

Wind Measurements Based on In-situ Data -Direct Vector Calculation and Hodograph Analyses-

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Un-manned Aerial Vehicles have been developing rapidly and performance as observation platform are increasing. Our group have used Rogallo wing UAV, called KitePlane for aerosol measurement about 20 years ago. In-situ wind measurements have tested, because of importance for meteorological analyses and technical requirements for safety flight operations. There are two typical methods for atmospheric wind measurements based on in-situ data by in-flight airplane. One is direct calculation method by difference between ground speed and true air speed. The other is that drift of center of hodograph circle for ground speed coincident with wind vector during flight.

Time and spatial resolutions for the direct calculations are around 1 second and 10 m respectively, and require high accuracy for true wind vectors. On the other hand, those for the hodograph methods are around 1 minute and several hundreds meters, respectively, however the method only require position and time for calculations.

It will be presented based on actual flight by KitePlane that accuracies of wind speeds and directions are around 0.1m/sec and several degrees for both methods with recently developed small and precision sensors.

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