

Bug of the Month

by Jim Revell / December 2015

Microdrones (Cyborg Insects)

I have recently been reading some amazing research in the field of Unmanned Aerial Vehicles (UAVs) or “Drones.” For years, researchers, backed by the pentagon, have been trying to develop “cyborg insects.” The goals are for these living insects to serve as controlled spies or as potential weapons.

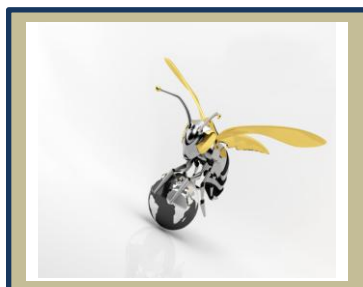
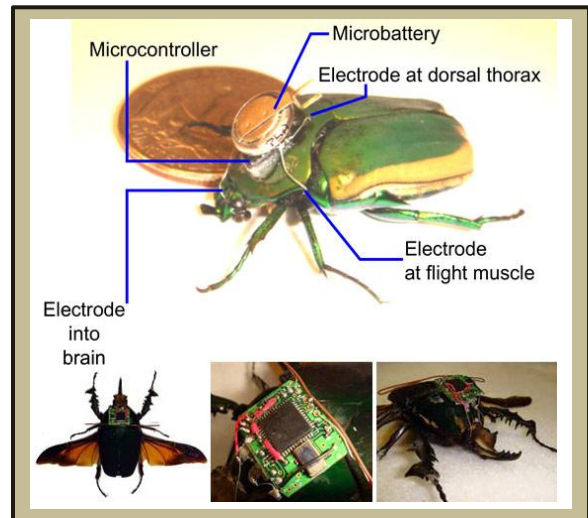
The idea is to implant micro-mechanical systems (MEMs) inside the early stages of metamorphosis. As the insect develops, tissue grows around and fuses with the MEMs (tiny machines). The plan is for the MEMs to control and operate the insect’s activity. By adding sensors such as video and audio capabilities with transmission, information can be relayed and recorded.

To some degree, success has occurred using a Manduca Moth (Tomato/Tobacco Hornworm Moth). Cornell University researchers succeeded in implanting electronic circuit probes into a Tobacco Hornworm. This allowed the muscles to be controlled. The size of the circuit board is 8x7mm (25mm=1 inch).

The Hi-MEMs (Hybrid Insect-Micro-Electro-Mechanical Systems) program of the DARPA (Defense-Advanced Research Projects) agency is continuing to produce amazing results. See the above picture from a December 30, 2014 article entitled “Bird and insect-like drones being planned by DARPA” (www.futuretimeline.net/blog/2014/12/30.htm#Vk42h79cBv8).

By 2008, at the University of Michigan, they had successfully created a cyborg Unicorn Beetle. This beetle is able to “take off and land, turn left or right, and demonstrate a number of flight control behaviors” (quote from “HI-MEMS: Cyborg Beetle Microsystem: Science Fiction in the News” found at <http://technovelgy.com/ct/Science-Fiction-News.asp?NewsNum=1420>).

The biggest issue facing researchers is the lifespan of the insects, therefore, research is leading more toward robotic insects (imitating the actual look, size and movement of the actual insect). Using nanotechnology, by 2030, the U.S. Army plans to have a UAV army of “nano” insect drones. These “insect-size” devices will be designed for land and air. Some research shows this could be done as soon as 2018.



Massachusetts.justgoodnews.biz/2014/05/16/robobees-coming-harvard/

The “RoboBee,” being developed by the Harvard School of Engineering and Applied Science, may become useful for rescue personnel in searching for survivors during a disaster, potentially for measuring micro-climates or even conducting stealth military reconnaissance. Their first goal, however, is to determine if these robotic bees can be used to artificially pollinate crops.

It is truly a fascinating read, and on some fronts, a bit scary. You may want to think twice about squashing that next beetle, dragon fly or even the mosquito landing on your arm - - you may be destroying some of your tax dollars!

Research References / Resources: <http://www.infiniteunknown.net/2012/04/17/darpa-hybrid-insect-micro-electromechanical-systems-hi-mems/>; <http://technovelgy.com/ct/Science-Fiction-News.asp?NewsNum=1420>; <http://technovelgy.com/ct/Science-Fiction-News.asp?NewsNum=1421>; <http://www.infiniteunknown.net/2008/03/20/pentagons-cyborg-insects-all-grown-up/>; http://www.huffingtonpost.co.uk/2014/01/03/us-army-drone-roadmap_n_4535425.html

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Read more of his articles on the “Jims Bugs” page @ www.BedfordMasterGardeners.org