

# MSU computer reaches space aboard research rocket

October 23, 2014 -- By Sepp Jannotta, MSU News Service

BOZEMAN – A computer built by Montana State University professor Brock LaMeres and his students rode into space Thursday aboard a rocket launched from the New Mexico desert.

Through a series of multiyear grants from NASA, LaMeres, an associate professor of electrical and computer engineering, and his students have built a computer designed to withstand bombardment from the high-energy radiation particles that pass through the radiation shields of spacecraft. While space radiation particles might not permanently damage electrical circuits, they can cause computers to crash. The goal set forth in NASA’s funding is to build a so-called radiation-hardened computer from less-expensive commercial parts.

This latest launch allows the team to collect critical data on how the system performs in the presence of space radiation, LaMeres said.

“We’ve been working on this radiation-tolerant computer system for five years and it is very exciting when we get to see it launched into space where it can be put into the environment for which we built it,” LaMeres said.

The suborbital rocket carried the experimental computer 77 miles above the Earth’s surface, where it traveled into microgravity at the beginning of space for three minutes before coming down at the White Sands Missile Range. Early indications are that the system survived the journey intact, LaMeres said.

“This is one more chance for us to demonstrate this technology before we send it up to the International Space Station, where it will face its most extensive testing yet,” LaMeres said.

This flight represents an incremental step in maturing the computer technology for use in a real NASA mission. This flight was funded by a \$100,000 grant LaMeres’ and co-investigator Todd Kaiser received in 2013 to test the system in space for a few minutes. In June of 2014 NASA announced that MSU is one of five institutions to receive another \$100,000 award and an opportunity to send a computer system into space for a ride aboard the International Space Station in 2015. The space station experiment will allow the computer to be exposed to radiation for up to six months. LaMeres and Kaiser also received a \$200,000 grant to demonstrate the computer as a stand-alone satellite in 2016, which will provide up to two years of radiation exposure.

LaMeres designed the radiation-tolerant computer system with doctoral students Justin Hogan and Raymond Weber who graduated in May, and master’s degree student Samuel Harkness. All four are in MSU’s [Department of Electrical and Computer Engineering](#). Harkness began working on the project while attending MSU as an undergrad.

“It’s beyond anything I could have dreamed of to see our work move from a laboratory environment to having it go up on a rocket,” Harkness said. “And best of all, we are on track to meet an early 2015 delivery to NASA, and from there it’s a matter of when we get slotted for launch to the International Space Station.”

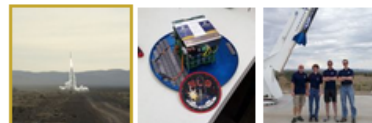
Barring any complications with contractor UP Aerospace separating the computer from the rest of its payload, LaMeres and his team said they should have their system mailed back to Bozeman within a week. From there, they will conduct tests to see how well the system performed.

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A computer built by Montana State University professor Brock LaMeres and his students takes a ride into space on Oct. 23, 2014 aboard a NASA-funded research rocket launched from the New Mexico desert. NASA photo.

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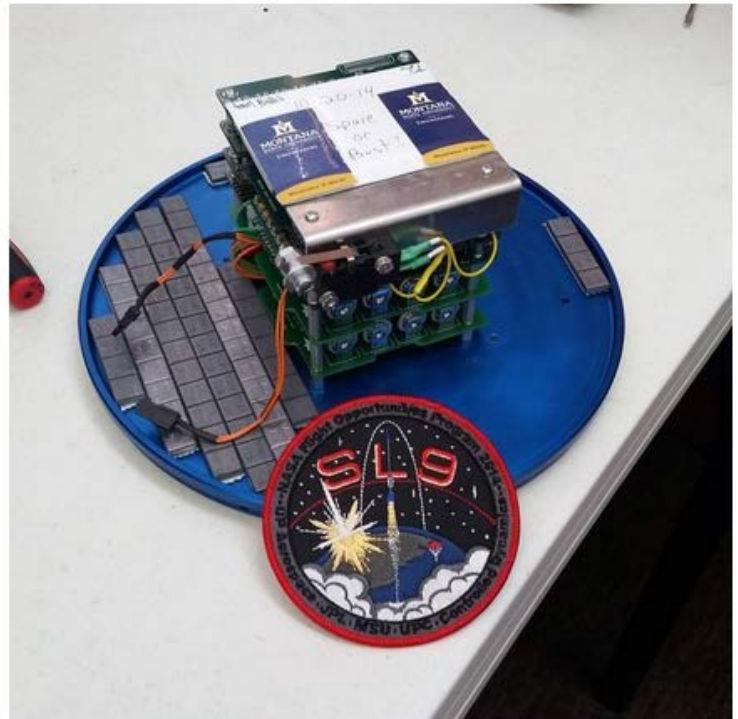
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The original grant to build the computer system came in 2010. It was a three-year, \$750,000 grant from [NASA's Experimental Program to Stimulate Competitive Research](#) (EPSCoR), the same agency that awarded LaMeres the opportunity to fly his technology on the International Space Station.

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"This project shows that MSU is continuing to do research that is critical to NASA's mission," LaMeres said. "And it is giving us the chance to contribute to the development of the next generation of scientists and engineers."

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Montana State University professor Brock LaMeres and his doctoral students Justin Hogan and Raymond Weber, who graduated in May, and master's degree student Samuel Harkness stand beside a rocket that will carry their radiation-tolerant computer system into space. All four are in MSU's Department of Electrical and Computer Engineering. Photo by Raymond Weber.

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A computer designed at Montana State University sits ready to ride into space aboard a NASA funded research rocket. Through a series of multiyear grants from NASA, Brock LaMeres, an associate professor of electrical and computer engineering, and his students built a computer designed to withstand bombardment from the high-energy radiation particles that pass through the radiation shields of spacecraft. Photo by Brock LaMeres.

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