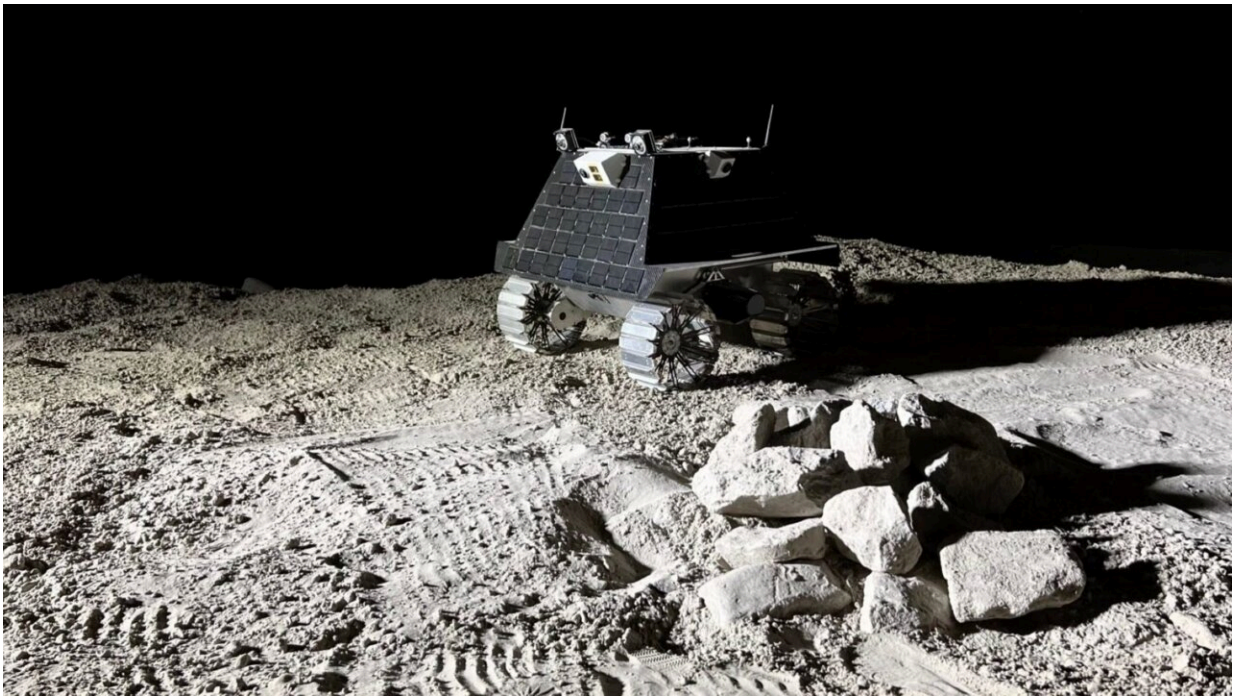
First-ever Canadian lunar rover will hunt for water ice on the moon

March 2 2023, by Adrianna MacPherson



The first ever Canadian rover to explore the moon is currently under construction, and U of A researcher Chris Herd will lend his expertise to interpret the data gathered by one of the scientific payloads on board. Credit: Canadensys Aerospace Corp.

The first ever Canadian rover to set wheels on the moon is currently under construction for a mission set to launch as early as 2026. The rover will explore the south polar region of the moon in a search for water ice

in the lunar soil.

Rovers are simply "mobile robotic vehicles that allow us to explore the surfaces of other planets," explains Chris Herd, a professor in the Department of Earth and Atmospheric Sciences and one of the scientific investigators involved in the mission.

The contract for the mission was awarded to Canadensys Aerospace Corporation, by the Canadian Space Agency and involves NASA, several industry partners and academic researchers including Herd brought aboard to share their expertise. The lunar rover will weigh about 30 kilograms and will take along six scientific payloads designed to gather data, five of which are Canadian.

Data detective work

The payload Herd is involved with is a tool being developed by Ontario-based Bubble Technology Industries, the Lunar Hydrogen Autonomous Neutron Spectrometer, or LHANS.

The LHANS tool is designed to detect water ice by identifying the presence of hydrogen in the lunar soil. It will look for the signature of radiation from space as it interacts with material beneath the moon's surface, Herd explains. The data can be interpreted to confirm the presence of hydrogen.

Information and samples from previous lunar exploration missions will prove valuable for interpreting the data, as will the researchers' expert ability to make inferences from the data the rover transmits, Herd notes.

Craig Hardgrove, associate professor in the School of Earth and Space Exploration at Arizona State University, will interpret the hydrogen component of the data, while Herd will turn his attention to any other

elements or minerals present.

"You can also get a signal from that natural radiation of other elements that are there too, like calcium, iron and titanium," says Herd.

Just as water and soil particles mix when the ground freezes on Earth, water ice would be mixed between the grains of minerals on the lunar surface, Herd explains. Figuring out what the lunar soil is made up of will provide geological context for where lunar ice might be located.

"If we do find water ice, then the other elements this instrument can detect can tell us what type of soil the water ice is in."

Going where the ice could be

Herd notes that the mission will focus on the permanently shadowed southern regions of the moon, because these areas act as "cold traps" for any water ice present.

"Any kind of water vapor that's around will migrate and get trapped into these cold spots."

Discovering water ice on the moon would advance space exploration by allowing researchers and astronauts to stay for longer missions on the lunar surface, Herd says.

"Water is one of the most important resources we could look for, because the less we have to bring with us from Earth, the more we can use there and the less expensive it is overall to go to the moon and eventually set up a long-term presence."

While the tool and the rover are still under development, Herd will become a part of the mission when it begins. He's no stranger to rover

missions, having been involved in a Mars rover mission over the past two years.

While the lunar rover is much smaller than the Mars rover, the general logistics and operations of the mission will likely have many similarities, according to Herd.

"There's this whole pattern or sequence of exploration that needs to be done with a rover," he says. The team must decide where the rover drives next, send commands, receive and process the data, then make decisions based on those data, whether it be determining the next location or doubling back and verifying or obtaining additional information.

"It'll be really cool to get Canadian-led, mostly Canadian instruments with NASA contributions instead of the other way around for this particular mission," says Herd.

"Our American partners are super excited as well, because it's a different way of doing things for them and we've been great partners in space exploration for a long time."

Provided by University of Alberta

Citation: First-ever Canadian lunar rover will hunt for water ice on the moon (2023, March 2) retrieved 27 April 2024 from https://phys.org/news/2023-03-first-ever-canadian-lunar-rover-ice.html