ROBOTICS

RoboBee breaks free

Nature **570**, 491–495 (2019)

Credit: Noah T. Jafferis and E. Farrell Helbling, Harvard Microrobotics Laboratory

Tiny robots that mimic the flying abilities of insects could be more nimble and manoeuvrable than other flying machines, such as fixed-wing drones, allowing them to navigate intricate spaces. However, these flapping-wing vehicles typically need to be attached to off-board power supplies and signal generators in order to fly. Noah Jafferis and colleagues at Harvard University have now developed an untethered, insect-sized robot called RoboBee X-Wing.

RoboBee has four wings that are driven by piezoelectric actuators and a span of only 3.5 centimetres. To power the vehicle, solar cells are incorporated above the wings. The low voltages (around 5 V) generated by the solar cells are then converted to the high-voltage (around 200 V), time-varying signals needed to drive the vehicle by

power electronics incorporated below the wings. The complete integrated system is around five centimetres long and weighs just 259 milligrams.

With a light source of approximately three suns, the robot is capable of flying for only around half a second, before moving out of the illuminated area. However, the researchers also note that RoboBee could incorporate an extra payload of around 70 milligrams, which could be used to carry a larger power supply such as a bigger solar cell array or a battery.

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Published online: 15 July 2019
<https://doi.org/10.1038/s41928-019-0280-8>