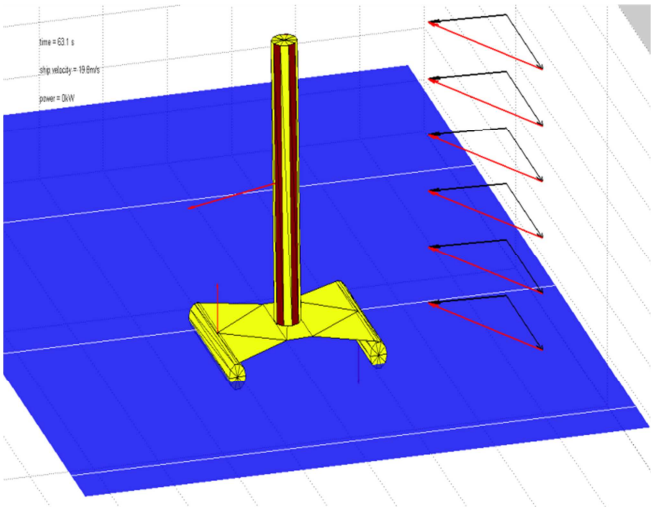
# Design and optimal routing of a wind driven ship dedicated to hydrogen production

The traineeship proposal concerns the development of a new concept for the capture of offshore wind energy. The concept is a wind driven ship that converts wind energy into hydrogen. The wind is used to propel the ship; energy is produced using the relative speed between the ship and the ocean. The energy is finally transformed into a storable energy (e.g. hydrogen to transport energy to the place of use).



**The objective of the traineeship is twofold:**

- To explore the design space of the concept in order to provide optimal configurations in terms of performance (e.g. energy conversion with regards to ship displacement) ;

- To elaborate routing strategies to significantly increase the capacity factor of the concept.

The student will first have to get used to a velocity prediction program (VPP) developed in Matlab for predicting the performance of the concept. The VPP will then be used intensively by varying the various design parameters (e.g. length of the ship, wing surface, hydrogenator parameters, etc.). The analysis of the results will show several configurations with optimal performance.
The next stage of the traineeship is then focused on the use of a commercial weather routing route planning software. The aim of the work is to test different exploitation scenarios taking into account the various operation constraints of the ship (e.g. oceano-meteorological conditions, predictive maintenance, discharging of hydrogen ...). The analysis of the results will show the performances of the different concept configurations previously defined and their abilities to have a significantly high capacity factor in comparison to other competing solutions.

**Required profile:**

Bachelor Master Degree in Mechanics (Fluid Mechanics, Hydrodynamics, Ocean Engineering).

**Disciplins** : Applied Mechanics, Fluid mechanics

**Needed skills:**

Some experience in programming (Matlab or Python).

**Location**:

Laboratoire d'hydrodynamique, énergétique et environnement atmosphérique (LHEEA), Centrale Nantes

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**Duration** : at least 4 months