's optical network unit, or ONU, there are elements of the optical gear that send and receive the optical signals transmitted over the network. Currently, assembly is done by hand, making the ONUs expensive to produce and affecting the overall price of the technology.

"We knew there was a way, using integrated photonics technology we've been developing over a number of years, to make this much less expensive," says OneChip President and CEO Dr. Valery Tolstikhin. "Our design team had the vision, we just had to take the right steps to bring it to reality."

The solution is to assemble all the optical pieces that go in the ONU on a single photonic chip, reducing the packaging cost and eliminating optical alignment by hand. This results in reducing the cost of the optical part of the ONU by an order of magnitude,

which makes the business case of mass deployment of FTTH PONs by telco companies very attractive. FTTH PONs are being deployed very rapidly in North America, South-Eastern Asia and Europe, and the global market is already in the range of tens of millions components a year, with almost unlimited potential for growth.

Almost as interesting as the one chip technology is the way the company came to life. With a void created by the demise of Ottawa-area MetroPhotonics and its state-of-the-art fabrication facility, the core of its design team led by Dr. Valery Tolstikhin joined forces with Dr. Trevor Hall at the University of Ottawa, an academic leader in photonics research who previously has collaborated with Dr. Tolstikhin's team in MetroPhotonics on a number of projects.

"This is a talented group of people and their work integrates perfectly with what we are doing at the University of Ottawa," said Dr. Hall. "The best part of this collaboration is that some University staff are able to work on the project, and that only enhances our research capacity."

After the design comes the fabrication of the chip and another key collaboration with the Canadian Photonics Fabrication Centre (CPFC) at the National Research Council (NRC). Fabrication (or "fab" as it is generally known in the photonics industry) is essential to the viability of any photonics operation. CPFC was the answer – a state of the art facility and very experienced fabrication team of NRC and ex-Nortel engineers.

The prototype preparation is underway and the one chip should be on the market in 2007.