

Adapting cargo handling, green fuel integration and harbour operation for wind propelled vessel

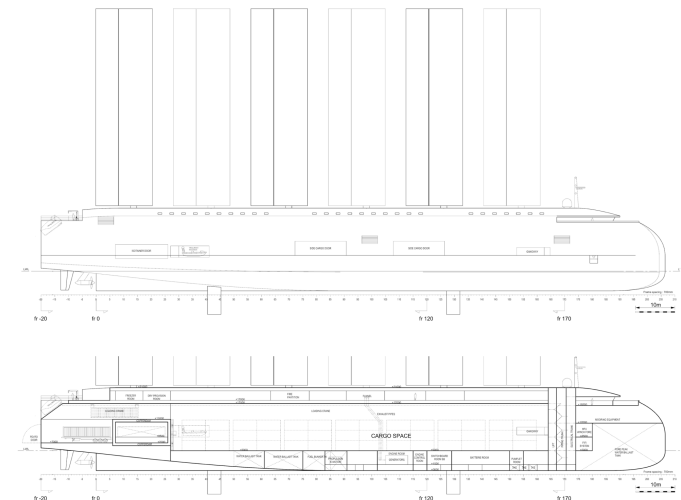
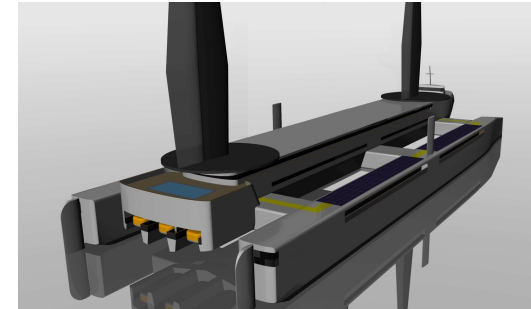
PROPELWIND at a Glance

- Established in 2011
- Design and Consultancy Office with:
 - Focus on commercial ship design using wind for the **main** propulsion + green fuel assistance up to **zero-emission**
 - Assist shipowners in selection of best **WAPS** system
- Combining in-house robust **shipping know-how** with:
 - State-of-the-art ocean **sail racing technology** from winners
 - Full market knowledge of proven devices from **WAPS** industry
- Owned by the founder, family and friends
- Operating company **PROPELWIND** s.a.s. Located in South Brittany
- Our main product: a **Ship Engineering Package**:
 - **Customized** for each cargo and shipowner
 - **Certified** by Class
 - For the shipowner **tendering** to shipyards
 - Including vessel **wind performance** data
 - Including recommended **WAPS device** selection



PROPELWIND status

- Completed a comprehensive initial assessment proving the feasibility of main propulsion by wind for commercial vessels up to **10,000 dwt**
- Co-founded **IWSA** (2012) and **ZESTAs** (2019)
- 5 patents, 2 Lloyd's List Awards nominations (2013)
- Completed the concept design for the container version of the concept (250 TEU / 330 TEU)
- Defined other versions with light cargo's:
 - car carrier (1,300 CEU)
 - expedition cruise (120 PAX)
 - liquid hydrogen carrier (13,000 m³)
- Ready to complete the development of the monohull, including performance calculations, risk assessment, model tests and basic engineering



SAFE CARGO

We combine wind propulsion with **safe solutions** for the cargo storage (**all inside**):

- **Fire:**

- effective detection
- full fire fighting coverage, direct and immediate



- **No containers overboard**

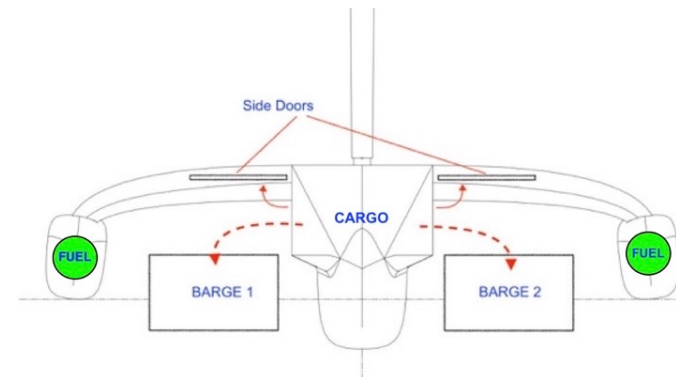
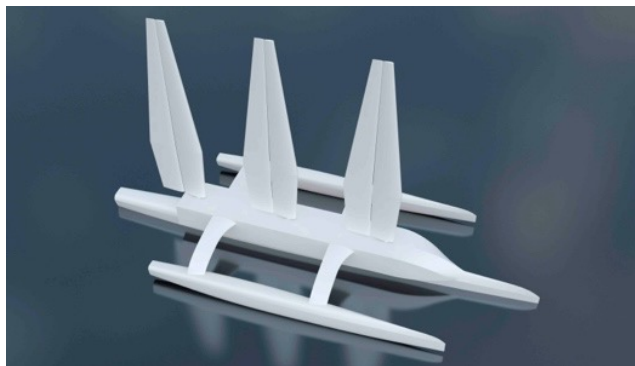
- all containers stored in-board



SMART containers handling – *origin: trimaran*

The idea came from the issue with **trimarans**, our initial base case:

- trimaran concept rejected by shipping mainstream industry because incompatibility with harbor:
 - too much space
 - no cargo access to central hull)
- mitigation :
 - system to load / unload directly from / to inland waterways vessels
 - both essels moored alongside in sheltered area
 - cargo transfer in **ship – to – ship** mode



SMART containers handling – *the issue from 2021 on*



October 2021 – US West Coast

« The **average delay** for late vessel arrivals continued to deteriorate, increasing by 0.58 days during the month to **7.6 days** in August. Separate research ... showed that there were delays of **up to 30 days** »

29/09/2021

« More than **600 containerships** are waiting outside ports across the world, unable to go directly to a berth on arrival because of congestion on the quayside or in storage yards. This represents around **12%** of the world boxship fleet in terms of ship numbers »

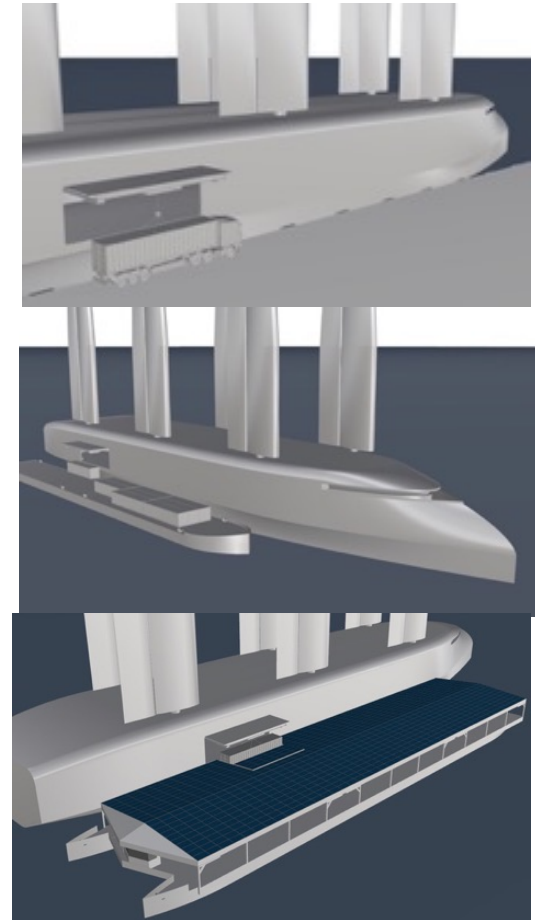
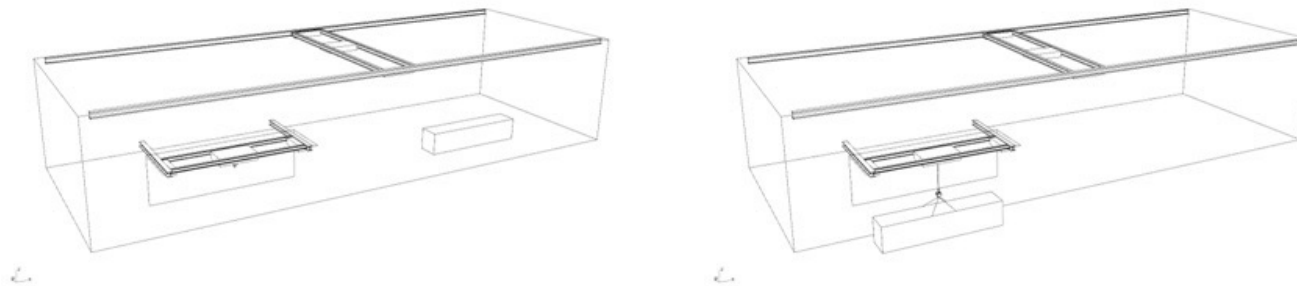
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SMART containers handling - *monohull*

We combine wind propulsion with **smart solution for Container Terminal Congestion risk**

=> *side-wise cargo autonomous handling:*

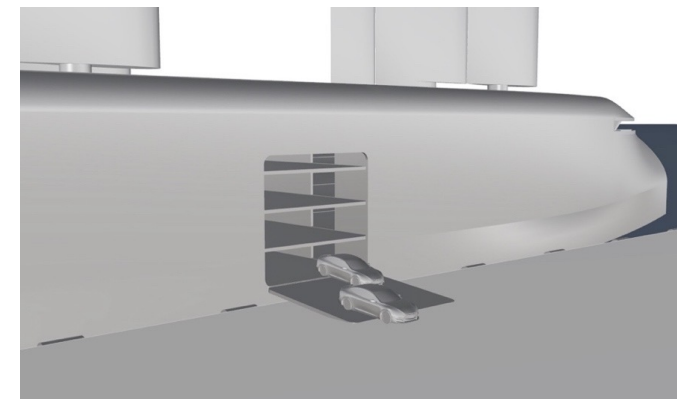
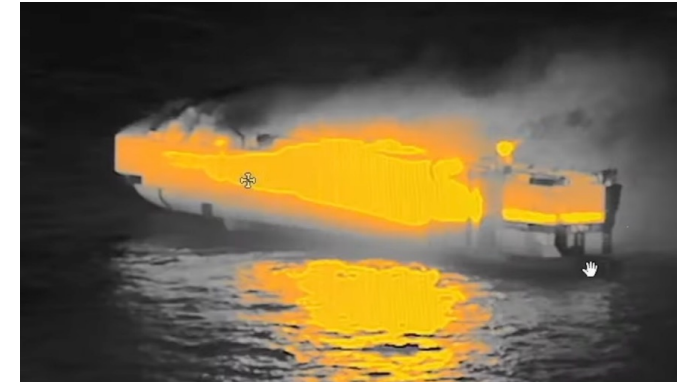
- no need for harbor cranes
- ability to load / unload directly from / to:
 - trucks alongside
 - inland waterways vessels
- direct access to small harbors
- *(work in progress)* same from / to solar powered inland waterways vessels, offering the ultimate supply chain decarbonization



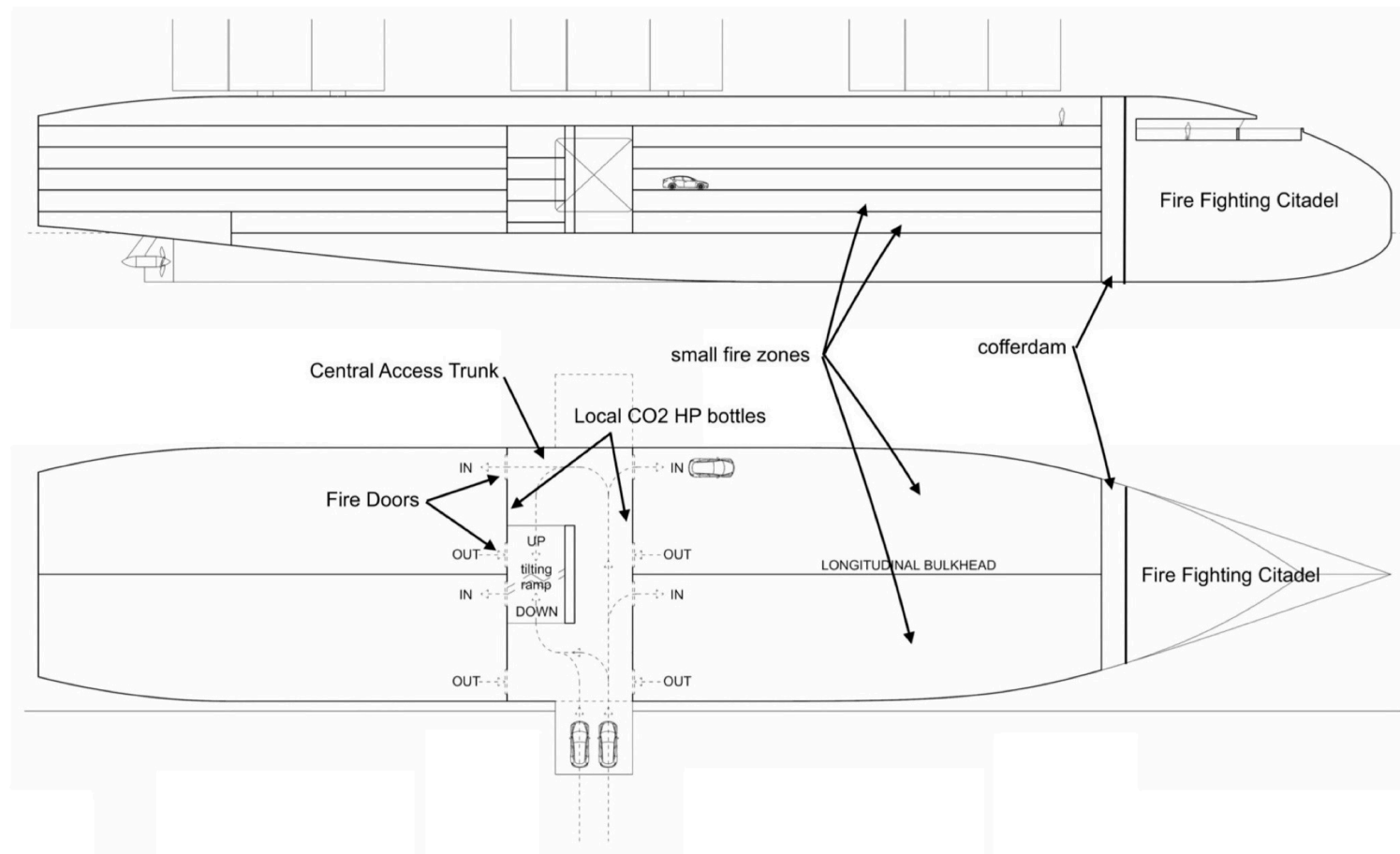
SMART PCC Fire Protection

We combine wind propulsion with a **smart solution** for:
Fire Propagation on PCC's

- Transverse **bulkheads**, a direct consequence of the lateral access trunk, instead of aft ramp / door:
 - drastic reduction of the volume affected by a car fire
 - allows oxygen removal (purging) in less than 15 minutes (critical for EV fires)
- High-Flow, long duration **purging** with IG from Inert Gas Generator i.o. CO₂ bottles (limited capacity):
 - stop the fire propagation, most from .. burning plastic !
 - also critical for EV fires
- Fire Fighting **Citadel** for:
 - fire management crew
 - safety equipment (IGG, EDG, fuel)
 - access for salvage crew



SMART PCC Fire Protection (cont'd)

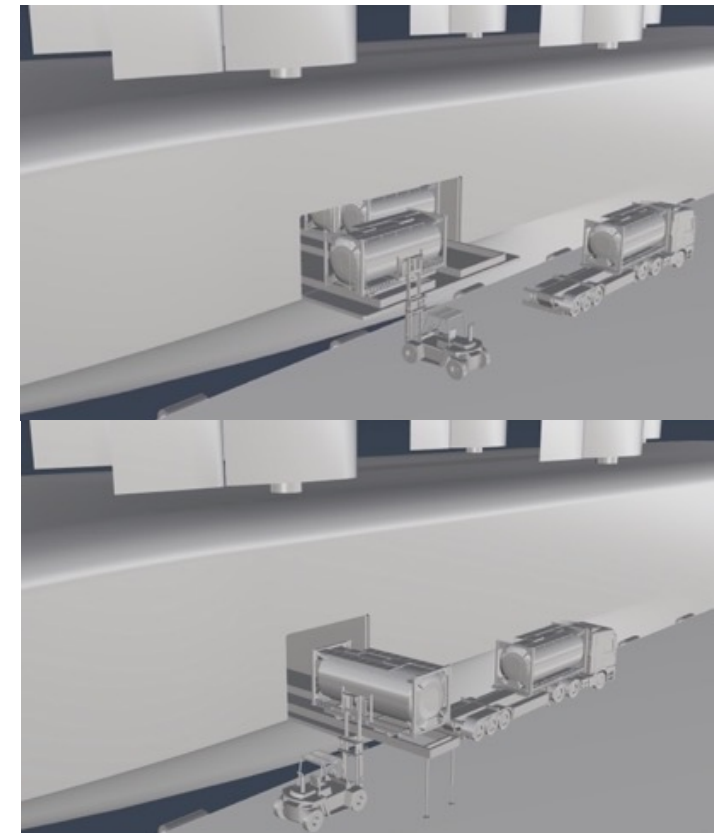


SMART flexi-fuel

We combine wind propulsion with a **smart solution** for:
Uncertainty about green fuel transition

=> **flexi-fuel** feature, a future proof solution:

- back-up fuel handled in ISO-tanktainers
 - storage in compartment surrounded by cofferdams
- safe handling:
 - no crane (drop-load risk)
 - just forklift truck (hydraulic)
- start with LNG, shift easily to Ammonia or H₂; just local changes – same hull
 - drive engines of gensets
 - fuel gas handling system
 - Safety systems : gas detection, air locks, ..
 - venting
- no need for local harbor infrastructure s.a. storage, bunker ship, ...; supply chain is by road trucks





CONCLUSIONS

- Appetite from the market for PROPELWIND concepts was triggered by the additional operational features
- Working in parallel on different markets
- First vessels to hit the water by 2028



Questions?

PROPELWIND S.A.S.

WIND PROPULSION FOR CARGO SHIPS

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