

Taking a very close look at Mars

Bromont's dalsa built camera part. Image sensors built in Bromont will help NASA's rovers see the red planet

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NASA will launch the first of two Mars exploration rovers from Cape Canaveral on Sunday, but it'll be early January before Robert Groulx will see the fruit of his labour.

That's when the rovers (the second goes up on June 25) are to start taking pictures of Mars using digital cameras built using image sensors that Groulx helped manufacture at Dalsa Corp. in Bromont.

If all goes well, the rovers will reach Mars in January, then start beaming images to Earth.

The main aim is to learn about the planet's climate and water, and see how suitable past conditions would have been for life.

"The cameras are key to the mission - they're the eyes that will see what we're going there for," said Groulx, the engineer who managed production of the devices for the rover.

"We have built the eyes."

Though 20 of 33 previous missions to Mars failed, the planet still has a hold on scientists.

On Monday, the European Space Agency launched its Mars Express mission, with its Beagle 2 lander expected to land in December, looking for traces of life.

NASA is spending \$800 million U.S. on its mission, sending identical rovers to land on different regions of Mars. Each is outfitted with nine cameras.

Three are for scientific study. One is a high-resolution microscopic camera that will help scientists determine how rocks and soils were formed.

The other two are part of a panoramic camera that NASA says is the most sophisticated colour-imaging system ever sent to the surface of another planet. The pancams will be used to photograph the surface and sky.

The six other cameras will 'help the 400-pound rovers navigate the surface of the planet and avoid hazards as they travel up to 40 metres a day over the course of their 90-day missions.

Dalsa, a Waterloo, Ont.-based company whose semiconductors and digital cameras are usually used on Earth in scientific, industrial and medical applications, has been working with NASA on the project since 1997.

That's when NASA's Jet Propulsion Laboratory approached Dalsa's Bromont



CREDIT: TYREL FEATHERSTONE, THE GAZETTE

Dalsa engineer Robert Groulx holds a device to be used in cameras that will help NASA's rover explore on the surface of Mars. "We have built the eyes," says Groulx, the engineer who is managing production of the devices in Bromont.



CREDIT: COURTESY OF NASA

The twin Mars exploration rovers seek to determine the history of climate and water at two sites on Mars where conditions might have once been favourable to life. Each rover carries five scientific instruments and can navigate around obstacles on the Martian surface.

division about developing special "charge coupled device" image sensors for space missions.

Unlike film cameras, which focus light on film, digital cameras use microchips to record light electronically. CCDs on the chips convert light into electrical signals.

NASA designed the Mars rover CCDs in collaboration with Dalsa, one of a handful of companies with a semiconductor foundry that can manufacture such specialized devices.

"These aren't the type of CCD that you would use in an everyday camera," Groulx said. "They're scientific-grade, space-qualified, custom-designed high-performance chips."

The company supplied 408 CCDs, which measure one centimetre by 2 centimetres, to NASA in late 2000. After extensive testing, the space agency selected the 18 best CCDs and turned them into microchips.

"They obviously need perfect imagers," Groulx said. "Usually, our CCDs are only tested for a few months, but usually they don't go that far."

Dalsa's engineers, who worked on CCDs for the 2001 Canadarm2, have other space projects on the drawing board.

They're working on CCDs to be used on the 2005 Mars Observer mission, as well as on a space-telescope project with the U.S. Department of Energy.

For now, Dalsa's 320 workers in Bromont are anxiously awaiting the Mars landing.

"We'll be very proud of seeing the first images from Mars," says Luc Ouellet, director of research and development at the Bromont plant. "We'll know that the sensors that will capture those images were made here."

Sites:

Dalsa: www.dalsa.com

NASA Mars rover mission: <http://mars.jpl.nasa.gov/mer/>

Jet Propulsion Laboratory's Mars rover newpage: www.jpl.nasa.gov/mer/

Mars rover scientific payload: <http://athena.cornell.edu/>

European Space Agency: www.esa.int

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