

Using Drone Dynamic Sensor Data to Measure Wind

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Small rotary unmanned aerial vehicles (UAV's) or drones are an emerging technology useful for localized flight applications for their high versatility and positional control. They are very suitable for taking wind measurements in the lower atmosphere, but anemometers mounted directly to their frames provide inaccurate measurements due to the downwash of the propellers.

We present a preliminary study investigating improvements to existing models by including dynamic effects such as acceleration and propeller thrust. This work is promising; these dynamic models have indicated improvements over existing methods when used on the same data in both simulation and test flight validation. However, there are fundamental limitations in the data used that need to be improved upon before an assessment of the true accuracy is made. This work only represents a first pass at making a robust, real-time drone-anemometer and multiple system improvements are identified for future work, such as differential GPS and -linear Kalman filtering for real-time noise rejection.