



A schematic view of the "Entomopter," a robotic bug (photo courtesy of NASA)

A Robobug's Life

Insect-like robots may one day swarm over the surface of Mars, helping scientists better study the planet. We are exploring to develop this new breed of robots.

We are working with NASA and The Ohio Aerospace Institute (OAI) to create a robotic flying machine. The mechanical insect, capable of crawling as well as flying, will be able to study, videotape, photograph, and gather other types of information about planets, specifically Mars, closer than any current technology. Scientists hope to send these robotic bugs to Mars by the end of the decade.

The project name is "Planetary Exploration Using Biomimetics." "Biomimetics" refers to the development of machines that imitate birds or flying insects. Our part of the research is centered on creating the wings. We must find the optimal size and shape for the wings to develop the necessary lift needed to make it fly. We have been working on computer simulations and prototypes of the Entomopter's wings. This is where the study of insects really comes into play. The shape and weight, as well as the frequency with which the insect wings move, make them quite different from conventional aircraft wings. We are reviewing biologists' research about insects and birds in order to closely mimic an actual insect wing that can be scaled up to the Entomopter's size.

This work is very exploratory. One of the reasons that we want to do this project is to double up these individual technologies and be ready to use them when they mature.

The machine could be as large as 5 feet wide and 2 1/2 feet long. The smallest it could be made depends on how small and light researchers can make cameras and other instruments and fit them into the body of the robotic bug.

Researchers face several challenges in their attempts to ready the Entomopter for space flight. First, Mars' atmosphere is composed mainly of carbon dioxide, which makes it hard for conventional aircraft to function because most conventional aircraft rely on oxygen-breathing motors. Instead, the Entomopter will have to rely strictly on chemical or electrical propulsion. The second challenge is that Mars has a very low density atmosphere, which makes it difficult to create a lot of lift. The gravity on Mars is about one-third that of Earth, so this is another consideration to take into account.

[Return to the UMR Page](#)