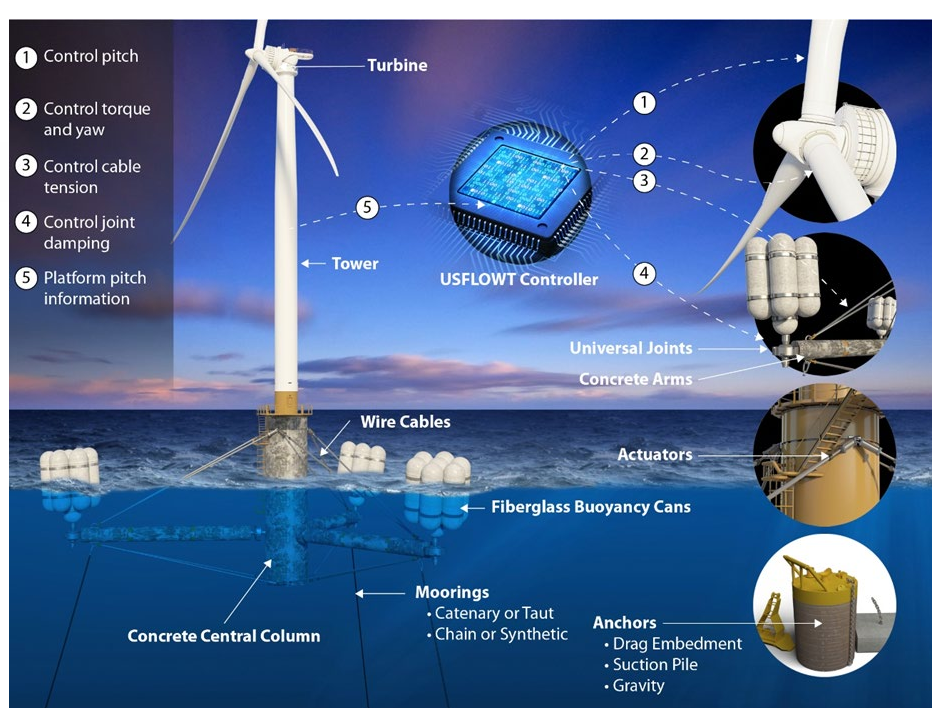# TCF-18-15631 - Model Test of an Innovative Offshore Floating Wind System

Technology RD&T and Resource Characterization; Offshore Specific R&D; Technology Commercialization Fund
Senu Sirnivas
NREL

August 5, 2021

FY21 Peer Review - Project Overview

Project Summary:

- Perform a wave basin model test of an Innovative Offshore Floating Wind System (SpiderFLOAT) as the next step in the commercialization process.
- SpiderFLOAT design given the flexibility minimizes wave induced loads/motions and it will significantly lower the Levelized Cost Of Energy (LCOE) for floating offshore wind technology.
- The test specification is complete and wave basin have been selected.

- Key project partner: Equinor

Project Objective(s) 2019-2021:

- Generate valuable platform response data.
- Characterizes the behavior of SpiderFLOAT.
- Validate numerical tools of the flexible design features.

Overall Project Objectives (life of project):

- Prove the SpiderFLOAT's flexibility features can stabilize the platform response and lower the LCOE for commercial viability.

Project Start Year: 2019
Expected Completion Year: FY 2022
Total expected duration: 2 years

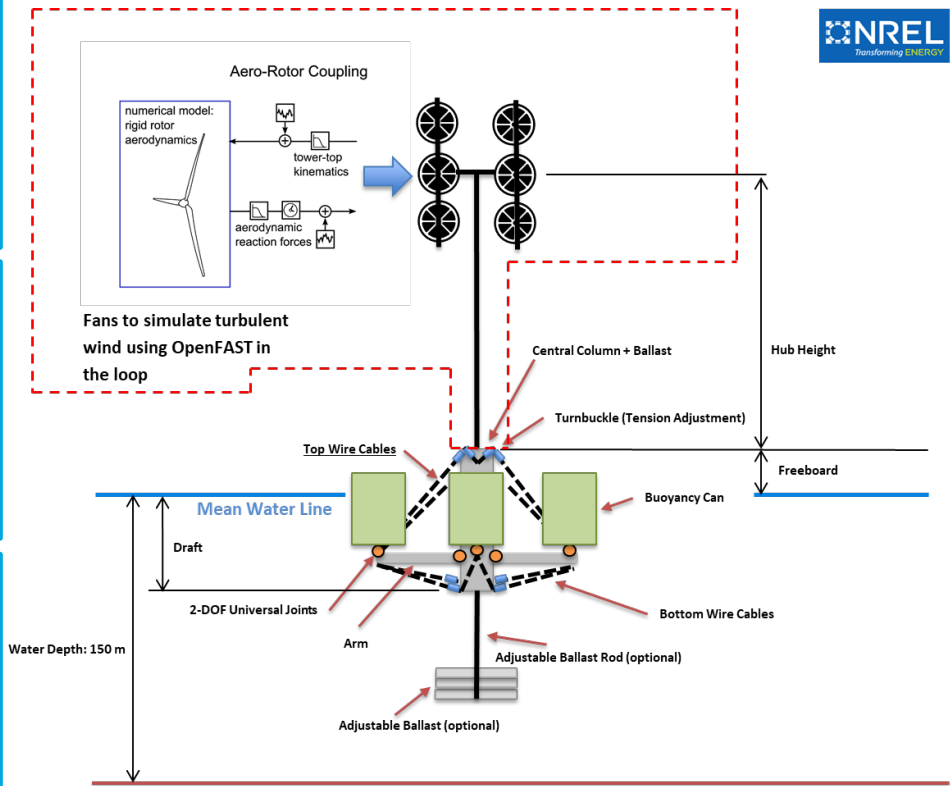FY19 - FY20 Budget: $250,000

Key Project Personnel: Senu Sirnivas

Key DOE Personnel: Nathan McKenzie

Project Impact

- **SpiderFLOAT** technology cost reduction through innovative substructure concepts coupled with advanced installation options make it competitive with land-based and fixed-bottom systems.

- It opens the market in deep water areas (Pacific Coast, Gulf of Maine, Hawaii, and Gulf of Mexico) for windfarm developers and utility companies.
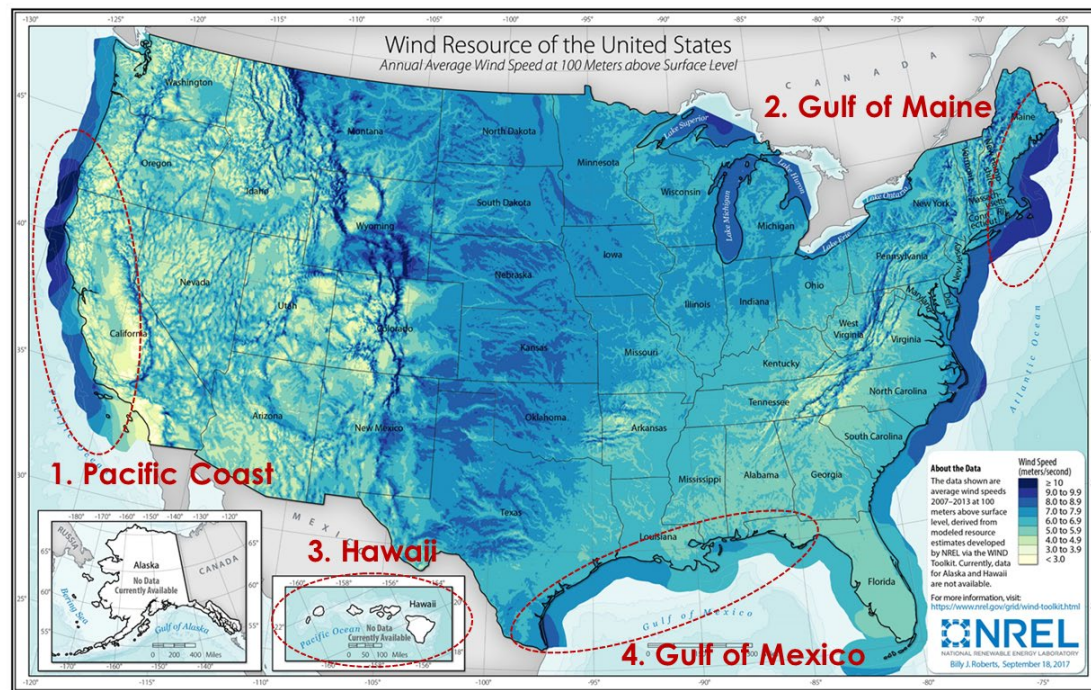
Program Performance – Scope, Schedule, Execution

- **Completed**
  - Survey of wave basins facilities in the U.S.
  - Selected the Hydraulics Wave Basin Facility at the University of Iowa.
- **Ongoing**
  - Contracting with University of Iowa (June 2021)
- **Next**
  - 1/50 scale model building and testing (Sep. 2021)
 - Reporting (Dec. 2021)
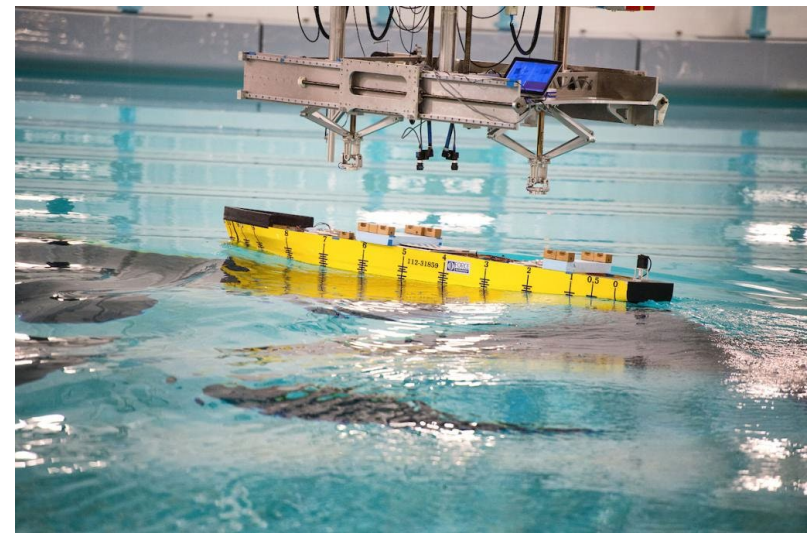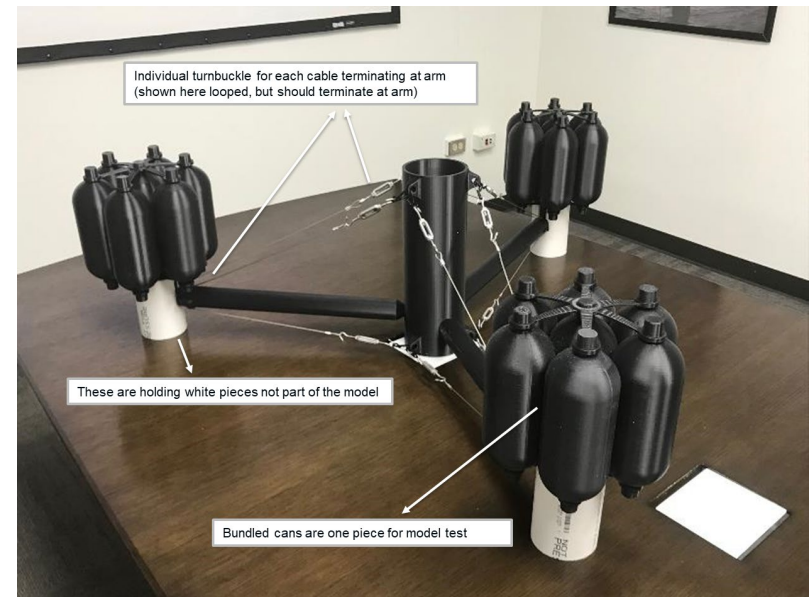
Program Performance – Accomplishments & Progress

- Due to signing up a new cost-sharing partner after award, reselecting a wave basin, and **COVID-19 the project has seen delays.**

- Working on the ARPAe Atlantis USFLOWT awarded during this delay has helped improve the design.

- The original scaled model has been updated to match the design for the North Atlantic environment.
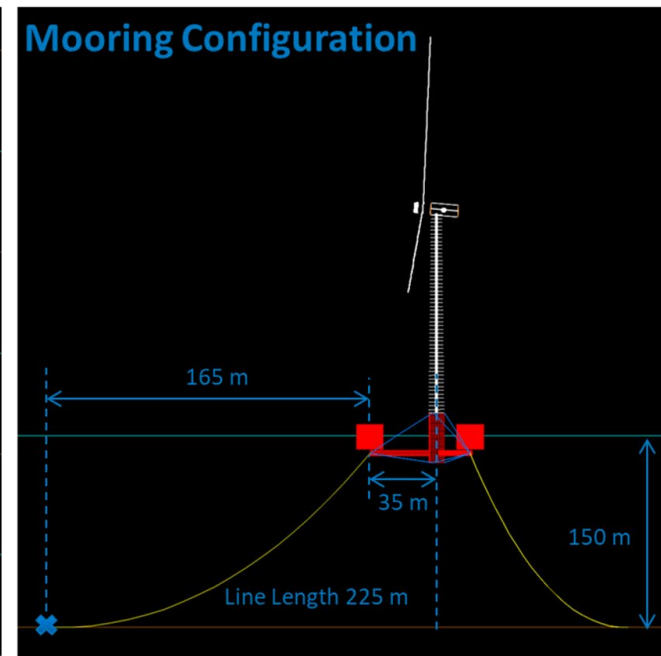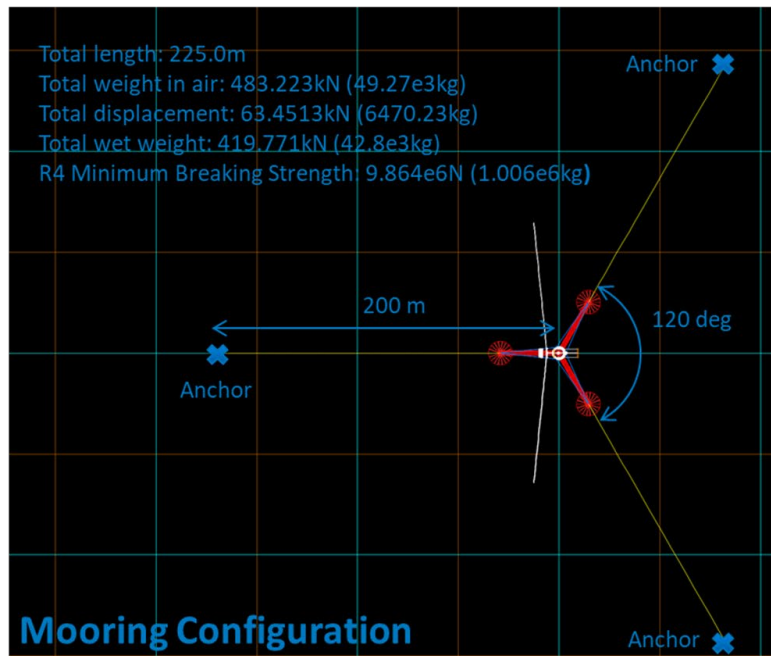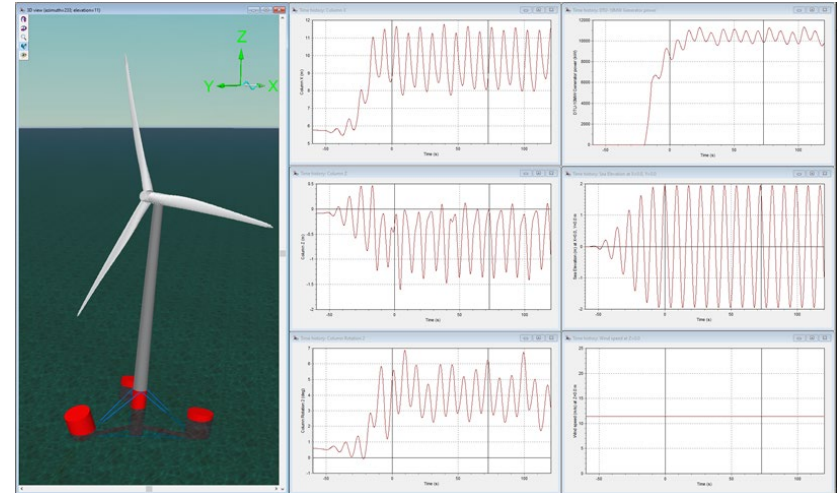
Project Performance - Upcoming Activities

- Contract to be signed with the University of Iowa (UI).

- 1/50 scale model to be built at UI.

- Run the test at UI's Hydraulics Wave Basin Facility.

- Document the measured data.
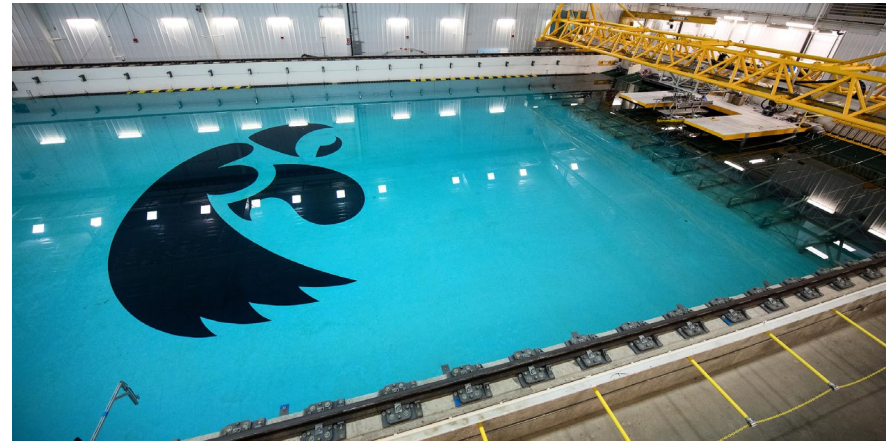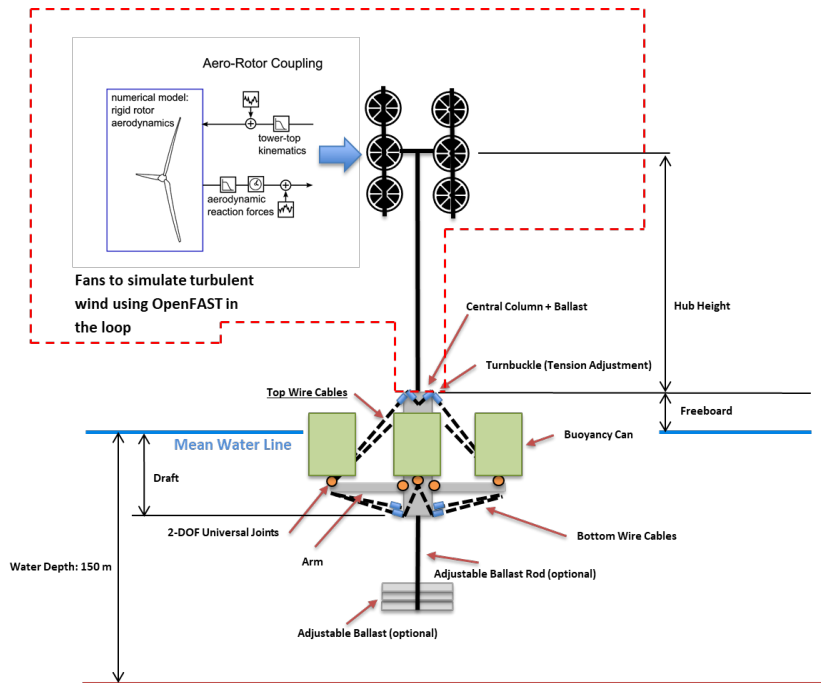
Stakeholder Engagement & Information Sharing

- **Equinor**
  - Provided guidance based on the simulation result.
- **DOE**
  - Present quarterly updates.
- **Outreach**

Date	Event	Type	Presenter
Aug. 25, 2020	FedTech Startup Studio	Startup Pitch	Senu
Oct. 19, 2020	LabStart – Startup Mentors (NREL)	Discussion	Senu
Nov. 05, 2020	Wind Energy Science Leadership Series	Design Webinar	Senu
Dec. 02, 2020	National Lab Accelerator Pitch	Startup Pitch	Senu
Dec. 21, 2020	Ocean Engineering - Leg Sizing	Journal Article	Rick & Max
Jan. 18, 2021	Sumitomo Presentation	Japan Interest	Senu & Rick
Feb. 09, 2021	CU School of Business	Startup Project	Senu
May 25, 2021	WESC 2021 Mini-Symposium	Conference	Senu
Jun. 07, 2021	AWEA Windpower	Conference	Rick
Aug. 09, 2021	IEEE Conference on CCTA	Keynote	Lucy, Mandar, David

Key Takeaways and Closing Remarks

- **<u>Project Impact</u>**
  - A modular floating offshore wind substructure that offers a substantial cost reduction in CAPEX and OPEX, leveraging local supply chain and onsite manufacturing.

- **<u>Project Performance</u>**
  - Delayed to COVID-19, but on track to complete by year end 2021.

- **<u>Stakeholder Engagement</u>**
  - Equinor and DOE are being updated with the progress.