



TRANSFORMING THE POWER GRID WITH AUTONOMOUS ROBOTS



Imagine being lowered from a helicopter, buffeted by icy winds, to an electrical cable hanging 50 meters above the Alaskan snowfields. Your task is to enhance the life of a conductor carrying 400KV of lethal electricity. When we spoke to the company responsible for manufacturing and maintaining millions of miles of US electrical cable, they told us it's no job for a human being. We agreed. It's a job for a robot.

PROBLEM

For the US utility industry, increasing the transmission capacity and reducing the power loss in aging overhead conductors is a pressing challenge. A 170-year old cable manufacturer, with more than half a billion miles of overhead transmission lines, invented a coating technology that improved both parameters by 25 percent. But while it was easy to apply the coating to new conductors in the factory, the company struggled to find an efficient way to coat existing installations. Wiremen, air dropped from helicopters, inspected and repaired transmission lines, but given the cost and risk to life, it was unviable to put them at risk for the coating job. In some places, robots inspected and cleared ice off lines, but so far they had never been deployed for cleaning and coating.

SOLUTION

Employing our “accelerate” and “zero distance” innovation frameworks, we devised several ideas that we experimented with quickly to narrow down potentially viable robots for prototyping. This helped us to weed out unviable ideas, and zero in on those that would work.

Our team built two robots, one each for cleaning and coating the conductors. Powered by lightweight motors to keep the overall weight down, the robots have an advanced drive-by-wire system and the ability to “see” the obstacles in their way. Once charged, the battery-operated robots could run autonomously, and decide whether to go forward or backward using high-end, on-board decision-making image processing cameras. An in-built IoT gateway enabled communication with ground stations that continuously monitored battery life, speed, coating volume in storage tanks, flow volume, and other important parameters remotely.

**PROJECTED
SAVINGS OF
UP TO
US\$2 BILLION
BY AVOIDING
CABLE
REPLACEMENT**

**PROJECTED
SAVINGS OF
US\$6 BILLION
DUE TO
REDUCED
TRANSMISSION
LOSSES**

The client is expected to reap huge benefits from this project, including lower transmission losses and extending the life of the cabling infrastructure. Once the robots are implemented extensively on the transmission lines, their impact on the utility industry will be significant. There is a great potential for deploying robots to inspect lines, and for using their data for predicting power loss in a grid.

But most importantly, it's a robot doing the dangerous work, not a human.

**WE DID THIS FOR THEM.
WE CAN DO IT FOR YOU.**

**Find out more about
how robotics and
AI can solve your
business challenges.
Reach out to us at
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