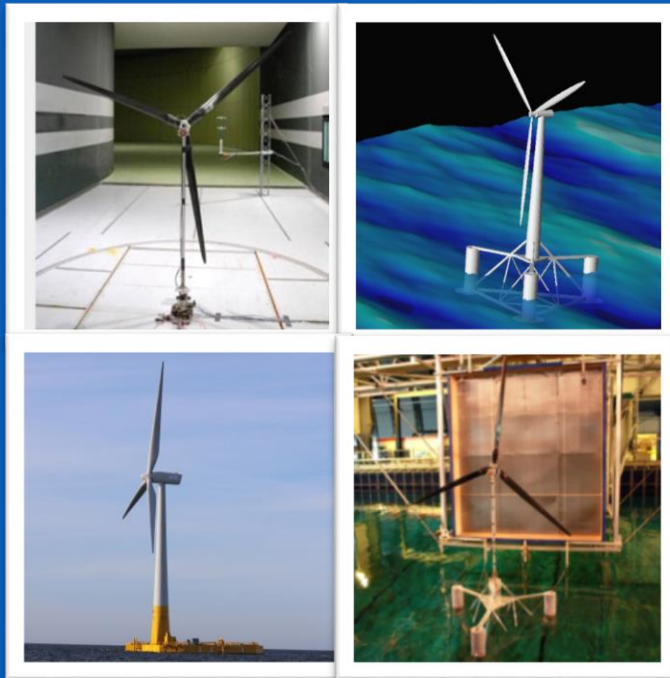


Applied Research Activities related to FOWT

Jean-Christophe GILLOTEAUX

Boston, 18th March 2019



CENTRALE NANTES

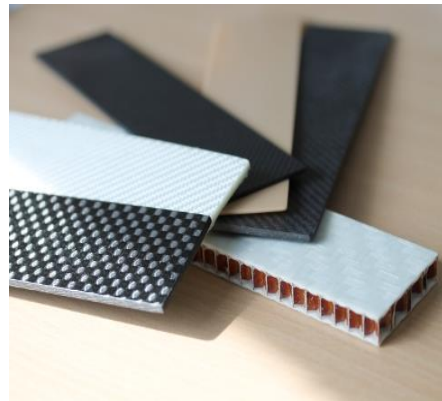
Public Research and Higher Education Organisation - Created in 1919

Research at Centrale Nantes is organised around 3 main themes

- > Energy transition
- > Factory of the future
- > Healthcare

A few figures

- > 115 partner Universities in 40 countries
- > 550 academics, researchers / 5 laboratories
- > 150 administrative & technical staff
- > **2000 students**
 - 1 500 engineer students
 - 220 PhDs
 - 230 Master students



CENTRALE NANTES - LHEEA Lab

Head: Prof. Pierre Ferrant



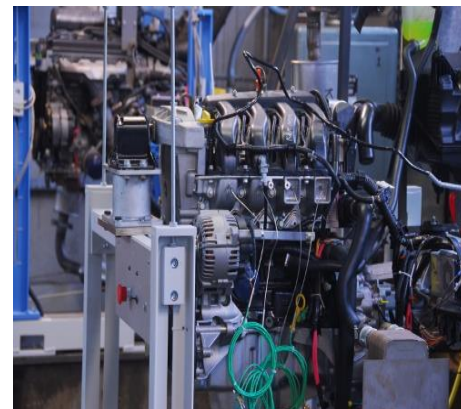
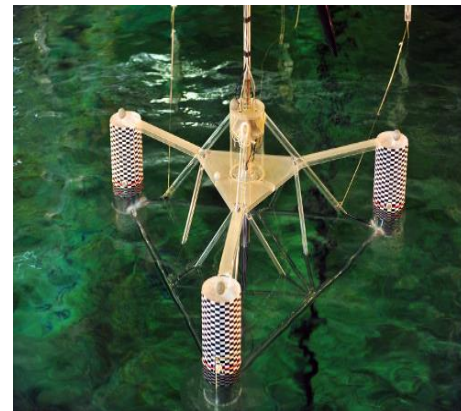
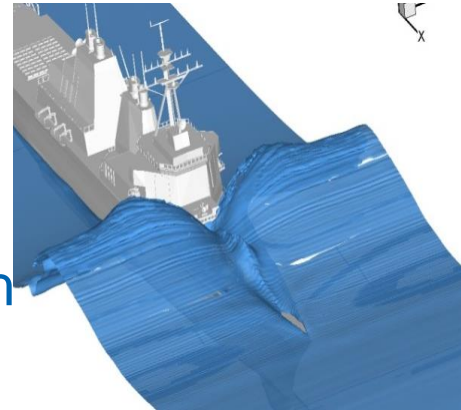
JRU of the National Center for Scientific Research

Research themes

- > Free surface hydrodynamics
- > Fluid-structure interactions
- > Dynamics of the atmosphere
- > System approach for ground and marine propulsion systems
- > Involved in Marine Renewable Energies for more than 30 years and more than 10 years in offshore Wind

A few figures

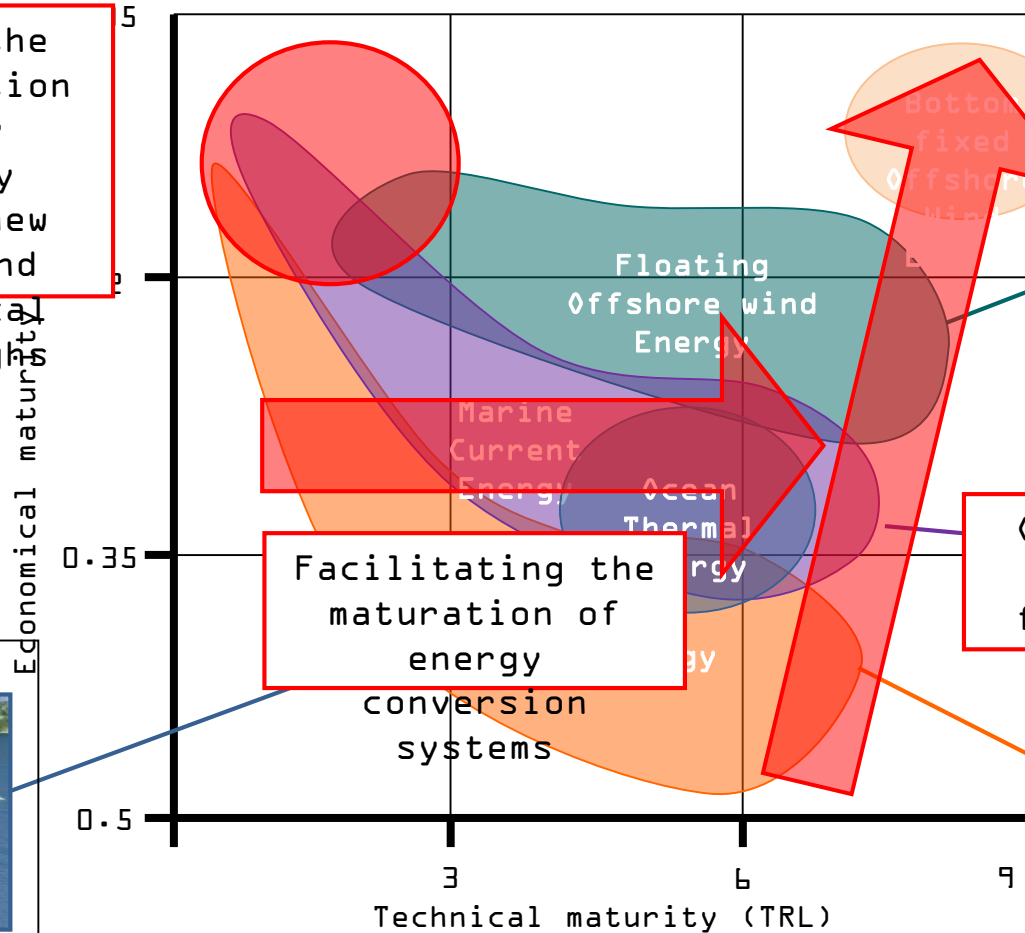
- > Staff: >140 (+30% since 2012)
- > 5 Research teams
- > Large scale experimental facilities
 - 60 Researchers and academics
 - 60 PhDs & Post-docs
 - + technical and administrative staff



S&T issues: Reducing Cost and Risk

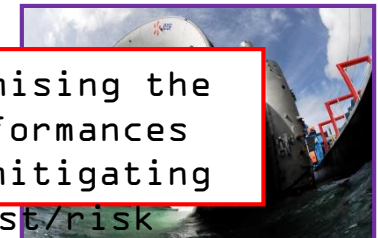
Research activities of the LHEEA Lab.

Preparing the next generation of energy systems by exploring new concepts and technological breakthroughs



Commercial parks

Demonstrators and pilot parks



Optimising the performances for mitigating cost/risk

Demonstrators

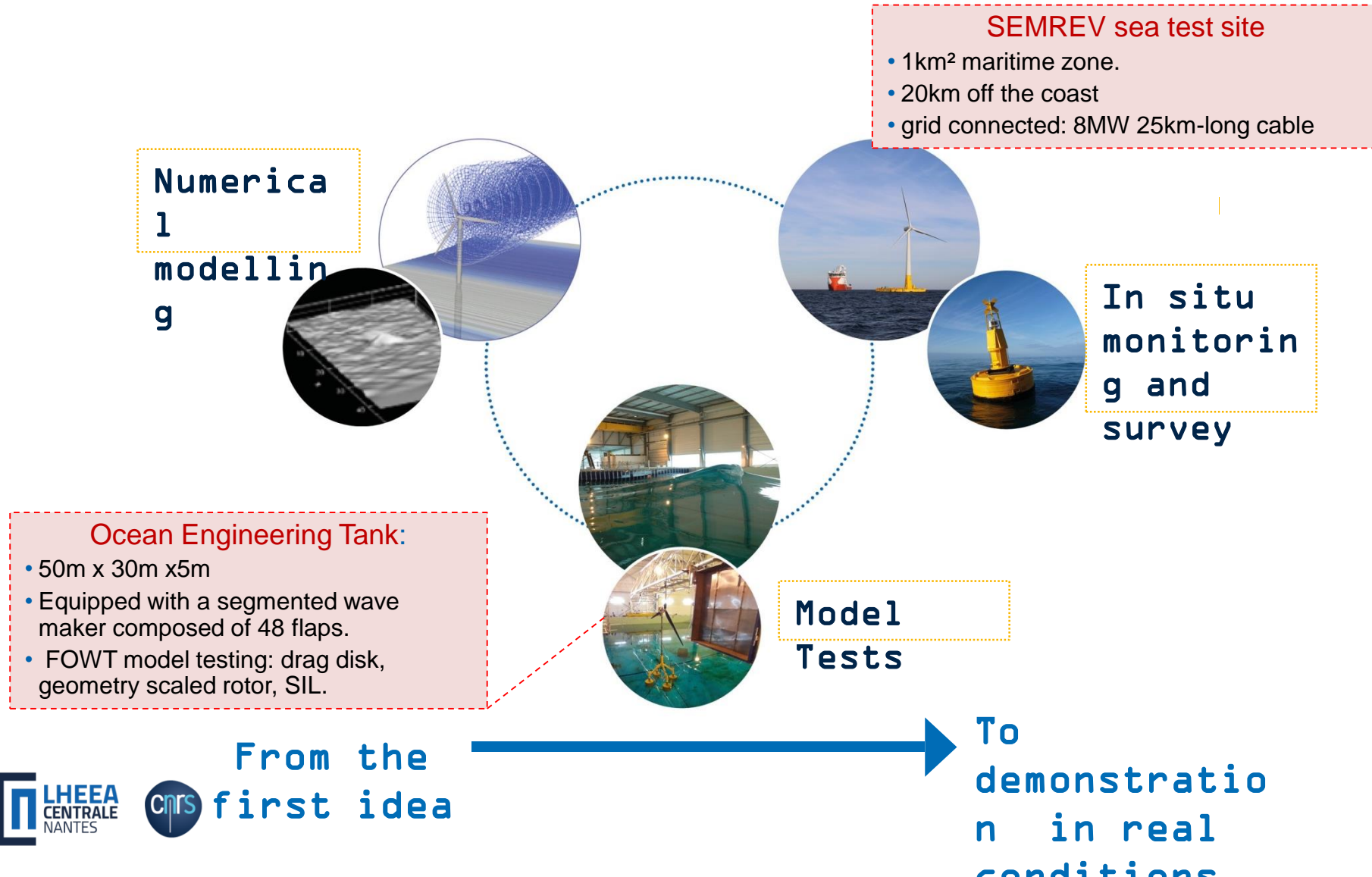


Demonstrators



Action 1: Facilitating the maturation of Floating Wind Turbine

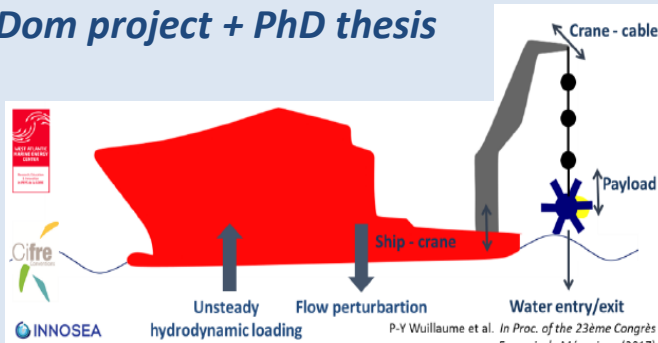
Design methodologies, Performance prediction, High Performance Computing, multiphysics modelling, complex environment, similitude laws, verification & validation, performance validation, permitting, ...



Action 2: Optimising the performances

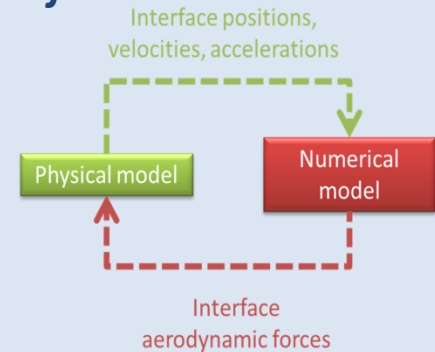
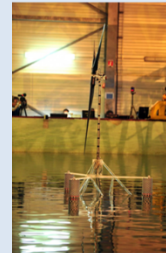
Park effects, control of offshore wind parks, monitoring, testing and development of innovative control/command laws,

FRyDom project + PhD thesis



Optimization and numerical modelling of marine operations

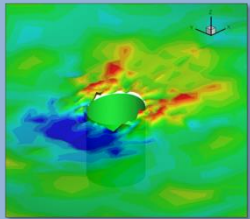
SoftWind project



Wave tank testing of control laws by means of SIL approach



HeLoFOW project



European Union
European Regional
Development Fund



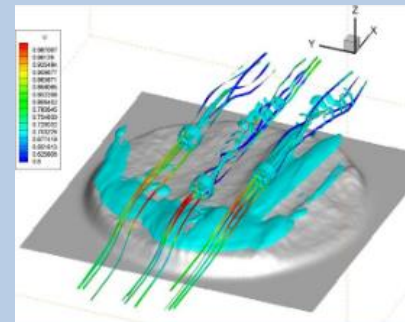
INNOSEA
Marine Energy Engineering

NTNU
Norwegian University of Science and Technology

Hydro-elasticity of FOWT foundation

1. Dvpt of a numerical solver based on unsteady hydrodynamic potential code
2. Experimental validation with segmented models

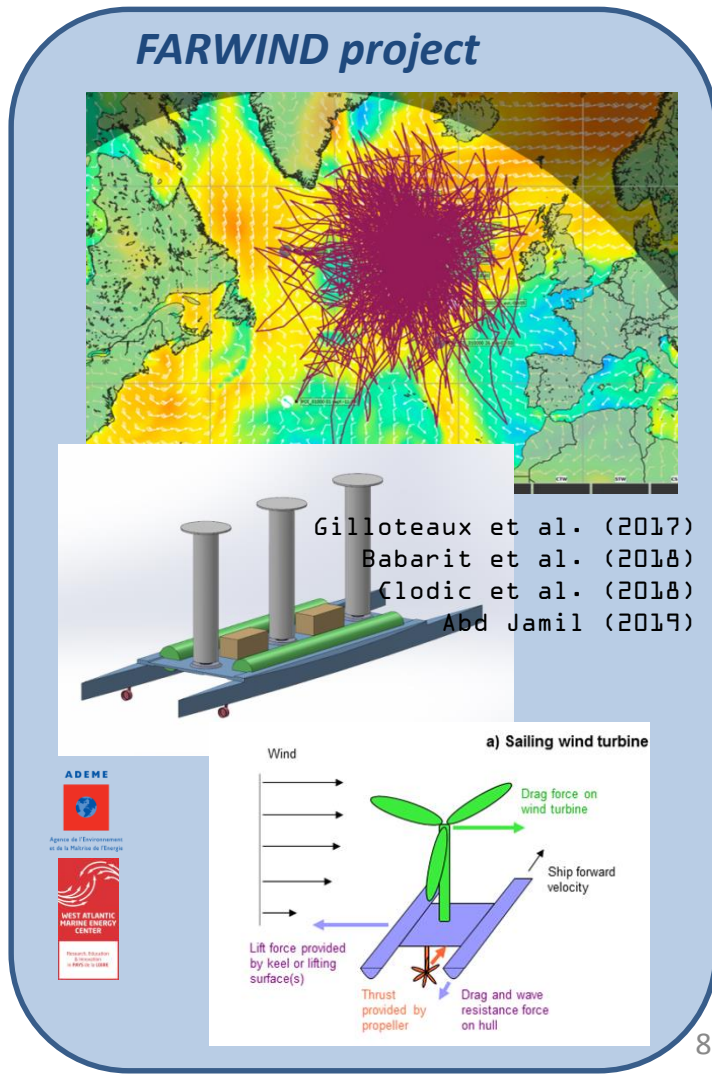
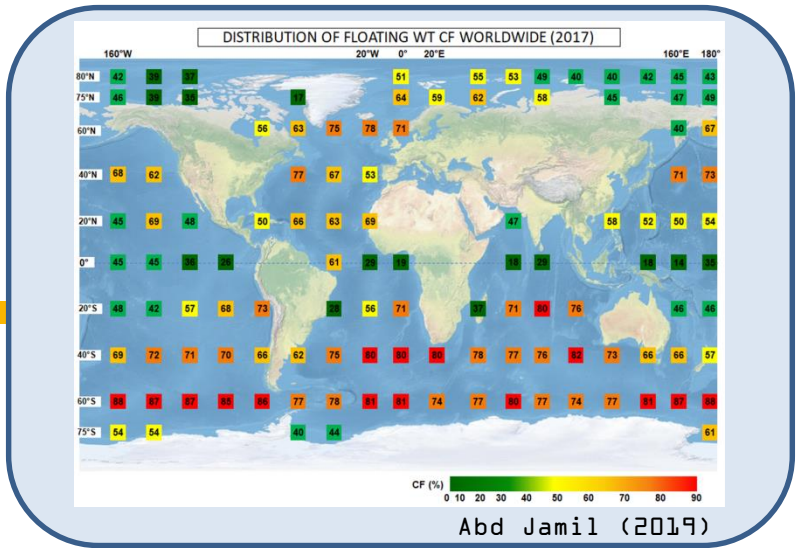
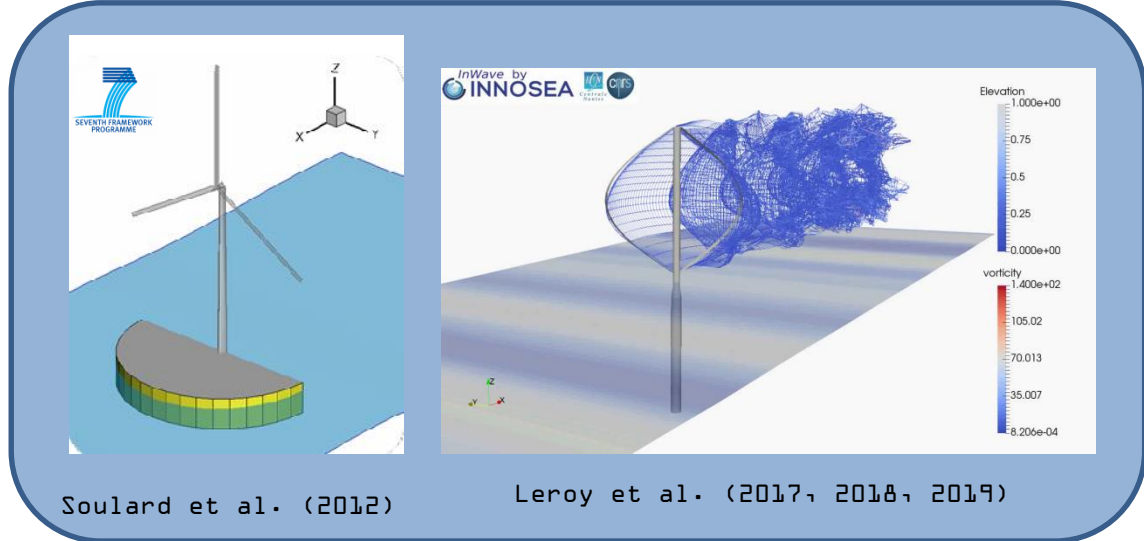
Ecosfarm & EOS project



Numerical modelling of a offshore wind park, control/command laws verification

Action 3: Supporting the Development of Innovative Concepts

Hybrid platforms, floating VAWT, Maintenance operations, far offshore wind capacity factor, mobile far offshore wind energy conversion systems (sailing wind turbines, energy ships)



Thank you for your attention

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