

Small company ... big job

MSE takes on Navy project to make launching fighter jets safer

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In a night-vision video, a man's silhouette moved swiftly across the deck of a U.S. Navy aircraft carrier.

In a blink, he disappeared, sucked into a fighter jet's roaring engine like dust into a vacuum cleaner.

"That's one of the most dangerous jobs in the world," said Jim McConnell, Navy program manager at MSE Technology Applications, as he narrated the horrific video.



From left, Dave Micheletti, Fred LaForest and Jim McConnell stand outside MSE headquarters in Butte recently. The men are working to develop technology for the Navy.

The man on the tape was a Navy hookup petty officer. His job was to crouch under a revving F-18 engine to check the position of a launch bar — a tool critical for a fighter jet's successful takeoff from an aircraft carrier. While the man on the video survived — his helmet jammed the blades — others in his job have perished in jet engines.

Now, Butte engineers are trying to eliminate that risk.

MSE, through federal funding, has created technology that could someday soon replace hookup petty officers on aircraft carriers, reducing injuries and expenses.

"It's exciting to think a small company in Butte, Montana, can provide a function that saves lives," said Dave Micheletti, vice president of the advanced energy and aerospace division at MSE.

Taking off

On a conference room table at MSE, in the Butte Industrial Park, sat two cylinders the size of AA batteries and a black box the size of a thick dictionary.

"It's a very sophisticated camera and software," Micheletti said, holding the tiny cameras in the palm of his hand.

While small, the inventions have a huge responsibility: taking rapid pictures and measurements of launch bars on aircraft carriers.

They are products of MSE's U.S. Navy Autonomous Launch Bar Seating Check project. The initial research, started in 1999, was funded through \$1.05 million in competitive Small Business Innovation Research contracts.

The project began when the Navy started searching for solutions to dangers posed when F-18s take off from aircraft carriers — massive ships that allow planes to launch at sea.

See BIG JOB, Page D4 As an F-18 prepares for takeoff, a T-shaped bar on its underbelly slides into a mechanism, called a spreader, on the ship's deck, holding it down as the jet engines rev to full power.

If all goes as planned, the launch bar releases on time and the plane takes off.

"It goes from 0 to 200 knots in two seconds," McConnell said.

But if the launch bar fails to completely slide into spreader, it releases too early. The jet, lacking sufficient power for takeoff, crashes into the ocean.

In the past 20 years, the Navy has lost six fighter jets — at \$50 million apiece — because of misplaced launch bars.

Hookup petty officers are supposed to prevent those mishaps by visually checking the launch bar position, but often operate on little sleep and at night. At worst, they risk death. At best, they risk hearing loss.

"Not only is this a problem for the guys late in life, it's a huge expense to the Navy," McConnell said.

MSE's invention takes the human element out of the process, turning responsibility for checking the launch bar position over to technology.

"Our system buries a camera into a deck fixture," McConnell said. "We can see better at night than the hookup petty officer." Deployment MSE's technology is faster, smaller and more consistent than any human.

The two low-light, infrared-sensitive cameras aim at the launch bar, snapping 30 pictures a second. They send images to a computer in the ship's belly.

There, MSE software measures the distance between three points — to within one-eighth inch — to tell whether the launch bar is in position.

If the software finds the bar is misplaced, the plane stays put.

"If the bar is popped out, in a fraction of a second we'll break the circuit," said Fred LaForest, senior computer engineer at MSE and a former Navy officer.

So far, MSE's idea works.

It tested the system on two aircraft carriers — McConnell and LaForest were on deck — and earned good feedback from pilots and crew members.

"It's a real thrill to be able to do something as significant as this and be on the aircraft carrier," McConnell said.

Now, MSE is in the deployment phase of the project, funded by \$2.5 million secured by Montana's congressional delegation.

When a carrier becomes available — all are at use in the Iraq War and elsewhere — the Navy will install the technology and use it for six months to evaluate its effectiveness, Micheletti said.

"Should that be successful, they've told us they plan to retrofit their entire aircraft carrier

fleet with Navy dollars," he said.

MSE's system would cost about \$700,000 per aircraft carrier.

And if the project reaches its full potential, he said, MSE will be successful in more ways than one, he said.

"Our country's at war today," Micheletti said. "The Navy is on the front lines of that war. There are carriers launching aircraft in the Persian Gulf every day. If this does work, it will be an example" of how a small company can play a big role in worldly issues, such as national defense.

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