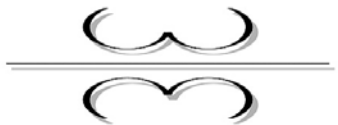


Wind Motion

The question is not "if"
It is "how" and "when"

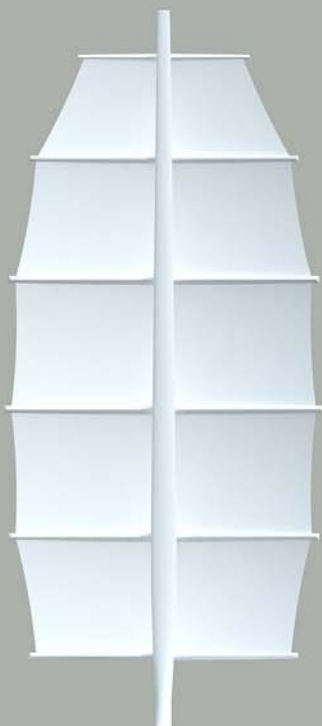


Part I : the idea

Bermuda Sail
CL : 1.0



Dynarig
CL : 1.4



Orientable Wingmast Full Batten
CL : 1.8



Articulated Rigid Wing
CL : 2.2



Rotating Twin Wingmast
CL : 4.0 *



* 2 x 2.0

Turbo Voile
CL : 6.0 **



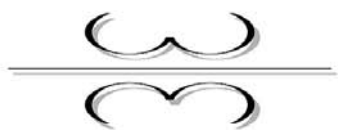
** excl. power consumption

Flettner Rotor
CL : 7.0 **



This illustration shows various wing types, scaled by their optimal Lift Coefficient, to achieve the same propulsive force, for a 30° Apparent Wind Angle boat course.

Not shown here, the kite with its pros and cons.



Wing types

Target: ship main propulsion device

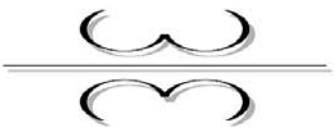
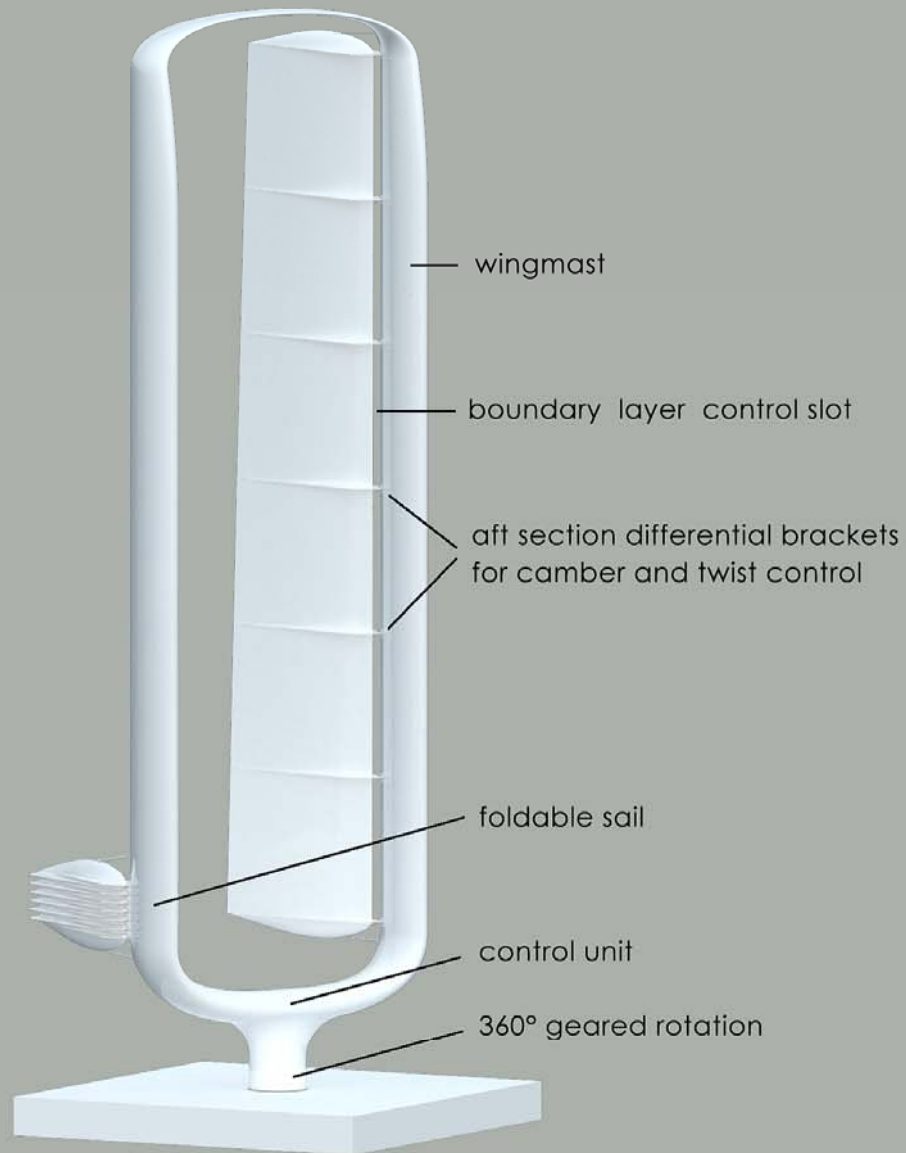
Under optimal conditions,
the ship should be a pure sailer.

Mandatory criteria :

- Automated maneuvers
- Efficiency in all wind directions
- Storm proof

Bonus criteria:

- Efficiency in all wind forces
- Low drag when motoring



Design brief

Target: to maximize wind harnessing

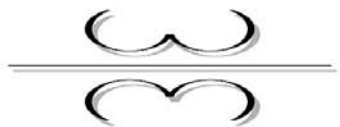
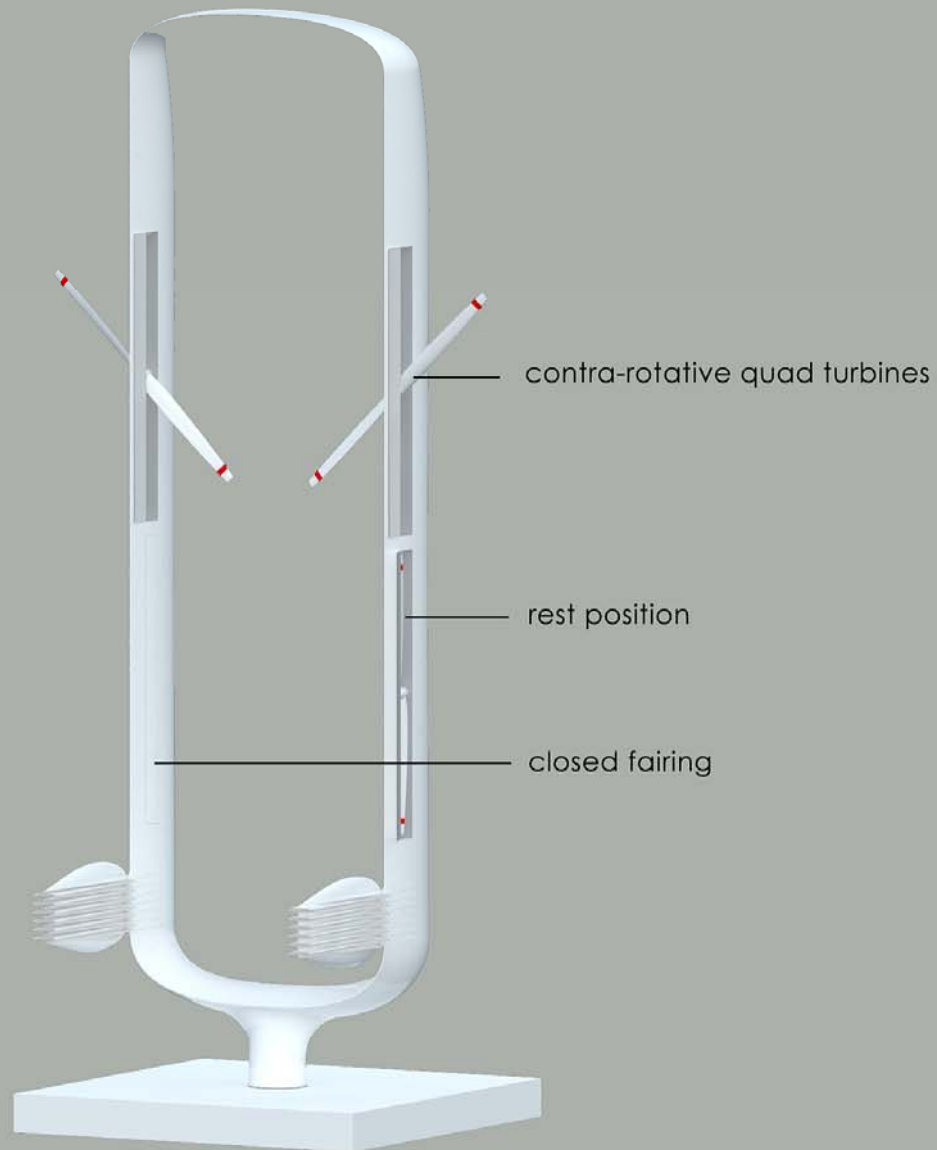
Observation:

When the ship stops:

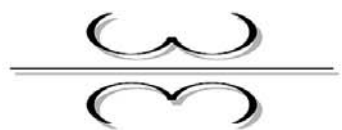
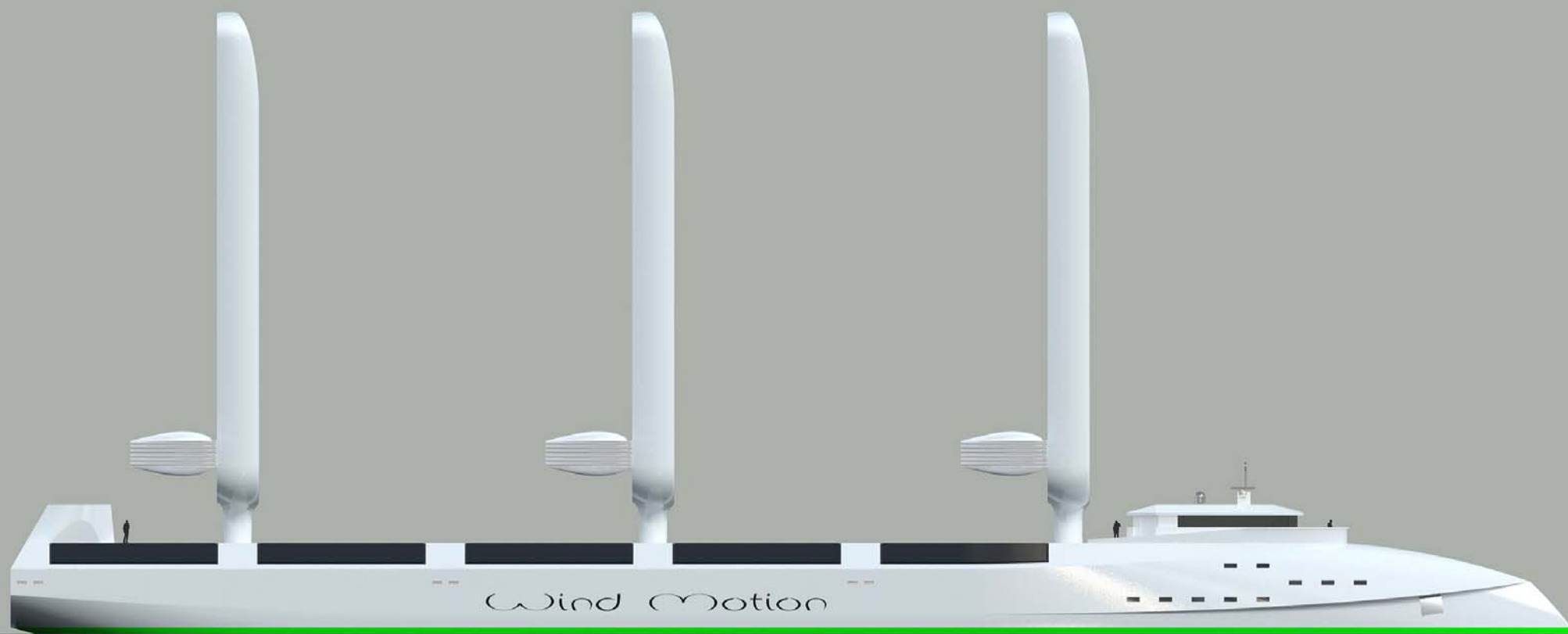
- > no wind energy is harnessed
- > the rig structure is useless

Optimization:

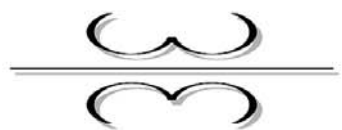
The rig becomes the support of wind turbines, charging the power pack for auxiliary motorisation and domestic needs



Optional wind turbines

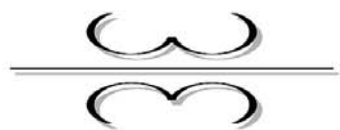
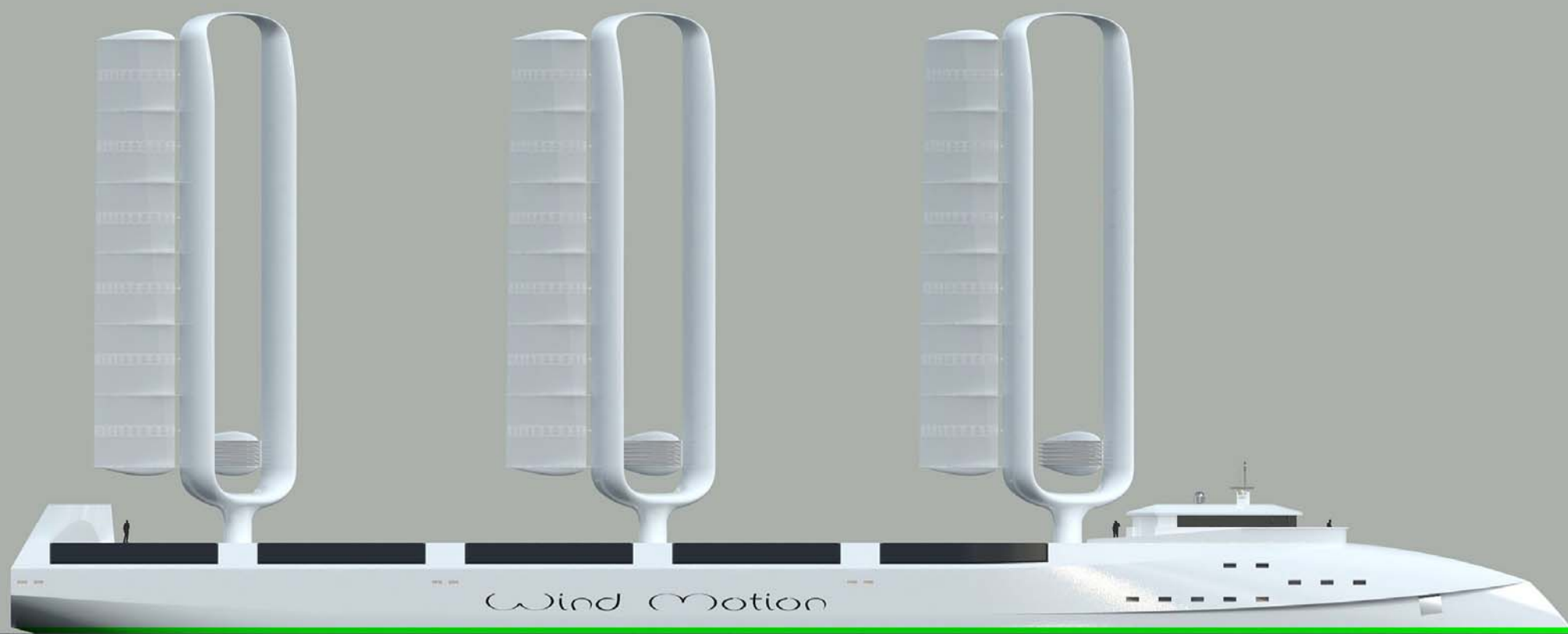


Flat calm motoring or storm wistanding

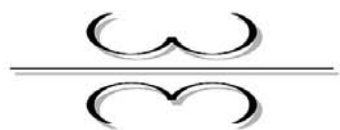
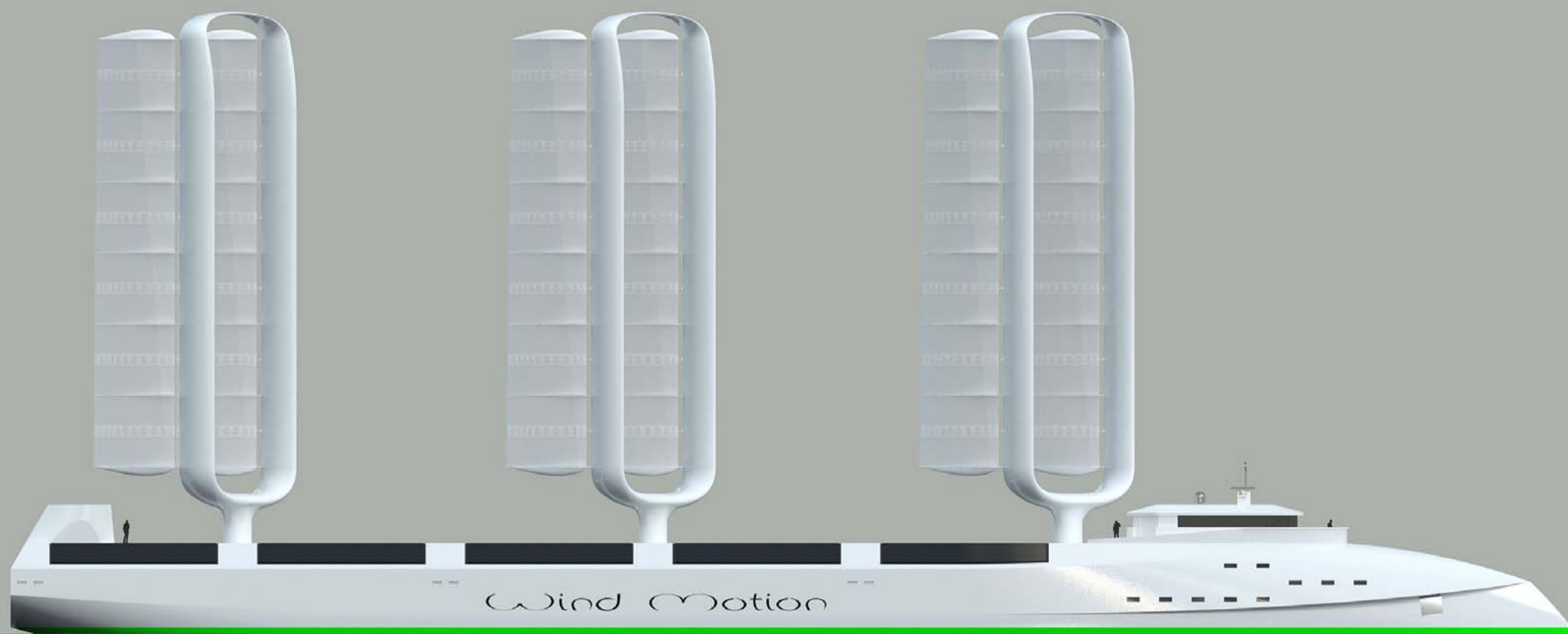


Sailing upwind 7-8 Bft.

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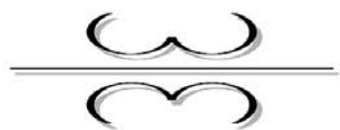
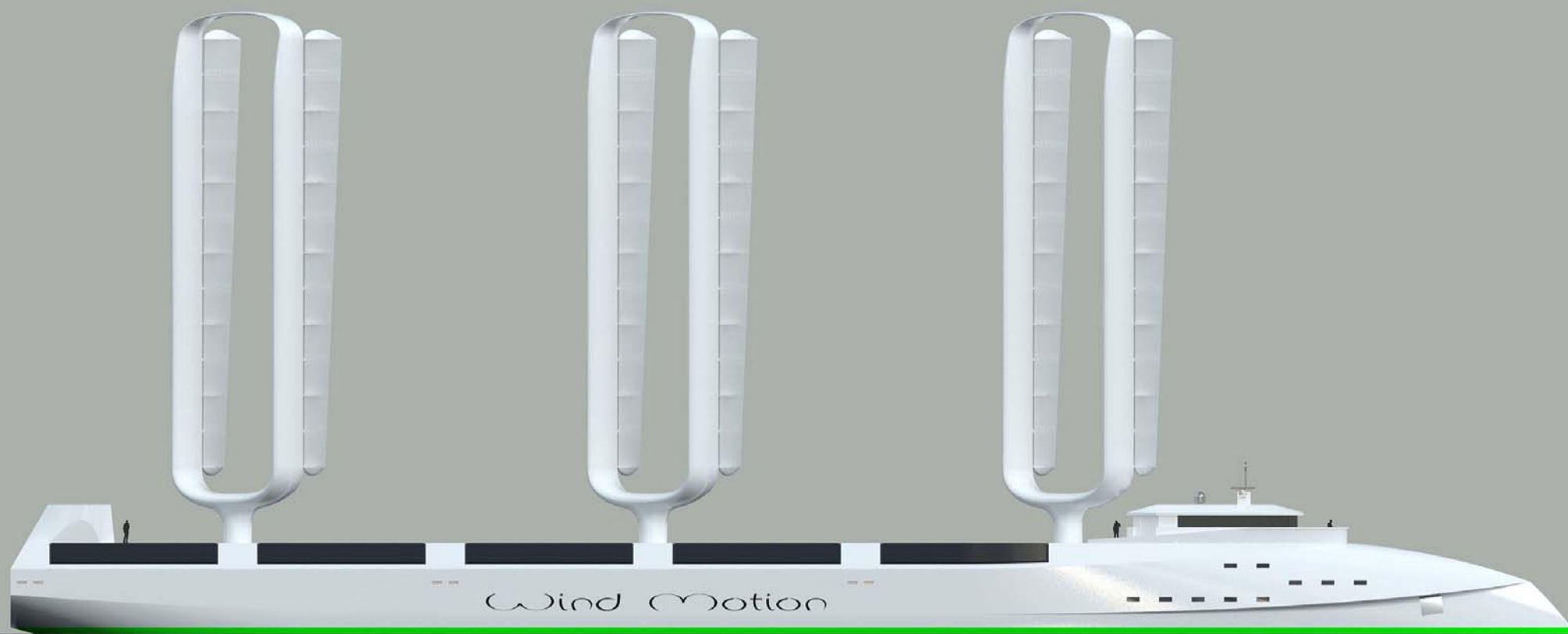


Sailing upwind 5-6 Bft.



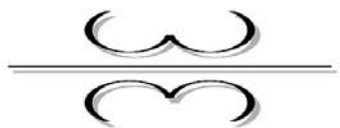
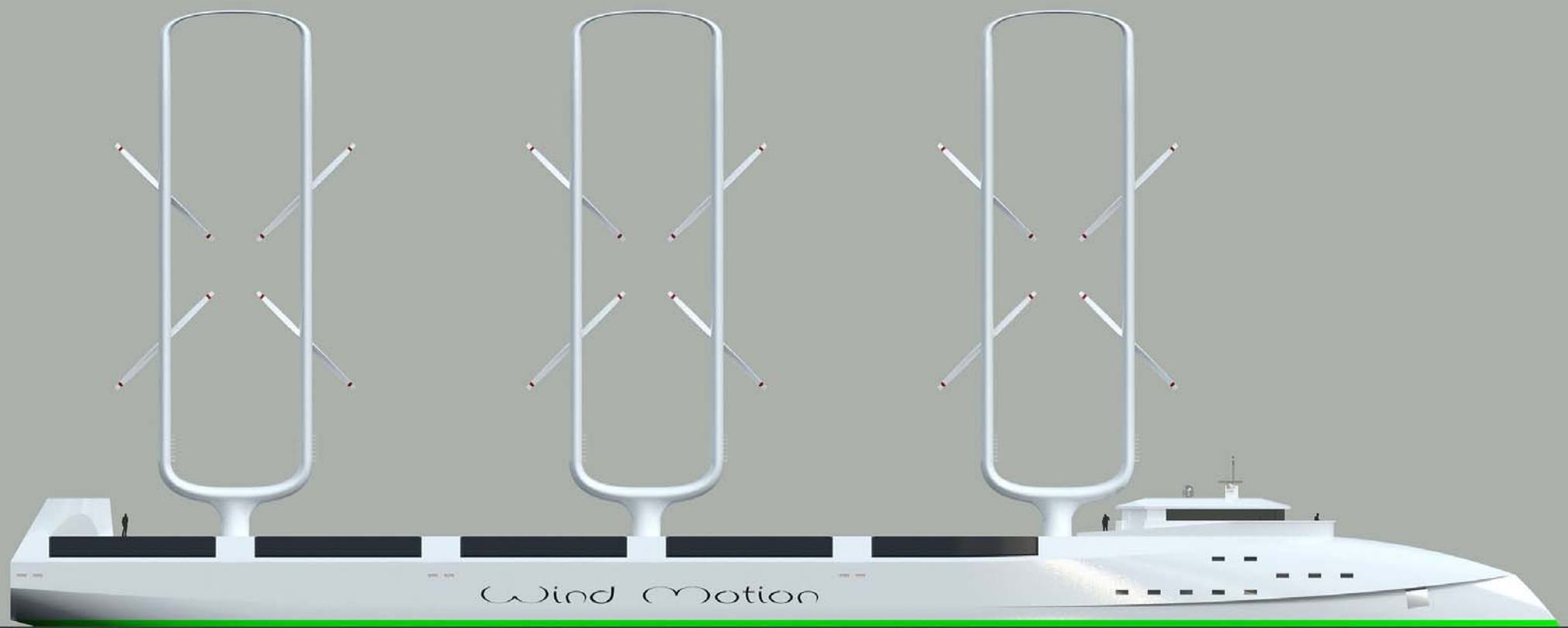
Sailing upwind 1-4 Bft.

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Sailing downwind

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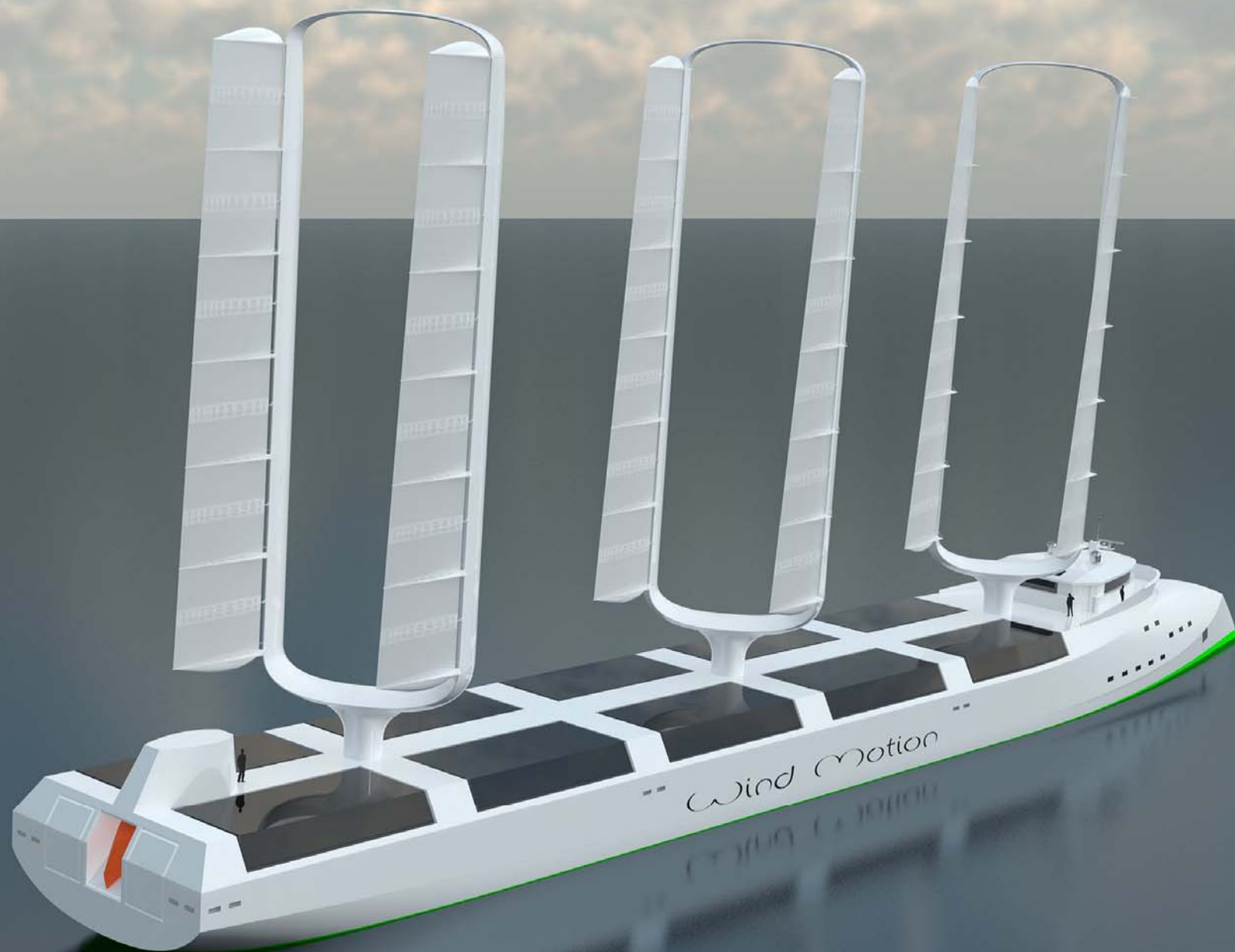
Docking & charging



Wind Motion

downwind

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upwind

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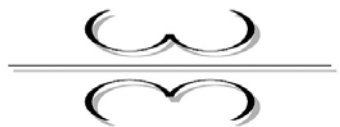
$\frac{3}{3}$ t 70

enjoying

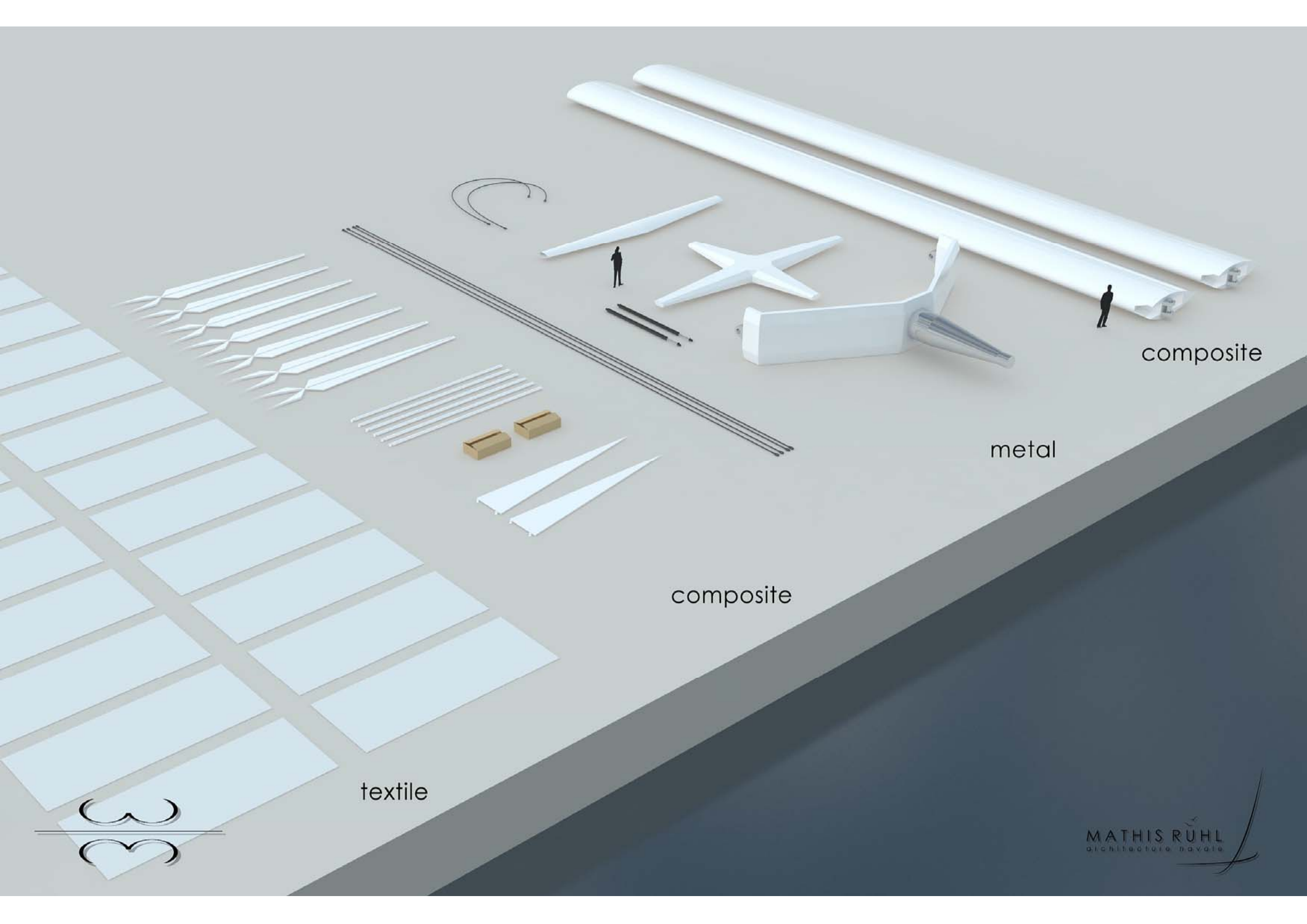
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Wind Motion

When economy matters
Industrial production considerations



Part II : the reality

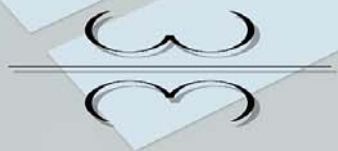


composite

metal

composite

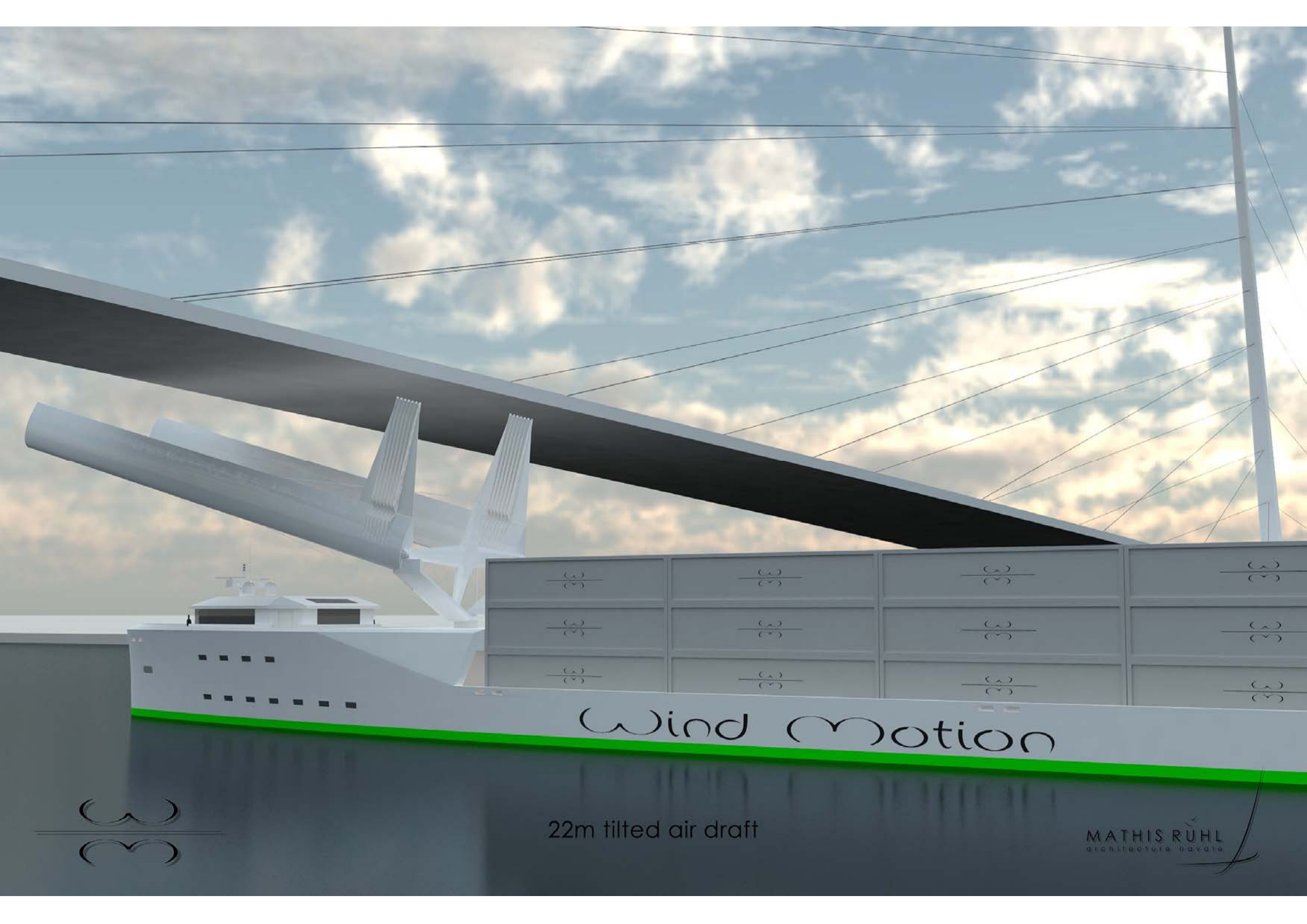
textile



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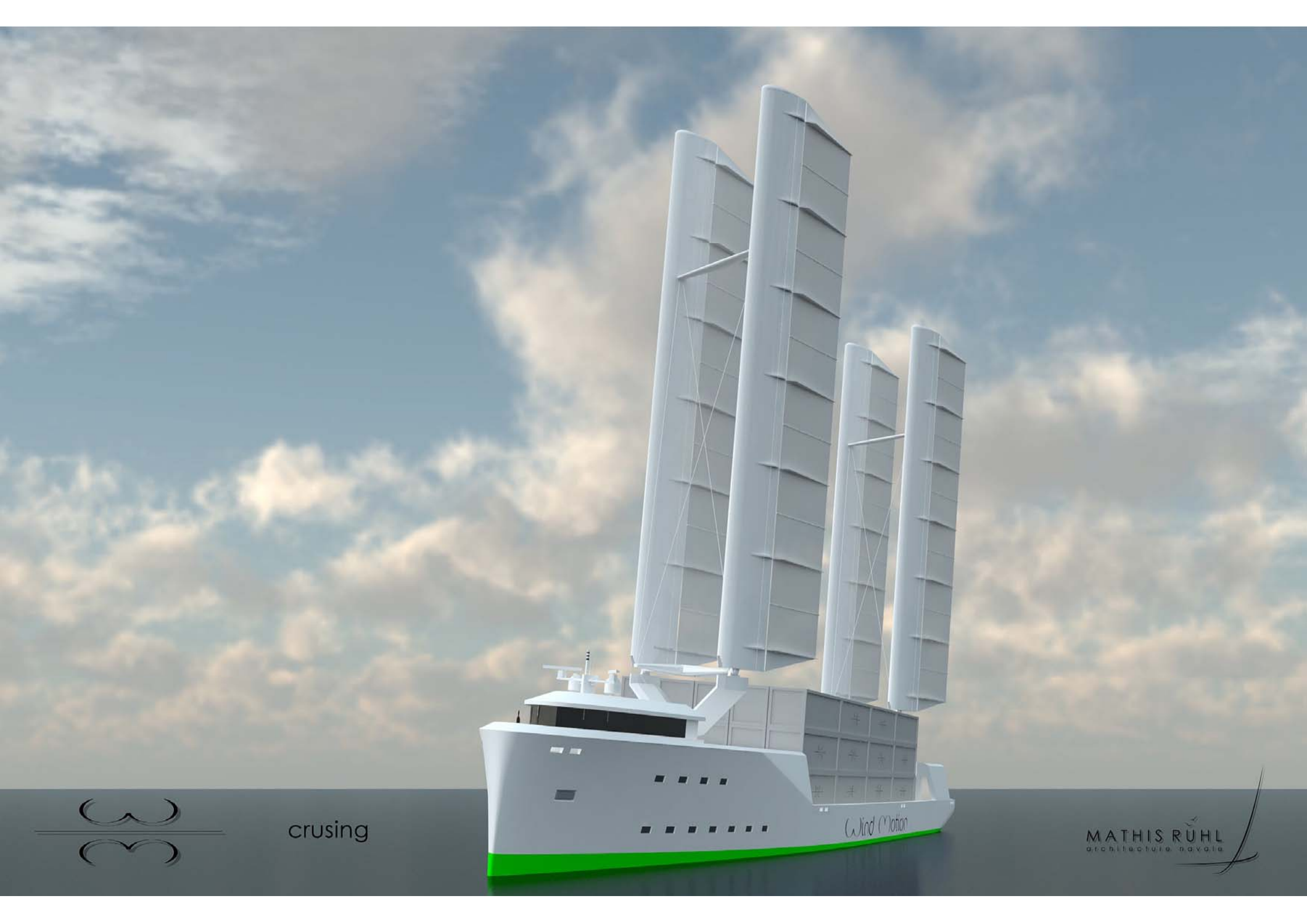
assembly



Wind Motion

22m tilted air draft

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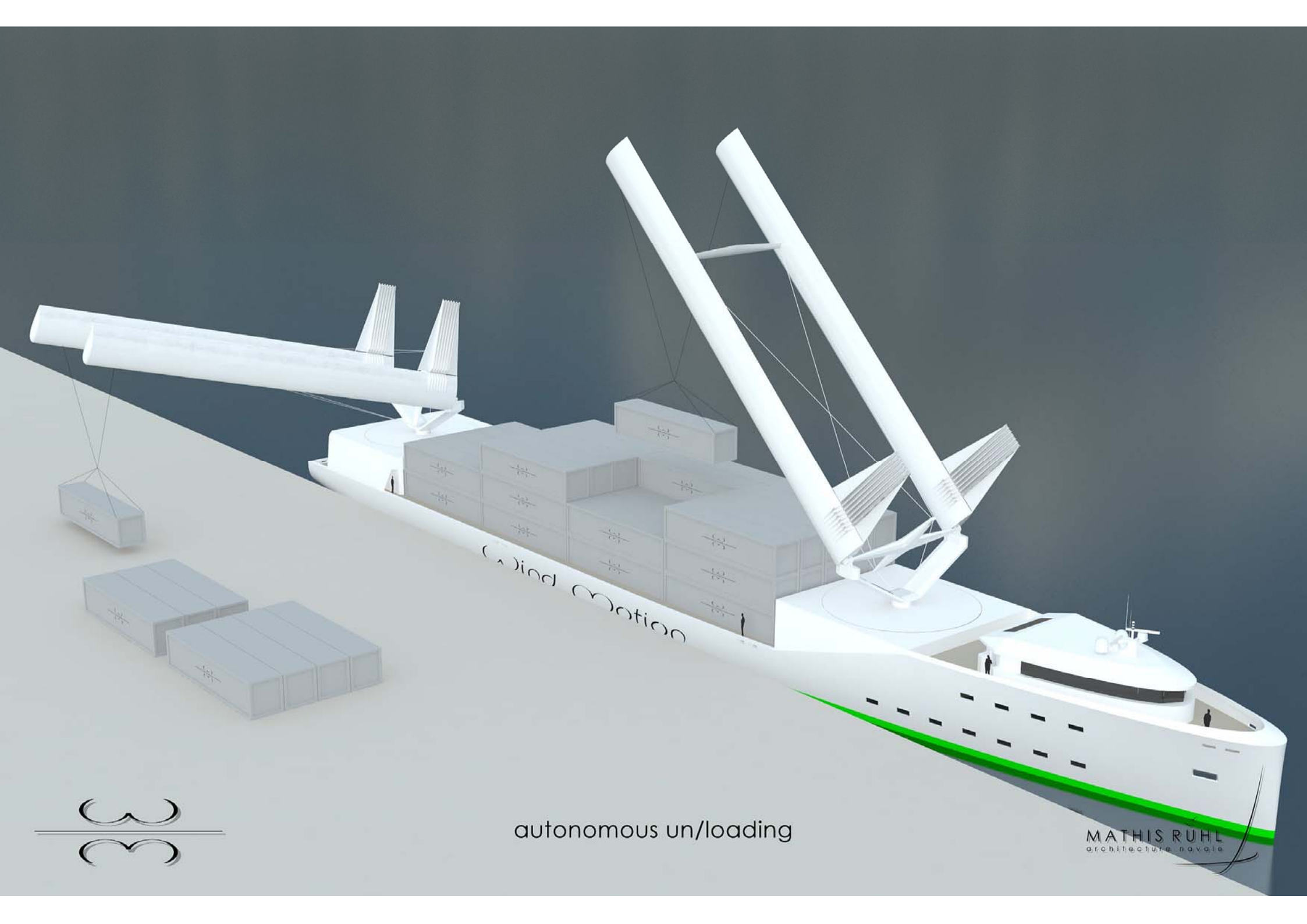


crusing

Wind Motion

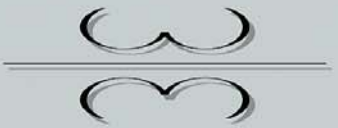
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autonomous un/loading

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Can we do it again?
Can we do it better?



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