

Abstract Submitted  
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**Horizontal Axis Turbine Wake Measurements Using Unmanned Aerial Vehicles**<sup>1</sup> STEWART NELSON, CHRISTOPHER HEINTZ, University of Kentucky, LUKE NORMAN, RUPP CARRIVEAU, University of Windsor, SEAN BAILEY, University of Kentucky — We use up to four highly instrumented, semi-autonomous unmanned aerial vehicles (UAVs) to measure the wakes shed by operational horizontal axis wind turbines during a one-week measurement campaign conducted at a line of four turbines located in a wind farm in Southern Ontario, Canada. During this campaign we investigated both the evolution of the wakes during a morning boundary layer evolution, and under the effects of wake steering. For the wake steering experiments, one turbine was yawed by 30 degrees with respect to the mean wind. In this talk, we will present results from the UAVs, which acquired horizontal wind velocity profiles across the turbine wakes at hub height, and with 0.3 m horizontal resolution. We also relate these wake measurements with Supervisory Control and Data Acquisition (SCADA) and tower strain data acquired concurrently to the measurements.

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