

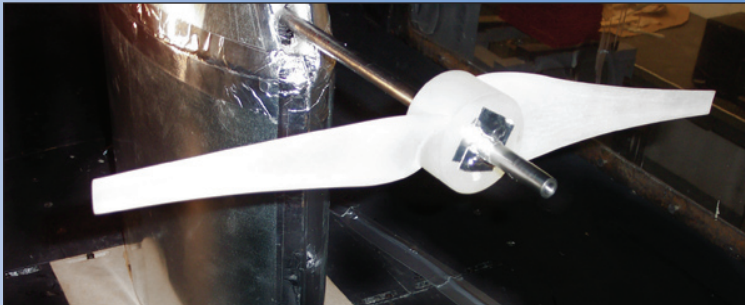


# DARcorporation

## WIND ENERGY: DESIGN, TESTING & ANALYSIS

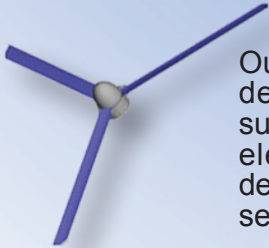
DARcorporation engineers are not only airplane designers. We are also very proficient in the aerodynamic and structural design of windmills (wind turbines). A wind turbine is essentially a rotating wing, so who better to design a windmill than an aeronautical engineer!

Our highly skilled and educated engineers have extensive knowledge and expertise in the design, testing and analysis of many wind energy devices, including horizontal axis wind turbines and vertical axis windmills. These designs are rigorously tested using advanced simulation methods and verified in the wind tunnel.



We use test stands that are specifically designed and tailored for wind tunnel testing and analysis of windmill blades. Each stand is fully integrated with data acquisition systems with real time visual feedback and are capable of measurements in all six degrees of freedom.

DARcorporation has worked with many unconventional designs. Based on results from computational fluid dynamics, structural analysis and wind tunnel testing these devices are designed for best performance.



Our services include aerodynamic design of the power generating surfaces, blade analysis using blade element theory codes, structural design, wind tunnel testing, calibration services and dynamics.

Please visit [www.darcorp.com](http://www.darcorp.com) or contact DARcorporation for additional information.

We can perform the following tasks on many types of wind turbine (vertical axis, horizontal axis and exotic systems).

1. Aerodynamic design of the power generating surfaces. We can analyze your design or will design the blades and aerodynamic surfaces for you, using Computational Fluid Dynamics (CFD) codes.

2. Blade analysis using blade element theory codes. We have developed our own in-house software for fast and detailed analysis of more conventional blades. Using these types of codes are generally faster than using CFD.

3. Structural design. We will design or analyze the structure, whether it is made out of composites, metal or a combination. We will do analysis for strength, stiffness, flutter and overall system dynamics. We can select materials and provide layup schedules for composites.

4. Wind tunnel testing. We will manufacture a scale model of the windmill, select the generator and design bearing systems, and test your scale windmill in the wind tunnel, including storm conditions if needed. We will measure the aerodynamic torque and translate this into energy generated for different wind speeds. We will recommend design changes if needed.

5. Calibration services. We will calibrate your generator and determine the efficiency curves versus rotational speed (rpm). This will tell you whether your generator is matched to your windmill.

6. Dynamics. We will perform dynamic startup so the effects of wind speed changes on your windmill energy generation can be captured.

