

Development of the Swept Twist Adaptive Rotor (STAR) Blade

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Abstract

The Low Wind Speed Technology (LWST) project seeks to develop technology that will allow wind systems to provide reduced energy costs in regions where wind speeds average around 5.8 m/s, so-called “low wind speed sites.” As part of LWST, Sandia National Laboratories contracted with Knight & Carver to develop a sweep-twist adaptive blade to passively reduce operating loads, thereby allowing for a larger, more productive rotor and ultimately reducing the cost-of-energy. After design and fabrication of a 27.1 m STAR blade, static and fatigue laboratory tests were successfully carried out. Full flight testing on a Zond 750 test turbine verified the predicted performance and operating loads. The STAR blade exceeded the project goal of improving annual energy capture over the baseline by producing 10-12 % more energy.

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