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January 23, 2011 8:00 PM

Meeting little friction: Accuri founder's new lubrication technology removes water from mix

Fusion Coolant Systems Inc. would seem to have nothing in common with **Accuri Cytometers Inc.**, other than being spun off from the **University of Michigan**.

Ypsilanti-based Fusion has devised what it hopes will be a better way of lubricating the cutting and drilling tools involved in industrial applications like engine blocks, and at the same time reducing contaminated byproducts and airborne health risks for workers. The goal: Make old-school manufacturing tasks cleaner and use less energy.

Accuri, by comparison, makes desktop instruments that silently automate cell analysis for university and biotech researchers looking to find the next big drug or launch the next startup.

But both companies were founded by the same associate professor at UM: Steven Skerlos, the chairman of graduate education in mechanical engineering.

Since he was a graduate student at the **University of Illinois** in the 1990s, Skerlos has focused on cleaning up the polluted oily water that is a byproduct of machine tooling.

Ann Arbor-based Accuri was founded in 2004 and struggled with funding for years until it found market acceptance and began generating substantial revenue, estimated to be more than \$10 million last year.

Fusion, which uses a cooled and pressurized mix of carbon dioxide and oil to replace the traditional mix of water and oil that cools industrial cutting tools -- it hits the cutting surface at temperatures between minus 20 and minus 60 degrees centigrade -- was founded last January and has begun making strides.

"This company is one year in, and it feels a lot better than Accuri did one year in," said Skerlos. "The path to market for Accuri was a lot less obvious. Here, there's a clear need to be filled."

Fusion Coolant has found an industry veteran to lead it, has landed a first customer and has won \$694,000 in federal small-business innovation research grants in the past year. It hopes to raise \$500,000 in angel funding later this year. It employs six and is hiring, looking for a field-service engineer and a sales rep.

"If there's one place on Earth you can launch this startup, it's Southeast Michigan," said interim CFO Andy McColm, who worked with Skleros when he was with UM's tech transfer office. He was referring to all the machine shops here, large and small, that

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LEISA THOMPSON



Tackling the problem of hazardous materials produced by traditional oil-and-water lubrication of metalworking tools, University of Michigan Associate Professor Steven Skerlos has come up with a new approach.

survived the recession.

McColm is now managing director of the Ann Arbor office of **Early Stage Partners**, a Cleveland-based venture capital firm. McColm will lead the angel fundraising. Fusion is not part of the portfolio of ESP, which invests in early-stage life science companies.

The **National Science Foundation** awarded the company a phase-one SBIR grant of \$220,000 last year, which funded its formal launch, and earlier this month company officials were told by NSF officials that they had been awarded a phase-two grant of \$404,000.

The company also won a phase-one SBIR grant of \$70,000 last year from the **National Center for Environmental Research**.

The NCER said Fusion Coolant's metalworking fluids -- which the company calls CHiP lubes, for cryogenic high pressure lubricants -- promise better cooling and increased lubrication. They also "have a much lower environmental footprint ... and also eliminate health risks to workers arising from chemicals and microorganisms in metalworking fluids.

Traditional machining fluids combine water and oil. That requires surfactants to get the two to mix properly, and those surfactants released into the air present health problems. In addition, water breeds bacteria that can be released and has on occasion caused Legionnaire's disease. Biocides used to lower bacteria counts create other problems for workers.

Then there is the cost of disposing of the hazardous wastewater.

Last October, Fusion hired Tom Gross as CEO, a veteran with nearly 30 years experience in machining tooling. He was manufacturing engineering supervisor for **General Dynamics Land Systems** at the Warren tank plant from 1985 to 1991 and COO of Farmington-based **Durr Production Systems** from 2002 to 2003. Durr Production is a \$40 million division of the **Durr Group**, a \$2 billion company based in Stuttgart, Germany.

"If you'd ever been in a machine shop on a 90-degree day and seen the haze of fluids in the air, you'd see the need for this technology," he said.

Fusion provides both coolant and the components to deliver it from storage tanks to the cutting surface, both of which are subcontracted out at this point. Gross said he landed his first customer in December -- **Paramount Precision Products Inc.** of Oak Park -- "and I'm talking to a \$2 billion Japanese company that is looking to add our components as an option to their catalog."

Sheila Rossmann is CEO at Paramount, a precision machine tooling company founded in 1948. She said that in addition to being Fusion's first paying customer, she is providing office space so Fusion employees can monitor progress at Paramount as it ramps up implementation.

"This is going to lower the cost of production, it's going to reduce coolant intake and it's going to lower the cost of getting rid of byproducts," said Rossman.

Gross said revenue should hit \$500,000 this year and \$1 million in 2012.

The company is based for now in the Spark East incubator facility in downtown Ypsilanti. It recently signed a lease for a 700-square-foot sales office in the front end of an old tool-and-die shop in Oak Park.

Though Fusion Coolant wasn't officially spun off as a for-profit company until last year, the technology had several years of financial support behind it. It has received funding via UM's tech transfer office, the **Michigan Universities Commercialization Fund**, the UM college of engineering, the **Michigan Microloan Fund** through **Ann Arbor Spark**, and, at last spring's **Great Lakes Entrepreneurs Quest**, an investment of \$12,500 for winning the fifth annual Automation Alley crainsdetroit.com/apps/pbcs.dll/article...

Innovation Award for Advanced Manufacturing.

"It's an eco-friendly approach to manufacturing and allows for faster processing time," said Tom Anderson, director of entrepreneurship at **Automation Alley**. "There's a need to get solvents out of the manufacturing process, and by reducing bacteria contamination, it's good for worker health, but what will make it a big seller is if lets customers cut more inches per second."

Burak Ozdoganlar met Skerlos when they were both at the **University of Illinois** and has kept in touch. He told Skerlos that there could be applications at the opposite end of the manufacturing scale from what he'd been envisioning.

Better cooling and lubricating was needed in cutting metal for such old-line applications as engine blocks, but it was also needed to help shape polymers, metals and ceramics in the very tiny micromachining world that fabricates such things as microfluidic channels or needle arrays in medical devices and the very small features such as gears and levers that go into miniature electrical devices.

Last fall, Ozdoganlar, an associate professor of mechanical engineering at **Carnegie Mellon University** in Pittsburgh, began testing Skerlos' system of CO2-based cooling and lubricating in his lab.

"The advantages were much more in micromachining than in regular machining. We've seen considerable advantages in the features we can create. For example, we've been able to reduce burr formation, which can be quite a problem in micromachining."

Timothy Hull is supervisor of machining and tooling development for advanced powertrain manufacturing for **Ford Motor Co.** He started vetting Fusion Coolant technology for UM in 2006 and continues to evaluate it in his lab in Livonia.

"In the applications we've looked at, it provides superior cooling of cutting tools, which significantly extends tool life and increases cutting speeds," he said, particularly with the super-hardened compacted graphite iron that is used to make engine blocks.

He said that while it is clear that the technology offers improvements in cooling and in reducing contaminants, it is a disruptive technology that can pose an impediment and a budget issue when introduced in a company like Ford that has such vast machining needs. Even if the technology comes in the form of a relatively small component that can be added to existing equipment, the total outlay is huge.

"It provides a benefit to the machining process, but you need to do an accurate cost-benefit analysis," Hull said. McColm said for now the company will focus sales on smaller companies, which have lower costs associated with changing machining processes.

"People talk about a triple bottom line. ... It will be good for the environment, good for the people using it and good for profit margins," he said.

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