



*Jon Gammell at the Mars Yard, Montreal*

## SUCCESS STORY

### Clearpath Robotics helps UofT Researcher Prototype Cutting-Edge Martian Rover Software.

The University of Toronto boasts the best aerospace department in Canada. It is a world-class department with research furthering the fields of aeronautical engineering (aircraft flight systems, propulsion, aerodynamics, computational fluid dynamics, and structural mechanics) and space systems engineering (spacecraft dynamics and control, space robotics and mechatronics, and microsatellite technology).

Dr. Tim Barfoot is a central figure in the aerospace department. Working towards developing critically-needed technology for next-generation lunar rovers, his research is geared towards the creation of aerospace algorithms to develop robots that can operate without the benefit of GPS, or other global positioning assistance, in space. This research will enable further, and more accurate, exploration of other planets.



### Before Clearpath Robotics

Dr. Barfoot believes that techniques should be proven through realistic field trials, not just in a lab environment. To this end, he conducts mission simulations using field robots at planetary analogue sites, such as the Haughton impact structure on Devon Island, Nunavut, to test his concepts and technologies in a realistic setting.

“Before we had the Husky we simply could not conduct our research.”

When Dr. Barfoot and his team began to conduct field trials for their algorithms on realistic planetary terrain, they encountered more challenges than initially expected. The mobile robotic platform initially chosen to use for testing was able to operate efficiently on smooth, road-like terrain, but floundered when introduced to less manicured landscapes. Dr. Barfoot’s team found themselves spending more time troubleshooting mechanical issues than conducting their research.

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## The Clearpath Advantage

Frustrated and looking for a reliable solution, Dr. Barfoot contacted Clearpath Robotics and purchased a Husky A200. The Husky performed as promised and navigated the planetary terrain without

acquiring the Husky we haven't had any mechanical problems and we have been able to focus on our experiments when before we could not. Before we had the Husky, we simply could not conduct our research.”

“Since acquiring the Husky we haven't had any mechanical problems.”

As well, Dr. Barfoot and his team know that they always have the full technical support of the entire Clearpath Robotics team behind them; “Having someone who is willing to provide on-site support is a huge gain for us,” says Barfoot. With the addition of the Husky, the team is finally able to focus on their research and come closer to developing fully autonomous space vehicles.

difficulty, allowing the team to get their research underway in a fraction of the time they had spent on the previous platform. Dr. Barfoot comments, “Since



*Husky at the MarsYard in Montreal, approaching a crater.*

## Results

Since acquiring the Husky A200 for their research, Dr. Barfoot's has been able to do a variety of algorithm tests on all kinds of simulated planetary terrain. They don't have to worry that the Husky will not perform as expected, that the terrain will be too difficult for the Husky to navigate, or that they will have to waste valuable time and resources repairing the robot. “I am absolutely satisfied with the Husky. It is a great little robot,” says Barfoot. “Clearpath Robotics is a company full of highly motivated individuals who are interested in making their robots the best that they can be, which hugely benefits us.”

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Dr. Barfoot has been very successful in his research and has published several articles on planetary worksite mapping using the Husky A200. Dr. Barfoot has been able to expand his research field from navigating in treacherous terrains to a methane detection rover. The success of his lab's research projects have led his students to internships at NASA.

## About Clearpath Robotics

Clearpath Robotics builds reliable and easy-to-use unmanned vehicles to help universities solve complex robotics research challenges. Our products are simple yet well-engineered systems that integrate powerful open-source technology and industry-leading customer support. Visit us at [www.clearpathrobotics.com](http://www.clearpathrobotics.com) to learn more or call us at **1-800-301-3863** to speak with an Applications Engineer.