

## Mico-robotic spy devices used at U.S. Anti-war protest

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Take-off ... a mechanical fly from the Harvard Microrobotics Lab.

Photo: *Robert Wood*

Vanessa Alarcon saw them at an antiwar rally in Lafayette Square in Washington last month.

"I heard someone say: 'Oh my god, look at those'," the university student recalled. "I look up and I'm like, 'What the hell is that?' They looked kind of like dragonflies or little helicopters. But those are not insects."

Bernard Crane saw them, too. "I'd never seen anything like it in my life," the Washington lawyer said. "I thought: 'Is that mechanical, or is that alive?' "

That is just one of the questions hovering over a handful of similar sightings at political events in Washington and New York.

Some suspect the insect-like drones are high-tech surveillance tools, perhaps for the Department of Homeland Security.

No agency admits to having deployed insect-size spy drones, though several US Government departments say they are trying. But several federally funded teams are growing live insects with computer chips in them, with the aim of mounting spyware on their bodies.

The robobugs could follow suspects, guide missiles to targets or navigate collapsed buildings to find survivors.

The technical challenges of creating robotic insects are daunting, and most experts doubt that fully working models exist yet. "If you find something, let me know," said Gary Anderson of the Defence Department's Rapid Reaction Technology Office.

But the CIA secretly developed a simple dragonfly snooper in the 1970s. And given recent advances, even sceptics say there is a chance that some agency has quietly managed to make something operational.

"America can be pretty sneaky," said Tom Ehrhard, a retired air force colonel and expert in

unmanned aerial vehicles who is now at the Centre for Strategic and Budgetary Assessments, a Washington-based research institute.

Pentagon documents describe nearly 100 different models of robotic fliers in use today, some as tiny as birds, and some the size of small planes.

The nation's fleet of flying robots logged more than 160,000 flight hours last year - a fourfold increase since 2003. A recent report by the US Army Command and General Staff College warned that if traffic rules are not clarified soon, the glut of unmanned vehicles "could render military air space chaotic and potentially dangerous".

But getting from bird size to insect size is not a simple matter of making everything smaller.

"You can't make a conventional robot of metal and ball bearings and just shrink the design down," said Ronald Fearing, a roboticist at the University of California at Berkeley. For one thing, the rules of aerodynamics change at very tiny scales and require wings that flap in precise ways - a huge engineering challenge. Scientists have only recently come to understand how insects fly.

The CIA was among the first to tackle the problem. The "insectothopter", developed by the agency's Office of Research and Development 30 years ago, looked like a dragonfly and contained a tiny petrol engine to make the four wings flap.

It flew but was ultimately declared a failure because it could not handle crosswinds.

An agency spokesman, George Little, would not talk about what the CIA may have done since then. The Office of the Director of National Intelligence, the Department of Homeland Security and the Secret Service also declined to discuss the topic.

But the Defence Department researchers are experimenting with putting computer chips into moth pupae - the intermediate stage between a caterpillar and a flying adult - and hatching them into healthy "cyborg moths".

The Hybrid Insect Micro-Electro-Mechanical Systems project aims to create camera-toting insects whose nerves have grown into their internal silicon chip so that wranglers can control their activities.

Even if the technical hurdles are overcome, insect-size fliers will always be risky investments. "They can get eaten by a bird, they can get caught in a spider web," Professor Fearing said.

The protesters probably saw dragonflies, said Jerry Louton, an entomologist at the National Museum of Natural History.

Washington is home to some large, spectacularly adorned dragonflies that "can knock your socks off", he said.

But, he added, some details do not make sense. The eyewitnesses all reported seeing at least three dragonflies manoeuvring in unison.

"Dragonflies never fly in a pack," he said.

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