SmartSondes for Atmospheric Sensing

Graduate Project Opportunity
Department of Aerospace Engineering Sciences at CU-Boulder
Spring 2009

This project will develop and test a small radiosonde-type instrument package (atmospheric pressure, temperature, relative humidity, wind velocity vector, location), together with a low-cost vehicle that provides capabilities for injection into a location of interest (e.g. pre-tornadic storm, over a forest fire, etc.) and maneuvering or station-keeping there. The vehicle should be designed to be air-dropped from a larger airplane or launched from a ground vehicle, and be semi-autonomous so that many can be controlled from a single laptop or PDA. The vehicle should be small, slow, and soft, mitigating collision concerns, and producible in high volume for low unit-cost, perhaps even disposability. The SmartSonde would provide in-situ data vital to predicting the evolution of dangerous storms and wildfires, so that better warning and mitigation decisions can be made. Since these disasters occur within large regions, with little warning, a market exists for a large number of low-cost systems, so that local first responders can deploy sensors and quickly interpret the data. This project would focus on-going research in several constituent technologies, including micro-avionics (Fig 1), folding wing vehicles (Fig 2), and semi-autonomous guidance and control (Fig 3), toward a concept with commercial potential. Vehicle and sensor design would occur in the Spring term, with initial field testing in the Summer. Final design and capability demonstration would occur in the Fall. A group of 5 vehicles will be developed and tested, together with a suitable ground control station. This project will also position the department to compete for research funding in several applications, such as the USDA Joint Fire Science program and the NSF Vortex 2 severe storm modeling experiment, where demonstrated sensing capabilities in harsh environments are needed.

Fig 1

Fig 2a

Fig 2b

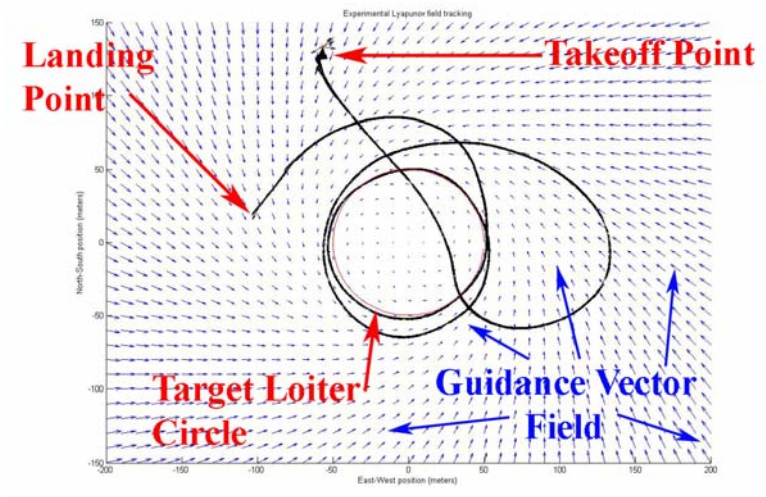

Fig 3

Contact Professor Lawrence for more information