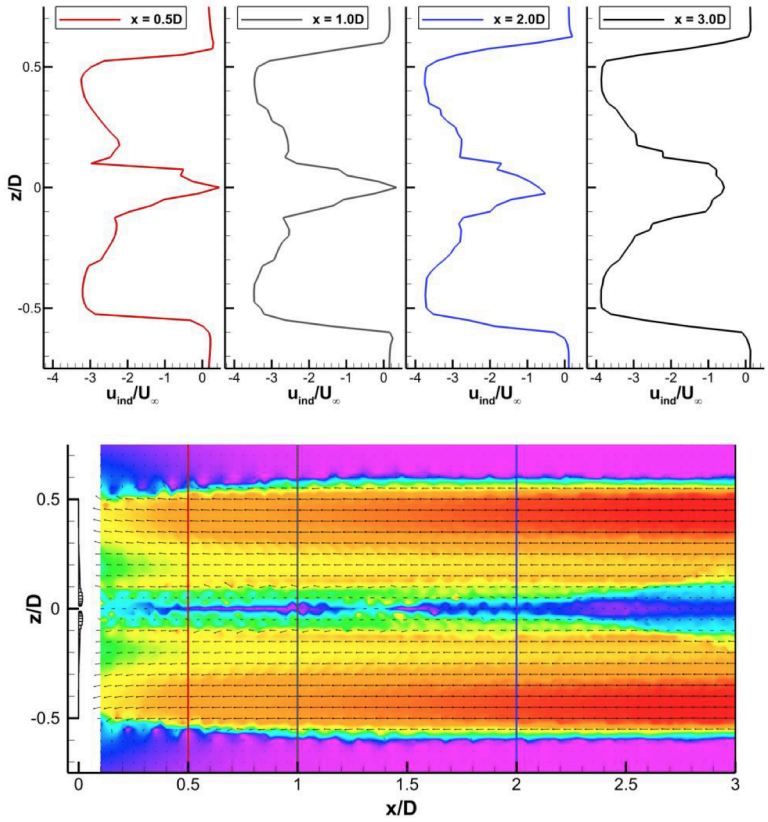
SAND2014-3014P

National Rotor Testbed Functional Scaling Presented at American Institute of Aeronautics and Astronautics 2014 Scitech

David Maniaci (6121) traveled to National Harbor, Maryland, in January to present a paper at the American Institute of Aeronautics and Astronautics (AIAA) SciTech/American Society of Mechanical Engineers Wind Energy Symposium titled, "Definition of the National Rotor Testbed: An Aeroelastically Relevant Research-Scale Wind Turbine Rotor." Approximately 60 researchers from various institutions and countries attended the session.

The presentation and paper summarized current work and progress of the National Rotor Testbed (NRT) Scaled Wind Farm Technology (SWiFT) facility blades designs, primarily on what we define as functional rotor scaling. Two design concepts for the NRT rotors were presented and the group discussed how the influence of blade circulation on wake creation has higher impact than local Reynolds number effects. The study also shows how special care on the airfoil selection is required with respect to functional scaling.

Discussion provided great feedback for the project. This included questions on the influence of characteristic turbulence scales in the atmospheric boundary layer from higher altitude of full-scale turbine vs. SWiFT turbines, as well as, discussion about plans for tests at other scales, such as in a wind tunnel.



Results of Vortex Method analysis of SWiFT rotor design. Colors show magnitude of velocity deficit.

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