

Ideas on the Edge

“If space exploration is going to advance to Mars,” says Dr. Mike Dixon of the University of Guelph, “we need to develop self-sustaining life support systems. Given the distance from Earth, it’s inconceivable that we could send supplies.”

The answer may involve adding a touch of green to the red planet. Dr. Dixon is experimenting with technology that may one day allow the first Mars explorers to grow their own food. The Martian greenhouse—tended by a Canadian horticultural mission specialist, of course—would provide the team with a menu that might include rice, onions, tomatoes, soy, potatoes, lettuce, spinach, wheat and protein-rich algae. The system would also help recycle and purify the mission’s water and air supply.

Dr. Dixon and his colleagues are exploring the possibilities at the university’s Controlled Environment Systems Research Facility—a lab funded in part by an investment from the Ontario Innovation Trust. Scientists at the facility are growing plants in a set of hypobaric—low pressure—chambers. Conditions inside each of the

two-and-a-half-metre tall cabinets are controlled by a computer-automated system that allows researchers to vary watering, humidity, carbon dioxide levels and atmospheric pressure.

Green Space HOW WILL THE FIRST EXPLORERS ON MARS SURVIVE SO FAR FROM EARTH? DR. MIKE DIXON AT THE UNIVERSITY OF GUELPH IS WORKING ON A HOME-GROWN SOLUTION.

“Right now we’re working on finding the lowest atmospheric pressure in which plants can grow,” says Dr. Dixon. “The lower the pressure, the less massive the growing system on Mars will have to be, and the less energy and money it will cost to get it there.”

Some kind of inflatable greenhouse looks like a good option; future lunar missions will likely provide an opportunity to evaluate the first prototypes. “The moon is a good place to test



MIKE DIXON

drive the technology because it’s only three days away,” says Dr. Dixon. “In about 10 years humans will probably be growing plants there—and in 20 to 30 years we’ll

RESEARCH THAT MATTERS
REAL-WORLD BENEFITS FOR ONTARIANS:

- innovative and environmentally friendly new systems for air filtration and water purification

probably see them grown on Mars.”

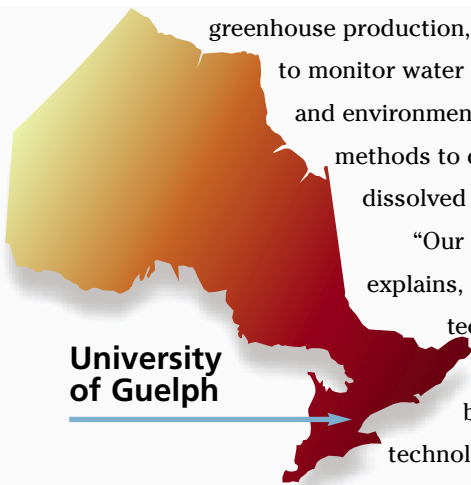
The University of Guelph program is producing benefits right now, however, here on earth. One example: Air Quality Solutions Inc., a spin-off company developed through a Martin Walmsley Fellowship from the Ontario Centres of Excellence, has applied the research in creating a building air filtration system partially made from plants. The technology has wide application from office towers to animal holding facilities.

Other new research projects with industry partners include the development of recyclable growth media for greenhouse production, sensor techniques to monitor water and effluent quality, and environmentally friendly methods to disinfect water using dissolved ozone.

“Our program,” Dr. Dixon explains, “is ‘pulled’ by the technical requirements of space exploration, but ‘driven’ by technology transfer to industry. And that leads to terrestrial benefits.”



Project: Biological Systems for Terrestrial and Space Applications
Institution: University of Guelph
Research Sector: Life Sciences
Principal Investigator: Mike Dixon
Trust Investment: \$3,150,000
CFI Investment: \$3,150,000
Total research investment from all sources: \$7,875,000



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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.