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Scientists Made Tiny Diving Suits for Cockroaches So They Can Help in Search-and-Rescue Missions

Researchers built oxygen backpacks that let cyborg cockroaches move underwater, potentially helping them search flooded disaster zones.

By Ashley Fike July 5, 2026, 9:30am

If you'd told anyone a decade ago that cockroaches would one day be suiting up for search-and-rescue missions, the response would have been...WTF? And yet.

Researchers at Nanyang Technological University in Singapore have 3D-printed a miniature diving suit for Madagascar hissing cockroaches, allowing the bugs to

operate underwater for up to three hours. The suit functions like a backpack, housing a chemical oxygen generator that produces breathable air by combining hydrogen peroxide and manganese dioxide.

Four silicone tubes connect the oxygen supply directly to the cockroach's spiracles, the tiny openings it uses to breathe. In testing, the cyborg roach navigated submerged obstacle courses at speeds only marginally slower than it moves on land, per a study published in *Nature Communications*.

SCIENTISTS GAVE COCKROACHES TINY DIVING SUITS TO HELP THEM SEARCH FLOODED DISASTER ZONES

This isn't the cockroach's first career pivot. Professor Hirotaka Sato's team at NTU has been wiring Madagascar hissing cockroaches with electrodes for years, turning them into remote-controlled insects that can be steered through disaster zones too unstable for human rescue workers.

The case for bugs over robots comes down to biology: they navigate rubble on instinct, need no motors, and run on essentially no power. The human operator mostly just nudges them back on course when they go rogue. "In a rescue scenario, we only need to stimulate the cockroach to turn its direction when it's walking the wrong way," Osaka University roboticist Keisuke Morishima told *Popular Science*.

The problem was water. Flooded disaster zones, which are among the most common and dangerous rescue scenarios, were completely off-limits for a bug that can't breathe underwater. The diving suit changes that. "This is important because real disaster sites can be challenging after heavy rain or flooding, blocking access routes in the rubble, drains and narrow gaps," Sato said in a statement. The team's cyborg insects already played a role in Operation Lionheart, a search-and-rescue operation following the magnitude 7.7 earthquake that struck Myanmar in 2025. The underwater capability makes them significantly more useful.

The longer-term ambitions extend beyond disaster zones. The same oxygen-generation principle, the researchers note, could apply to any low-oxygen environment—including, theoretically, the surface of Mars. Cockroach cosmonauts, anyone?

The backpack housing the whole system measures about 10 by 10 millimeters, roughly the size of a small piece of gum. The roach, for its part, doesn't appear to mind wearing it. Though, as *Popular Science* noted, it's hard to know for sure without actually speaking to the bug.