

The Pueblo Chieftain

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Pueblo engineer powers Mars craft

Jeff Coyne is part of a four-man team that provides solar electricity for Phoenix Mars Lander.



COURTESY PHOTO/PAT CORKERY Pueblo native Jeff Coyne (middle) and other members of the Phoenix Lander launch team celebrate after telemetry data confirms that both of Phoenix's solar array wings had deployed successfully on Mars a week ago

By PETER ROPER
THE PUEBLO CHIEFTAIN

OK, so this really is rocket science.

Last Sunday, when the Phoenix Mars Lander blazed down through the Martian atmosphere to a controlled stop on the surface of the dusty Red Planet - 420 million miles from Earth - Jeff Coyne's life suddenly got very intense.

The Pueblo engineer, a veteran of two previous Mars projects, knew all the scientists in the Phoenix Lander project now were looking at Coyne's four-man "power" team. Their time had come to turn on the robotic lander's two solar panel arrays, unfold them like Japanese fans in the cold Martian atmosphere, and give the lander the electricity needed to operate, stay warm, and send data and images back to Earth in the coming months.

After all, it wouldn't have been the first time that millions of dollars in research and planning had fizzled into nothing when a Mars lander crashed or just failed to work on arrival.

"It takes about 15 minutes for any command to get to the lander from Earth," the 44-year-old Coyne explained last week, from his Lockheed Martin office in Denver. "So giving Phoenix a command and getting an answer back is a 30-minute job."

For Coyne, the thrill came when Phoenix's solar arrays fanned out and the robotic explorer came fully alive, setting the stage for what NASA engineers and other researchers hope will be five months of Martian exploration around the planet's North Pole.

"I couldn't be happier," Coyne said. "It's absolutely thrilling, seeing everything work the way you designed it. A project like this involves months of sometimes tedious planning that finally pays off when you get to Mars." Coyne is the lead power engineer on the Phoenix project, meaning his team is responsible for keeping the lander running, using solar power and storage batteries - not a small challenge in a frigid Martian atmosphere where temperatures routinely fall to a minus-140 degrees C. The lander has touched down near the planet's North Pole as well, which cuts down even more on the available sunlight.

One of Coyne's tasks was to figure out how to keep the lander warm enough for its electronic systems not to freeze.

"We designed the project to last for 90 days but we hope that lander will function for up to 150 days," Coyne said.

The Phoenix Lander was created by a consortium of partners. The University of Arizona is leading the mission, with operational support from NASA's Jet Propulsion Laboratory in Pasadena, Calif., and Lockheed Martin in Denver. The Canadian Space Agency is taking part as are several European universities.

Besides the deep Martian cold, Coyne worries about dust. The atmosphere on the Red Planet is much thinner than Earth's, but there still are winds and dust storms. The most severe storms appear to be near Mars' equator and scientists hope that by putting the lander down near the North Pole, it will be spared most of the dust storms.

"If the solar panels get covered in dust, that cuts down on the amount of power they can generate," Coyne said, adding that Phoenix has no way to shake its panels to clear dirt away. "But Martian winds can come along and blow the dirt off as well."

On Friday, the lander's operators were delighted when it's robotic arm unfolded on command and demonstrated it is functional - ready to start digging into Mars' soil in a search for ice and other basics for life.

"The biggest challenge we faced was in how to array the solar panels to get the most power that we could out of the available space on the lander," Coyne said. "That's how we ultimately ended up designing them like fans."

Mars is much farther from the sun than Earth, so Coyne's power system had to be designed to grab as much light as possible.

Coyne grew up in Pueblo, graduated from South High School in 1982 and then obtained his electrical engineering degree from Colorado State University in Fort Collins. He has worked on the Martian Rover projects and for Lockheed Martin for the past five years. He was at Cape Canaveral last year when Phoenix was launched and isn't shy about his enthusiasm for space flight and exploration.

"There is nothing like seeing a launch. It is incredible," he said.