# Alfond W$^2$ Ocean Engineering Lab

## Combined wind-wave simulation basin with tow carriage and variable depth floor

A 1:50-scale offshore model testing facility that accurately simulates towing tests, variable water depths, and scaled wind and wave conditions that represent some of the worst storms possible anywhere on Earth.

## Wave Basin

30 meters long by 9 m wide (98 x 30 ft) with a working depth of floor of 0 - 4.5 meters. The basin contains a 16-paddle wave generator, a beach, a moving wind wall, and an adjustable floor.

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## Multi-directional Wave Generator

The 16-paddle wavemaker can simulate regular waves and all standard spectra as well as custom random seas with directional waves and a range of frequencies. It can produce wave angles in excess of +/- 60 degrees relative to the basin centerline. Waves can be the maximum height of 0.6 m at T = 1.65 seconds, and 0.8 m at T = 2.3 seconds.

## Towing System

The system has a maximum speed of 1 meters/second (3.3 feet/second)

## Wind Generator

The 5 m x 3.5 m x 6 m wind machine can generate wind speeds up to 12 m/s with flow direction relative to waves up to 180 degrees.

## Beach System

The elliptical profile beach was designed and constructed in-house. It has aluminum ribs and a composite surface with a removable central structure to accommodate the towing system.

## In-House Model Design and Fabrication Capabilities

Fabrication can be completed with a variety of materials including metals, composites, plastics, foams, and others. Equipment in the ASCC lab facilities allows for in-house fabrication using a water jet, welder, CNC machine, 3D printer, and other options.

## Instrumentation

The W2 data acquisition system is built on industry-leading National Instruments hardware and can accommodate a large variety of instrumentation including force, acceleration, and velocity measurements. Non-contact motion tracking above and below the water is made possible by two linked Qualisys camera systems. Flexible synchronization and data I/O allow for integrating hardware- or software-in-the-loop control systems and supplemental data acquisition systems. Custom instrumentation and integration support are available.
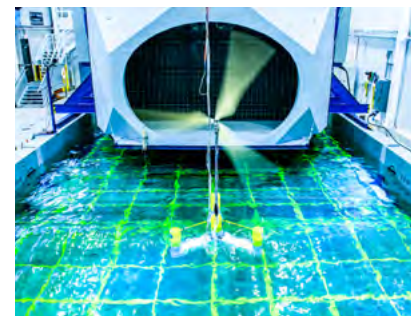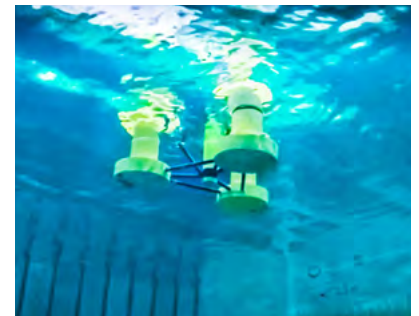
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