



Engineering marvels

MSE solves big problems

STORY AND PHOTOS
 BY TIM TRAINOR
of The Montana Standard

If your business has problems, MSE Technology Applications Inc. can solve them.

Not small problems, mind you, like running low on toner or an office-wide pinkeye outbreak.

MSE solves big problems, like taking over where the Ph.D.-wielding scientists of a multi-billion dollar company leave off, and turning a small company's big ideas into reality.

"We've found our niche," President and CEO Jeff Ruffner said. "We solve difficult problems with practical solutions."

He said the company fits snugly between the huge government contractors and the smaller companies without the ability to test or manufacture their own products.

The company, headquartered south of the airport off Basin Creek Road, was formed in 1974 to test and engineer MagnetoHydroDynamic

(MHD) technology.

For 15 years the company studied the technology, which they proved could burn coal at high temperatures and flow the resulting gas through a magnetic field, thereby increasing a plant's efficiency by 15-25 percent.

Once the technology had been mastered, the next stage of development was construction of a new MHD plant.

"The utility industry did not proceed with an MHD plant as the technical and capital costs were perceived to be too high," said Neil Eaton, MSE's senior vice president.

Energy costs were relatively low, and there didn't seem to be much future in MHD research. So, in 1989, the company decided to largely abandon it and branch out. MSE diversified and took on work from the U.S. Department of Energy, the Environmental Protection Agency and the Department of Defense.

Currently, the Butte facility is testing a wide array of technology, including a wind



JUNE PUSICH-LESTER, above left, runs the control center that records data from MSE's wind tunnel technology program. She is explaining some of the center's video capabilities to Senior Vice President Neal Egan, left, and CEO Jeff Ruffner.

JOE MCLEAN AND MIKE WILLIS, top photo, discuss ways to increase fuel pressure to a giant piston that will eventually test missile defense technology.

tunnel that engineers hope will eventually be able to test how materials respond once they hit hypersonic speeds.

"It's made to test the exact

re-entry conditions of missiles," Ruffner said.

MSE signed a five-year contract with the Department of Defense to develop the wind

tunnel technology, which can not only be used for missile studies, but also space vehicles and aircrafts using propulsion

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ENGINEER JIM MCCONNELL of MSE has been working to develop a low-cost surveillance system for the U.S. Air Force. His current design is about the size of a coffee can.

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technology.

Ruffner said the immediate effects of the wind tunnel study could improve the country's missile defense system. It could give scientists a glimpse of how missiles behave when they enter the earth's atmosphere.

But, as of now, there is no wind tunnel.

Engineers Mike Willis and Joe McLean are first working in the large, spacey Mike Mansfield Advanced Technology Center, tinkering with a large piston and a maze of fuel hoses to discover ways to produce highly-pressurized air.

Eventually, that piston will be used to pump air more than 20,000 times more pressurized than what we feel on earth into the wind tunnel at hypersonic speeds.

The wind tunnel is not the only project currently under way at MSE. The company is also testing or manufacturing a variety of other products, too.

Engineer Jim McConnell is currently working on a project for the U.S. Air Force, called Watchkeeper, the goal of which is to provide surveillance over a large area, like an international border.

Watchkeeper uses a network of low-cost, easily deployable sensors equipped with radar to detect intrusions, small cameras to snap a photo of all human-size motion, and an ability to send those images back to a command center in real time.

McConnell took a prototype of the project and miniaturized it, so it is roughly the size of the coffee can. Running for months on only a few batteries, the nodes can withstand extreme heat or cold, vibration, shock and sand.

"There's certainly a feeling of accomplishment," said McConnell, whose work has helped put the Watchkeeper program on the fast track.

MSE is designing the nodes themselves and testing the materials that will be used to protect them. They will also instruct the Air Force on how best to mount the system, whether along a 1,000 mile stretch of land between Afghanistan and Pakistan, outside a federal penitentiary or around a U.S. Embassy.

And still, the company is working on more projects.

In the developmental stage is the DEPUTEE program, which uses microwave technology to fry vehicles' electrical systems. The

technology could be used to stop cars that pass security checkpoints or venture too close to national security sites and embassies.

Already an MSE product, developed and working in nearly 100 deep wells across the country, is a system invented by their engineers to rid natural gas wells of water.

Using the Bernoulli Principle, Steve Johnson and his team invented a contraption, placed inside a pipe more than a mile underground, that can suck water out of the bottom of the well and release it as mist on the surface.

The invention allows wells that had become bogged down with water to be cleaned out, and the natural gas to flow freely.

Ruffner said the pumps are one example of how MSE, who became aware of the project because of their engineering services, now owns a product that is in high demand in the oil and natural gas industries.

He said about 75 percent of the company's income, which was \$21 million in the 2007 fiscal year and is expected to grow another \$2 million this year, comes from selling their services.

For example, another company will contact MSE to test, improve or redesign their project.

That's where Ruffner says his 150 employees excel. "We solve problems other people can't," he said. "It's just our employees' way of thinking — trial and error, not getting frustrated, using knowledge from one project on another."