The Alfond W² Ocean Engineering Lab at the University of Maine Advanced Structures and Composites Center is the first purpose built combined wind-wave testing facility equipped with a high-performance rotatable wind machine over a multidirectional wave basin. The facility accurately simulates towing tests, variable water depths, and scaled wind and wave conditions that represent some of the worst storms possible anywhere on Earth.

This world-class ocean engineering facility will assist businesses in developing products for the marine economy while offering hands-on training for students. These products include ocean energy devices such as wind, wave and tidal energy; improved boat and ship hulls; aquaculture technology; oil and gas structures; waterfront infrastructure such as bridges, piers, docks and port facilities; as well as systems to protect coastal cities from effects of erosion and extreme storms.

**UMaine W² Capabilities**

**Basin Dimensions**
- 30 m long x 9 m wide (98 ft x 30 ft)
- Working depth of floor 0 m to 5 m (0-16.4 ft)

**Wind Machine**
- Dimensions: 5 m x 3.5 m x 6 m (16 x 12 x 20 ft) across flow x height x along flow
- Wind speed: 0 to 12 m/s (0-27 mph)
- Flow direction relative to waves: 0 to 180°
- Capable of simulating turbulent wind fields representative of IEC-61400 requirements
- Capable of simulating vertical wind shear

**16-paddle Wavemaker**
- Max height: 0.6 m (24 in) at T = 1.65 sec, 0.8 m (30 in) at T = 2.3 sec
- Regular waves and all standard spectra in addition to custom random seas
- Wave angles in excess of +/- 60 degrees relative to the basin center line

**Tow Carriage**
- Max speed: 1 m/s (3.3 ft/s)
- Max towed model dimensions: 4 m x 4 m x 1 m length x beam x draft (13 x 13 x 3 ft)

**Advanced Model Fabrication Capabilities**
- Rapid modular 3D printing 0.6 m x 0.6 m x 0.9 m (2 x 2 x 3 ft)
- 3D CNC Water Jet 2.0 m x 4.0 m x 0.1 m (6.5 x 13 x 0.5 ft)
- Wood, foam, composites, and metal fabrication facilities

**Two Stock Advanced Wind Turbines Capable of Simulating Turbine Sizes from 3-15MW**
- Active controls in turbulent wind fields
- Tunable aerodynamic loading
- Collective or individual blade pitching
- Rotor speed/torque control

For more information, contact Dr. Anthony Viselli, Manager, Offshore Model Testing and Structural Design

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