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"Mesicopter: A Meso-Scale Flight Vehicle"

A team of researchers from Stanford University, SRI, and M-DOT Corporation propose to build the 'mesicopter', a centimeter-size electric helicopter, designed to stay airborne while carrying its own power supply. This device represents a revolutionary class of flight vehicles at an unprecedented size, and suggests a range of potential uses. The proposed work focuses on the development of mesicopters for atmospheric science, permitting in-situ measurements of meteorological phenomena such as downbursts and wind shear, and with unique capabilities for planetary atmosphere studies. Swarms of mesicopters could provide atmospheric scientists with information not obtainable using current techniques and could aid in the understanding of phenomena that play a critical role in aviation safety.



Better characterization of atmospheric phenomena on Mars and other simple sensing tasks may be feasible with these very low mass and low cost aerial micro-robots. The mesicopter will pioneer the application of new aerodynamic design concepts and novel fabrication techniques, including solid free-form fabrication and VLSI processing steps. These techniques may ultimately allow the mesicopter to be scaled down to millimeter dimensions. Significant challenges are anticipated in the areas of materials, battery technology, aerodynamics, control and testing. This proposal describes work for the first phase of the program in which initial designs and fabrication tests are used to evaluate the concept's feasibility. An outline of subsequent phases is also provided.