Robotic Dogs May Soon Be Heading to Mars

By: Hannah Shariff

Before astronauts land on Mars, scientists must know everything they can about its **harsh** landscape. While the various exploration vehicles **dispatched** over the years are providing researchers with **invaluable** data, the bulky machines are **constrained** to exploring flat surfaces close to their **respective** landing sites.

This leaves out the many scientifically-interesting Martian regions **accessible** only by crossing rough **terrain** or **descending** below the ground. To change that, NASA is training a new team of explorers — **agile** robotic dogs that can independently **navigate** the Red Planet's **treacherous** landscape and **subsurface** caves.

Autonomous robot "dogs" will be used to explore underground caves on Mars (Credit: NASA/JPL)

The Autonomous Spot, or Au-Spot, is a **modified** version of Boston Dynamics' world-famous Spot robot, which has successfully conducted numerous **hazardous** tasks on Earth, including helping hospitals treat **coronavirus patients** remotely. On December 14, 2020, the group responsible for the Au-Spot said that though the robodogs will operate similarly to the current Mars explorers, they will be able to **achieve** much more.
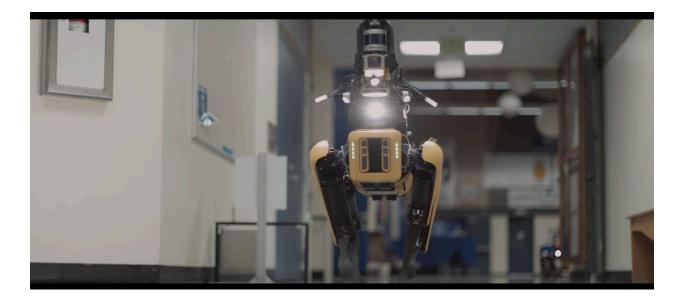
For starters, the four-legged machines can **trot** at speeds of up to 3 miles (5 kilometers) per hour, or about 38 times faster than the Curiosity rover, which has been roaming the Red Planet since 2012. They can also travel long distances over extreme **terrains** and instantly recover from tumbles. "Toppling does not mean mission failure," the team said. "Using recovery **algorithms**, the robot can self-right from a **multitude** of falls."

Au-Spot is a modified version of Boston Dynamics' Spot robot (Credit: Boston Dynamics)

The "Mars dogs" will use artificial intelligence to avoid **obstacles**, choose between multiple paths, and identify objects of scientific interest. They will be **equipped** to process the data obtained from the built-in laser, visual, thermal, and motion sensors to create detailed 3D maps of buried tunnels and deep lava tube caves. A communication **module** will enable a **seamless** transfer of all data collected to the mission team on Earth.

The NASA scientists are also working on creating a robotic arm and a **tethering** mechanism that will allow a pack of "Mars dogs" to work together when attempting to lower themselves into the underground caves and lava tubes. The robots will also be able to communicate and share their observations with each other in real-time, and even store each other's samples and help **charge** a team member running low on power, if necessary.

The researchers believe the cave explorations may yield evidence of past or existing Martian life. More importantly, knowing their exact locations may prove useful for human explorers seeking shelter from the Red Planet's deadly UV **radiation**, extreme cold, and **intense** dust storms, which can last for weeks and are sometimes big enough to be spotted by telescopes on Earth.

Though there is no word on when the robots will be deployed, the Au-Spot team is currently undergoing intense training through a range of obstacle courses. These include **maneuvering** through tunnels and hallways, running up and down stairs and ramps, as well as navigating the lava tubes in Northern California, which closely **simulate** Mars' terrain.