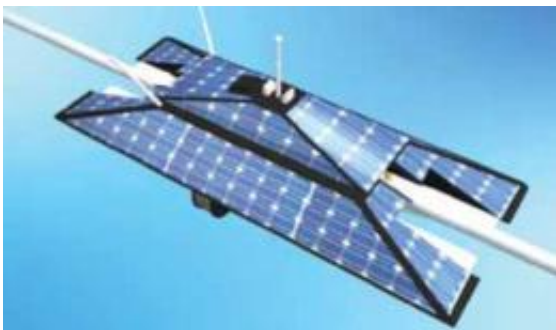


# Robots designed to inspect power lines

June 10 2010, by Lin Edwards

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(PhysOrg.com) -- Overhead transmission lines traverse thousands of kilometers, often crossing remote areas. Inspecting the often ageing lines and the vegetation near them is an important aspect of maintenance, but it can be extremely expensive and is sometimes dangerous. Now a robot has been designed to travel along transmission lines, covering 130 km of line at least twice a year, inspecting the line and checking for high-risk vegetation.

Scientists at the Electric Power Research Institute (EPRI) in the US are developing the [robot](#), which looks a little like a solar car, is around two meters long and weighs about 65 kilograms. It is designed to clamp onto the shield wire, which is above the main transmission line and protects it from lightning strikes. The robot will “crawl” along the wire on rollers at about five kilometers per hour, powered by energy harvested from the shield wire and with [solar panels](#) and batteries as backup. The robot can

cross obstacles such as cable spacers and suspension clamps and can maneuver around pylons (towers) using cables built in (or retrofitted).

The robot is equipped with sensors and a high-definition camera to detect obstacles such as overgrown trees, and it can analyze the images and compare them with previous images to see if anything has changed. It will also be able to use images taken at two locations and use parallax measurements to calculate clearances between conductors, trees and other objects. Overgrown trees are the major cause of electrical outages, so detecting them early is important to the utility companies and power consumers.

The robot will also contain sensors to detect electromagnetic noise that could indicate problems, and it will check for faulty connections. It could also retrieve data from sensors in the field that is normally retrieved by ground or helicopter visits. In remote regions data collected will be relayed to the utility via satellite link. Images will be transmitted when the robot returns to locations with cell phone coverage.

According to EPRI representative Andrew Phillips, the savings should more than offset the expected price tag of under \$500,000 for each robot.

The first prototype of the robot will be tested later this month, and commercial field testing is expected to start in 2014 along the 440 km Potomac-Appalachian Transmission Highline in Ohio. Similar robotic power line inspectors are also being developed by Canada's Hydro-Québec Research Institute and the Kansai Electric Power Co. in Japan.

**More information:** EPRI Journal - [Spring 2010 \(pdf\)](#)

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