
Starting Up With Harsh Environments

After developing fiber sensors for harsh environments, the department's Photonics Laboratory spun off a company to meet an immediate need by the U.S. Air Force for jet engine instrumentation.

Before the Virginia Tech breakthrough, taking measurements at high temperatures in harsh environments had been difficult and costly. For example, in coal gasification plants, where the temperature is critical to the process, thermocouple temperature sensors are corroded in just a few hours. In high-temperature, high-pressure oil reservoirs, conventional sensors last only 300 hours after installation — and it costs more than \$1 million to pull the head and replace the sensors.

Tech's new sensors can provide multiple years of service in environments characterized by high temperatures (approaching 3500° F), high pressures (exceeding 20,000 psi), intense electromagnetic fields, and corrosive atmospheres.

"There are many applications of the new sensor technology, ranging from petrochemical to aerospace," said Russell May, president of Prime Photonics, Inc., the new spin-off company. "However, we are initially concentrating on developing a family of sen-

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**— Russell May, President
Prime Photonics**

sors that can be used in instrumentation in gas turbine and jet engines."

May and Anbo Wang founded Prime Photonics in 1999, and are currently negotiating with VTIP for rights to the sensor technology. May, who had prior experience in a start-up firm as one of the founders of Fiber & Sensor Technologies, Inc. (now Luna Innovations), handles the business operations and has contributed to its growth.

Although he is a co-owner of the company, Wang, who is a professor and director of the Photonics Laboratory, does not take an active role in the day-

to-day operations of Prime. "I concentrate on the company, and Wang concentrates on Tech's rapidly growing Photonics Laboratory," May said.

Prime was established through a Phase I SBIR grant through the Air Force. "We are still in the R&D stage because of the very strong emphasis on reliability and safety by the ultimate end users of the technology," May said. "The sensor instrumentation will require extensive laboratory and field testing before being adopted on a widespread basis. The applications will not be just military, although initially it will be because the Air Force has immediate needs," he said.

"We are excited about working with the Air Force," he added. "They are results oriented. We are working on an industrial, not an academic, schedule. They have a research objective they see our technology fitting in, and they are holding our feet to the fire to meet their objective."

In addition to serving as president of Prime, May has a half-time position as a research assistant professor on the department's faculty. "I am officially half time in both positions but it seems like full time at both places," he commented.

"Starting up Prime has been pretty demanding on my time," he continued. "Over and above the technical work, I'm spending time on the job learning how to run a company. I was classically trained as an engineer, so it has been a matter of constant learning on the job," he said.

"Fortunately, the Blacksburg environment is a particularly good one to be in that position because of the opportunities afforded by the university and its affiliated organizations, such as the Business Technology Center and the Small Business Institute. Also, we have an office at the Corporate Research Center, which is a good environment. There are other start-ups with which to collaborate or commiserate, depending on the day," he added.

One of May's prime concerns is staffing up as the firm grows. "I do not think we will be as constrained by funding as by labor," he said. "I am concerned how we will find the qualified engineers who will do the work." At this point, he does not have a plan to use students as employees, although he would



Left: Russell May, president of Prime Photonics, aligns a sapphire optical fiber as he prepares to measure the optical losses in the fiber before using it to construct a high-temperature sensor. Right: Anbo Wang, co-founder of Prime Photonics and director of the department's Photonics Laboratory where the sensor technology was developed.

be open to the possibility. "I'd prefer full-time employees," he said, "but it depends upon my success in recruiting."

"If we were to hire graduate students to work at Prime Photonics, I would hope that, when they completed their studies, the company would be successful enough that they would grow into ownership and remain part of the success of the company.

May has enjoyed the current atmosphere of encouragement and enthusiasm concerning spin-offs

in the university community. "This is new territory for the university," he said. "It seems the administration is embracing the concept and that the mechanisms are falling into place in a way that protects the interest of the university in education and research, yet leads to economic development in the community.

"It is one of the missions of a land-grant university," he said.