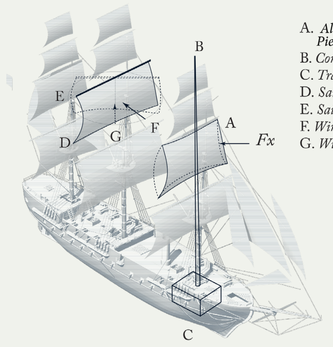
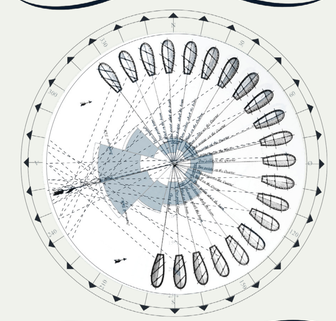
WIND & SAIL



A. *Aluminum Coated Piezoelectric Fabric*
B. *Conduit*
C. *Transformer*
D. *Sail Orientation 1*
E. *Sail Orientation 2*
F. *Wind Direction 1*
G. *Wind Direction 2*

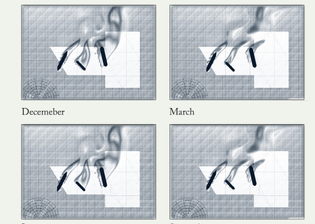
SAIL POSITIONS



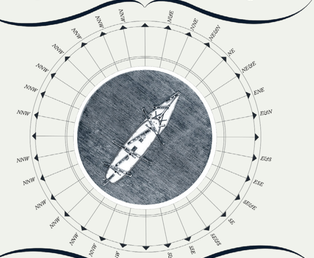
ENERGY OUTPUT

Total Area:
331.38 Square Meters
Total Output: 1,248 MWh

WIND SIMULATIONS



SAIL DIRECTIONS



— Harnessing Wind through Nautical Technology —

The three ships are arranged on the site to maximize energy capture from the prevailing winds from the South-West. Further to the wind capture, the ships are also oriented to create a series of soft spatial boundaries at various scales for intimate uses to large collective events. In section, the ships are placed at a consistent top datum, or the *water line* when they were in use, which allows all the sails equal access to the wind flow. While there is no singular ideal wind orientation, the scheme has flexibility in that the direction of the sails can easily be re-rigged daily, weekly, or seasonally to optimally harvest differential wind patterns. Here, we combine the refinement of wind harvesting by centuries worth of empirical research by Danish sailors with a high-tech peizoelectic membranes for the sails.

The ship's sail and mast configuration already has the potential to capture energy from prevailing winds and forces. By integrating the sails with piezoelectric fibers and subjecting them to mechanical excitations they would be capable of transforming mechanical energy into usable electrical energy. The ship's sail will be made of two types of fibers: the *warp* which is composed of polyvinylidene difluoride piezoelectric fibers and the *wefts* which are metalized conductive yarn which are able to conduct the electricity produced.

This fabric will have the ability to generate electricity against stimulus such as mechanical strain or vibration from natural winds. This fabric is suitable for the ship's sails as it is lightweight, flexible, and heat resistant. Naturally a ship elevates its sails in order to capture undisrupted wind patterns, which are an optimal location for capturing maximum forces. This energy is captured in the fabric, and transferred to the yard, down through the mast, and stored in a concealed transformer housed in the ship's hull. Based on annual wind averages of 21 Mph and a total sail area of 331.37 square meters, the sail's area is able to generate 1,248 mega-watt hours, or enough to power approximately 115 houses annually.