NARRATOR: If astronauts are to venture deeper into space than ever before, the trip is going to be a lot easier if they can use the materials they find along the way. The moon, for example,

is full of oxygen and methane in its soil.

Processing the moon's dirt into substances such as rocket fuel and breathing air could give astronauts the vital chemicals they'd need to travel to distant asteroids or Mars.

Rob Mueller, Senior Technologist, KSC Surface Systems Office: We recently found that there's water ice on the moon. If we can capture the water ice, that's H2O, we can split the hydrogen and oxygen and that's rocket propellant and rocket propellant is very important because when a rocket lifts off from Earth, 90 percent of its mass is propellant. If we can make the propellant on the moon or on Mars, we don't have to bring it from Earth.

Basically, we have everything we need inside the regolith.

NARRATOR: Collecting the regolith is where RASSOR comes in. RASSOR is a robotic miner designed for a life spent digging into the lunar regolith and carrying it to a processing base 40 pounds at a time.
Unlike scientific rovers NASA's operated on other worlds before, RASSOR is meant to move fast, avoid trouble and solve any problems that come up along the way by itself. All while operating 16 hours a day for years.

MUELLER: This is not your typical NASA rover with lots of very sophisticated instruments on it that are quite fragile. This is actually very tough little robot. It can dig, it can climb, it can flip over. If it does flip over, it can right itself up again.

NARRATOR: One of the biggest challenges to overcome is the fact that machines working in the moon's reduced gravity can't count on their own weight to hold them down and let them work.

RASSOR's answer to this problem is two barrel-shaped digging wheels that can rotate in opposite directions to give the robot the traction it needs to mine the dirt in the low gravity of the moon.

A.J. Nick, RASSOR Development Team: Each drum only takes a little scoop at a time. It allows us to trench and dig down deeper.

NARRATOR: Under development at NASA's Kennedy Space Center, RASSOR is expected to see several modifications as engineers and designers refine the design and put it through more testing.
A.J. Nick: Each time we come up with a new design, we try to further it to get ready for a mission and so each one will bring something new like a, like trying to get it close to the relative environment.

NARRATOR: If the plans work out, future explorers could have RASSOR to thank for reaching out into space.