

Cyborg beetles to be the US military's latest weapon (w/ Video)

October 15 2009, by Lin Edwards



'Cyborg beetle.' Image credit: UC Berkeley

(PhysOrg.com) -- A team of scientists funded by the US Defense Advanced Research Projects Agency (DARPA) have implanted miniature neural and muscle stimulation systems into beetles to enable their flight to be remotely controlled.

Researchers Hirotaka Sato, Michel Maharbiz, and colleagues implanted a system of [nerve](#) and [muscle](#) stimulators, a microbattery, and a microcontroller with transceiver into [beetles](#). They were able to successfully control the beetles' take off, flight, and landing by stimulating the brain to work the wings. They controlled turns through stimulating the basilar muscles on one side or the other to make the wings on that side flap harder.

Three types of large beetles from Cameroon were used in the experiments, which were carried out at the University of California in Berkeley. The smallest, *cotinis texana*, is 2 cm long, while the largest is a massive 20 cm long (*megasoma elephas*). The third species was *mecynorhina torquata*, a 7 cm long beetle. The components of the system were implanted in the beetles when they were at the pupal stage.

According to Professor Noel Sharkey, an international expert on [artificial intelligence](#) and robotics from Sheffield University in the UK, there have been attempts in the past to control insects such as cockroaches, but this is the first time the flight of insects has been controlled remotely.

The ultimate military application of remotely controlled beetles is puzzling, Professor Sharkey said, since you would need to also implant a GPS transmitter/receiver to pinpoint the beetle's location, and probably a camera too, but this would be too heavy for even the largest beetle. Potential use of the system as a means of carrying a payload of biological or chemical weapons would be completely illegal.

The Berkeley researchers suggested the "cyborg" beetles -- part beetle, part machine -- could serve as models for micro air vehicles. DARPA, which funded the research, is also known to be developing a Nano Air Vehicle (NAV) that would weigh less than 10 g, and measure under 7.5 cm, and give the military the capability of carrying out indoor and outdoor operations in urban warfare situations.



'Cyborg beetle.' Image credit: UC Berkeley

Sato and colleagues also said the beetles could serve as couriers to inaccessible locations. The Berkeley team is also experimenting on dragonflies, flies and moths because of their "unmatched flight capabilities".

More information: Sato H, Berry CW, Peeri Y, Baghoomian E, Casey BE, Lavella G, VandenBrooks JM, Harrison JF and Maharbiz MM (2009) Remote radio control of insect flight. *Front. Integr. Neurosci.* 3:24. [doi:10.3389/neuro.07.024.2009](https://doi.org/10.3389/neuro.07.024.2009)

© 2009 PhysOrg.com

Citation: Cyborg beetles to be the US military's latest weapon (w/ Video) (2009, October 15) retrieved 17 April 2024 from <https://phys.org/news/2009-10-cyborg-beetles-military-latest-weapon.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.