Towards Practicality

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In previous research, I explored how shrouding/ducting can improve the efficiency of both horizontal and vertical axis wind turbines. My results clearly showed that the concept was viable, with performance improvements in both horizontal and vertical axis turbines. This year I wanted to create a more practical and efficient system for a vertical axis wind turbine. I hypothesized that if I created a new design, which incorporated a structurally and mechanically simple ducting mechanism, then it would improve the efficiency of an already efficient lift-based vertical axis turbine to a practical and significant degree. A highly efficient, commercially available vertical axis wind turbine was utilized in order to test the theory, comparing unducted performance to ducted performance, at various wind speeds, and various duct configurations, varying both the size of the duct vanes and their distance from the rotational plane of the turbine. The initial experimental results showed a clear increase in the power output of the turbine, with a peak increase in power output of 12% compared to the power output of the unducted turbine.

Awards Won: