



## Neuromorphic Solutions for UAS Collision Avoidance

Mark Motter



**NASA's J-FLIC unmanned aerial vehicle for collision avoidance tests.**

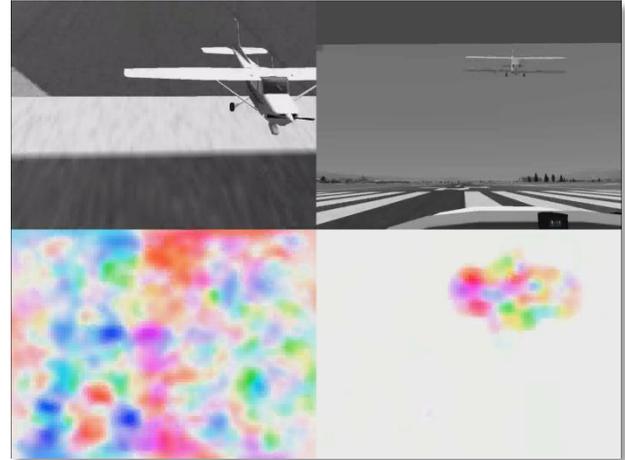
In the next few decades, it is predicted that there will be large growth in the number of Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS). UAS will be utilized across the world in a variety of ways, from performing missions vital to national security, to supporting commercial applications that could improve our economy.

In order to fully integrate unmanned aircraft into the NAS, it must be proven that the aircraft can fly autonomously without posing danger to other aircraft around them. Dr. Mark Motter of NASA's Langley Research Center in Hampton, VA is developing a system that will help UAS detect and avoid collisions with other aircraft.

The project, which received support from the Center Innovation Fund, is taking a unique approach to solving the problem. Dr. Motter is working with Boston University's Cognitive Science and Neural Systems Department to develop neuromorphic optic flow algorithms for collision avoidance. Put simply, the team is trying to design a system that processes information similar to the human brain rather than a traditional computer. Using this type of system, Motter believes that optical components would be able to recognize potential hazards and react to them quickly.

The challenge in designing these algorithms is a great one, which is why Dr. Motter instituted the collaboration with the neural scientists at Boston University.

"Boston University has the lead in the development of the neuromorphic algorithm and Langley's task will be take those algorithms and test them in realistic unmanned aircraft autopilot simulation and take that to some flight tests" says Motter.



**A UAS neuromorphic algorithm simulation**

Both Langley and Boston University will work together to program the algorithms into specialized circuits, which they hope will one day be integrated into specialized neuromorphic hardware. In the future, these technologies could be used to improve vehicles of all types, including those that are used to explore other planets.