

Ideas on the Edge

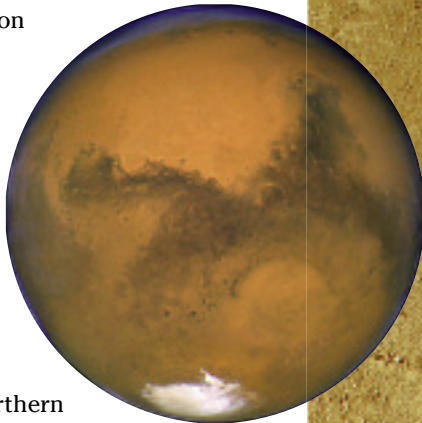
Mars: We'll Do It Our Way

"We're currently looking for a ride to Mars."

If Dr. Brendan Quine of York University succeeds in his attempts at interplanetary hitch-hiking, Canada could be just the third nation on earth to successfully land a spacecraft on another heavenly body. Dr. Quine is the leader of Northern Light, an all-Canadian effort to land a rover on Mars. It could happen in the next year or so if the mission can catch a ride on a Russian or European rocket.

The Northern Light package is typically Canadian—modest but thoroughly innovative. The rover vehicle weighs just over six kilograms, but boasts a spectrometer, ground penetrating radar and digging tools to collect and grind samples for analysis under an onboard microscope.

And there's more innovation in the landing system. Unique airbag technology will bring the probe to a soft stop



YORK RESEARCHER BRENDAN QUINE WANTS TO PULL OFF A SPACE EXPLORATION COUPE—CANADIAN STYLE.



within two metres of its impact point. The current NASA system, by comparison, bounces its payload up to 15 times over a kilometre or more, decreasing landing accuracy and increasing the possibility of damage.

To succeed in reaching the red planet, the probe must endure a range of stresses, from the intense vibration of launch to the alien chemistry of the Martian atmosphere. And that's where



BRENDAN QUINE

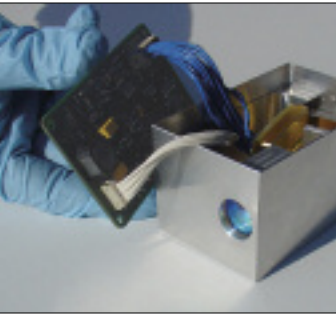
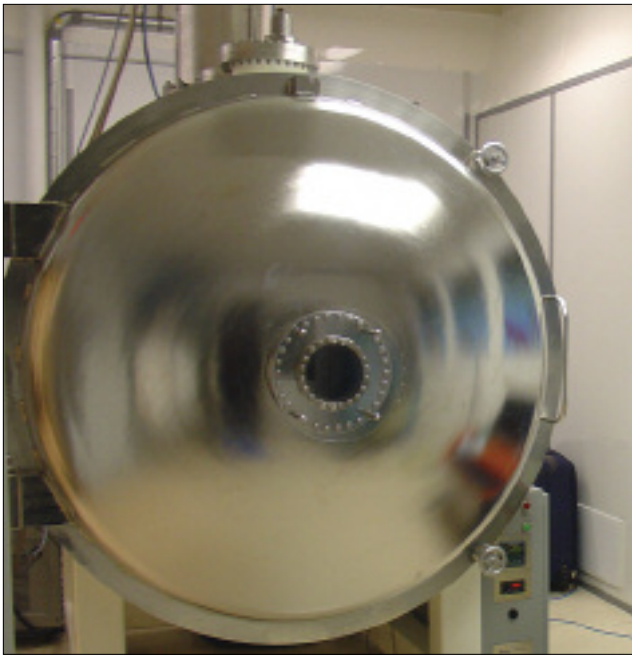
infrastructure funded in part by the Ontario Innovation Trust is playing a key role. At the new Space Test Facility at York, scientists can subject the

package to whatever it will encounter on its journey, using a large vacuum chamber and a sophisticated

vibration table. "It's unique," says Dr. Quine, "to have this equipment together in a university environment." The private

sector is interested, too.

"We're doing a growing amount of work for Canadian space companies like ComDev and MDA."



THE ARGUS SATELLITE SPECTROMETER IS 1/100TH THE WEIGHT OF AN EQUIVALENT TERRESTRIAL INSTRUMENT.

Dr. Quine also has an eye on terrestrial applications for space research. Through his technology company, Thoth, he's developing "Argus" satellite technology for environmental monitoring.

The system uses some of

the same miniaturization techniques as the Mars probe: an on-board spectrometer weighing only 235 grams

Project: Space Test Instrument Laboratory
Institution: York University
Research Sector: Natural Sciences
Principal Investigator: Brendan Quine
Trust Investment: \$244,699
CFI Investment: \$244,699
Total research investment from all sources: \$611,747

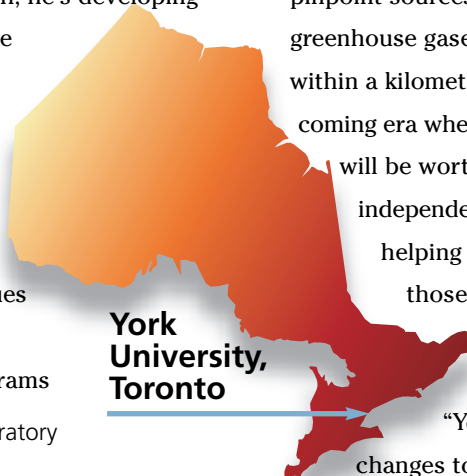
performs the work of a 20-kilogram terrestrial instrument and can pinpoint sources of greenhouse gases to within a kilometre. In a

coming era when internationally traded emissions credits will be worth tens of billions of dollars, the ability to independently verify emissions will be important in helping to determine who is or isn't entitled to those credits—and a network of satellites using Argus technology may give Canada a leg up.

"You can't innovate by making very small changes to the technologies you have," says Dr. Quine, referring to Northern Light's ground-breaking lander. "Things like space exploration force you to think outside the box—far outside."

RESEARCH THAT MATTERS
 REAL-WORLD BENEFITS FOR ONTARIANS:

- continuing leadership in economically important global aerospace industry
- Canadian verification systems for future emissions trading systems



York University, Toronto



Ontario Innovation Trust

MaRS Centre, Heritage Building
 101 College Street, Suite HL20
 Toronto, ON M5G 1L7
 416-977-9188 Fax: 416-977-9460
 innovation@oit.on.ca
 www.oit.on.ca

Infrastructure for Innovation About the Ontario Innovation Trust

The Ontario Innovation Trust was created in 1999 by the Government of Ontario to invest in research equipment and facilities at Ontario's universities, colleges, hospitals and other non-profit research institutions. The Trust is governed by a volunteer Board of Directors, according to the terms of a Trust agreement established by the Ontario government. A small permanent staff looks after day-to-day operations.

Since its inception, the Trust has committed almost \$843 million to strengthen Ontario's position in the global marketplace of ideas. This represents more than a third of the \$2.44 billion in total funding that has been invested in Trust-supported projects.