



MICHAEL MOORE / Sentinel Staff

VISIONARY JOB — Precitech project manager Jeffrey Roblee explains the function of a precision lathe, or turning machine, in creating a component for the James Webb space telescope, the successor to the Hubble telescope.

Shoot for the stars

NASA grant means big things for Precitech

By IAN BAGLEY
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“IT’S WORTH A LOT TO (NASA) TO MAKE THIS REALLY FUNNY-SHAPED PART.”

— **JEFFREY ROBLEE, PROJECT MANAGER**

It could help us understand the origin of the universe.

It may lead to new technologies that will change the way we fight wars, build computers, and do everyday things such as driving or watching TV.

And there’s a chance that it will triple the size of Precitech Inc., a Keene-based company that’s one of the world’s leaders in a process called machine diamond turning.

Precitech and North Carolina State University received a \$600,000 NASA grant in March.

They will use the grant money to continue their work designing and building a machine that can make a special part NASA needs for a new stellar telescope it plans to build.

Precitech’s grant was one of 24 Congress approved nationwide as part of the second round of grants of the Small Business Technology Transfer program.

The James Webb space telescope, a successor to the Hubble telescope, is intended to capture light still shining from the dawn of the universe.

The special part, made of aluminum, shaped somewhat like a football, and about 4 inches square, has to be precisely shaped down to the nearest micrometer to reflect the light properly, project manager Jeffrey Roblee said.

In other words, it has to be perfect to the nearest 20 millionths of an inch.

Building machines that can carve objects with that level of precision is the specialty of Precitech, a 100-employee firm owned by American Capital Strategies.

It’s also the specialty of Precitech’s only North American competitor, Moore Nanotechnology, also in Keene.

“We use single-crystal, gem-quality diamonds polished to a very round, very sharp edge, but

the diamonds themselves don’t turn. They’re used on a turning machine, which is another word for a lathe,” Roblee said.

These ultra sharp diamonds carve shapes out of aluminum, plastic, and other materials, Roblee said.

A simple lathe is good at making parts that are symmetrical. But the component NASA needs isn’t. And therefore the machine Precitech hopes to design is more complicated.

The grant gives Precitech two years to build the machine with help from professors at North Carolina State.

The idea for the project arose several years ago, when NASA asked professors at North Carolina State to develop a way to build the special component.

See **PRECITECH** on Page 18

Precitech eyes the stars with a \$600,000 grant

(Continued from Page 15)

In 2003, Precitech and the university, which uses Precitech machines, applied jointly for a \$100,000 Small Business Technology Transfer grant to work on their idea for a more sophisticated diamond-turning machine to make the part quicker and better than existing machines can.

This year’s grant award is a follow-up to that earlier work; the idea now is to turn the designs into an actual prototype that’s ready for production.

“It’s worth a lot to (NASA) to make this really funny-shaped part,” Roblee said.

Four engineers and several other technicians will work on the project for the next two years, with engineering professor Thomas Dow and others at North Carolina State.

If the company can pull it off, this machine could have applications in many other areas, from car engines to computers to eyeglasses to missile targeting systems, company President Michael Jannish said.

Automobile manufacturers, for example, are interested in using the technology to produce cars with “heads-up” displays that are projected onto the windshield of cars, similar to the projections used in fighter planes, Jannish said.

And the technology may allow infrared sensors to help drivers locate the edges of the road at night, he said.

That’s partly the point of the grant, Roblee said — to help companies develop new technologies that will have commercial uses as well as government-related ones.

“I foresee that this could be utilized in ways we can’t even imagine today,” he said.

Developing technologies is a big part of Precitech’s business, which relies on sales of a small number of machines priced at between \$200,000 and \$800,000.

Precitech’s customers are striving to flatten projection televisions, improve the quality of digital cameras, increase the speed at which computers read and write data, and do other things better and more quickly, requiring ad-

vancements and improvements in Precitech’s machines.

Optics driving market

Precitech has been in business since 1968, and has sold about 900 machines, of which only about 50 are no longer used. That means the company is always looking for new customers, because a typical customer may buy only one machine and never replace it.

Optics represent about 85 percent of Precitech’s business.

Its customers include companies that make the lenses implanted in the eye during cataract surgery, as well as the molds that make the plastic lenses that go in DVD players and disposable cameras.

Janos Technology, a Keene company that makes infrared sensors, is one local customer. Another is Corning NetOptix, a maker of sophisticated optical components for defense and aerospace applications.

In past decades, the triggers on many American nuclear warheads were made with Precitech machines — and about two dozen radioactive machines used for that purpose have been buried in Oak Ridge, Tenn., Jannish, the company president, said.

Sales dropped a little in 2003 when the telecommunications industry fell through, he said. But this year things are looking up again: the company expects to sell another 75 machines, bringing in about \$20 million in revenue.

Precitech sells worldwide; its biggest competitors, such as Toshiba, are in Japan, Jannish said.

Over the long term, the company relies on innovation, but the investments of time and money needed to explore and test new technology can be a big loss if the explorations don’t produce results.

The riskier the idea, the harder it is for Precitech to justify taking the plunge, which is why the grant is important, Roblee said.

Risk is one of the things NASA looks at when selecting grant recipients, Roblee said.

“If it was a great business opportunity and there was no technical risk ... we could probably go to our bank and fund it,” he said.