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Experimental Measurement of Small Scale Multirotor Flows[1]
JACOB CONNORS, JOSEPH WEINER, JOHN-MICHAEL VELARDE, MARK GLAUSER, Syracuse Univ — Work is being done to create a multirotor Unmanned Air Vehicle (UAV) based anemometer system that would allow for measurement of velocity and spectra in the atmospheric boundary layer. The flow from the UAVs rotors will impact such measurements and hence must be filtered. This study focuses on measuring the fluctuations of the velocity field in the flow both above and below various UAVs to determine first, the feasibility of the creation of the filter, and second, the optimal placement of the system on the body of the UAV. These measurements are taking place in both Syracuse Universitys subsonic wind tunnel and Skytop Turbulence Labs Indoor Flow Lab. Constant Temperature Anemometry is being used to measure these velocity field fluctuations across a variety of UAVs with differing characteristics such as size, number of propellers, and rotor blade type. The data from these experiments is being used to define a method to estimate the filter band required to isolate noise from wake effects, and determine ideal sensor placement based on characteristics of the vehicles design alone.

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