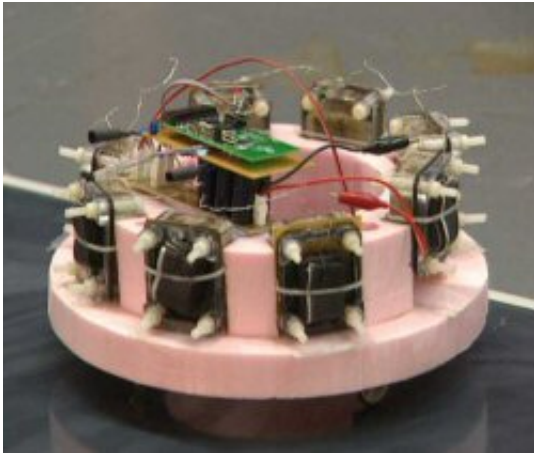


Tiny aircraft that just eat and go

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Aircraft the size of bees that get the energy they need by feeding themselves a diet of dead flies could be buzzing around the battlefields and motorways of the future, thanks to research in southwest England. The aircraft, up to 15cm long and equipped with sensors and cameras, could have a number of uses in civilian life and modern warfare, including reconnaissance missions, traffic monitoring or fire and rescue operations.

By "digesting" its own fuel, the aircraft could become autonomous and operate without the need for refuelling, changing batteries or recharging from the mains.

The research is being carried out by scientists from the University of Bath and the University of the West of England who are working on

different aspects of the technologies involved.

The University of Bath researchers are studying the complex aerodynamics needed to fly very small unmanned aircraft. The smaller an aircraft is made, the slower is its speed and the more it is vulnerable to high winds. This means that existing micro air vehicles can only fly for short periods at low speed and are too large to carry out fine manoeuvres.

But the Department of Mechanical Engineering at the University of Bath is now carrying out five research projects over the next two years to find ways of overcoming these problems.

One approach they are working on is to get the micro air vehicles to flap their wings in a similar way to insects such as bees, flies or birds. By studying animals' motion, the researchers hope to match the efficiency of nature and keep smaller aeroplanes in the sky for long enough to carry out their tasks.

Professor Ismet Gursul from the University of Bath's Department of Mechanical Engineering says, "In general this kind of low speed aerodynamics is not as efficient as high-speed aerodynamics so you could never achieve the same efficiency as you would get for high speed civil transport aircraft.

"Insects and birds are as efficient as they could be, so we look at how they are doing this and try to imitate their flapping mechanisms"

Like insects and birds, it is just possible that such micro aircraft might one day even be able to feed themselves. Researchers at the University of the West of England are creating a new breed of autonomous robot that will carry out specific tasks and even "feed" themselves while working.

The research team have built a robot which can move and transmit sensor data over a radio link (over 30m inside the lab) powered solely by unrefined food including dead flies and apples.

The robot, known as Ecobot II, uses a Microbial Fuel Cell as its only power source. In the Microbial Fuel Cell microbes are used to extract electricity directly from food – in this case flies or apple.

Professor Chris Melhuish, Director of the Intelligent Autonomous Systems Laboratory at the University of the West of England, says, “We are interested in developing robots that are intelligent and autonomous which means they do the right thing at the right time and without human intervention. One of the big problems with autonomy is that of energy; they have to get their energy from somewhere.

“To do this they need to get energy from their environment which could include sunlight or water, but in our case it is organic matter”.

The 1kg Ecobot doesn’t move at any significant rate, about 30 metres per hour, but its ability to power itself by digesting its fuel is a major advance in the way such units have been designed so far.

Insect-sized aircraft could be possible in the future, says Professor Melhuish, “The biological fuel cell would have to be made into a soft system which might, in the future, be able to do some sort of movement at a small level, a small insect level.”

Source: University of the West of England

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