

ASIAN INNOVATION AWARDS

Optiqua Helps Ensure Safety of Water Supply

EventLab System Is Being Tested in Singapore and the Netherlands

By ANDREW LAVALLEE

Cities invest heavily to ensure that their drinking water is safe, and while most treatment facilities keep close watch on their supply, water becomes harder to monitor once it goes into vast networks of pipes and other distribution infrastructure.

Optiqua Technologies Pte. Ltd., a Singapore-based firm that is an Asian Innovation Awards finalist, has developed a warning system that water utilities can use to detect minute changes throughout their network. The system, called EventLab, is being tested by suppliers in Singapore and the Netherlands.

EventLab uses optical, silicon-based chips that gauge changes in refractive index. That is a measure of how light travels through a substance—pure water, for example, has a refractive index of 1.33—and if it is modified or has other substances added to it, the refractive index changes.

“The beauty of this concept is that refractive-index measurements, therefore, react to any chemical contaminant, any contamination of the sample,” said Melchior van Wijlen, Optiqua’s managing director and one of its founders. “That makes it possible to use one simple chip to monitor the full spectrum of possible chemical contaminations.”

That is important because while water is closely monitored at treatment plants, he added, once it leaves the plant, “it goes into the distribution network, which is miles and miles of pipes before it ends up in your tap.”

That network is vulnerable to decay and contamination as well as potential terrorist attack, as some security experts have warned, since water outlets are widely available in homes, businesses and public spaces.

“Security is not just a matter

of having cameras everywhere,” Mr. van Wijlen said. “Security threats are increasing in the world, especially in high-density urban areas, so definitely this is also an aspect that makes it more and more important to be able to detect anything that goes wrong, anything that happens within your distribution grid, as early as possible.”

Singapore’s national water agency, PUB, first reviewed EventLab in lab tests, then rolled it out in small pilots and now expects to expand it throughout the city, said Harry Seah, director of PUB’s technology and water quality of-



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fici. Singapore uses about 1.7 million cubic meters of water a day.

EventLab’s chips are incorporated into sensors that can be placed throughout pipes and other accessible locations in the network. Optiqua combines those sensors with software and data algorithms that help utilities make sense of the changes detected, and cities can calibrate the sensors to reduce false positives and ensure they’re seeing what is relevant, said Mr. van Wijlen.

The end user, typically a water-utility operator in a control room, sees an overview of the network with the ability to zoom in on different locations and receive alerts when a threat is detected. He can review the data to assess its severity as well as whether it appears to be spreading to another part of the network. This kind of information helps utilities prioritize their inspections and maintenance, and respond more quickly to areas where alerts recur, Mr. van Wijlen said.

Singapore, like many other cities, has until recently surveyed its water supply on a macro level, Mr. Seah said. “We have some physical or chemical parameters, like conductivity, pH, total chlorine and temperature, and we use those, in a way, as indirect indicators that the water is OK. But this is still a very indirect inference of the water quality.”

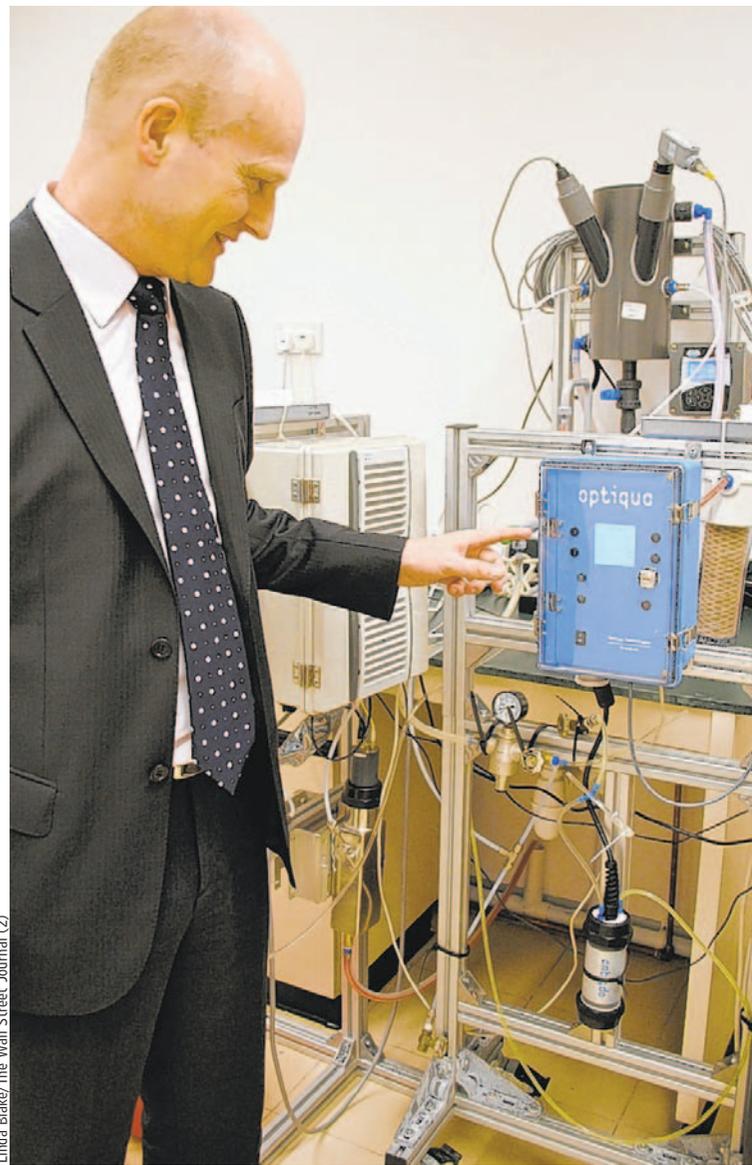
EventLab lets them work on a micro level, he said, giving them more information on the location of a contamination. “If there’s a problem, we know where,” he said. “From an operations point of view, it’s a much faster response.”

Optiqua, a unit of Netherlands-based **Optisense BV**, employs 25 people in Singapore and the Netherlands, primarily physicists and engineers. It plans to continue work on its technology as well as add more products to its portfolio, Mr. van Wijlen said. EventLab, which is patented, acts as “a generic indicator”—it can note a contamination but doesn’t say what the contamination is, he said. For that, Optiqua is developing another sensor, called MiniLab, that is designed to detect specific substances and, in addition to working in tandem with EventLab, has additional applications outside the water industry.

The company is in talks with other firms about potential partnerships, as well as utilities in the U.S., Europe and Asia for more EventLab pilot tests. As concerns about water safety have grown, interest in stronger monitoring tools has as well, said Mr. van Wijlen said. “By not monitoring within the grid itself, basically you’re closing your eyes.”

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Optiqua Technologies’ Melchior van Wijlen shows the EventLab probe, which detects toxic substances in drinking water. The contamination detector, below.



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