

BeSeL

BALLAST FREE SUSTAINABLE VESSEL



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e+Ingeniería



G.Junquera Marítima is a spanish family Company group with more than 105 years experience at Shipping.

Navinorte is a General Cargo vessels Shipowner at the European Tramp Market carrying many different cargos from grain to Steel in different shapes and types.

Remolques Gijoneses is a Port Towage operator at Puerto de Gijón in the North of Spain

E+ ingeniería is a technological Company focused on naval engineering together with energy efficiency knowledge from other sectors.

Combined experience and knowledge allowed as to develop ***BeSeL***

My name is ***Pablo Campos-Ansó Fernandez*** and I am in charge of Innovation and New Business development for ***G.Junquera Marítima***. Recently became Board Member of the Company.



A revolutionary solution
for merchant ships whose
design and characteristics
allow ballast-free navigation.



BALLAST FREE

Problem

Ships have been carrying tons of seawater from one place to other in the world with two main associated problems:

- *Transporting water together with its microorganisms from one part of the world to another one with a completely different ecosystem. BWM Convention appeared for this reason trying to reduce this impact.*
- *Lack of efficiency increasing hull resistance (fuel-consumption associated costs and emissions) while sailing without cargo, but with ballast. The ballast water was needed because of a lack of stability in this condition.*

Solution

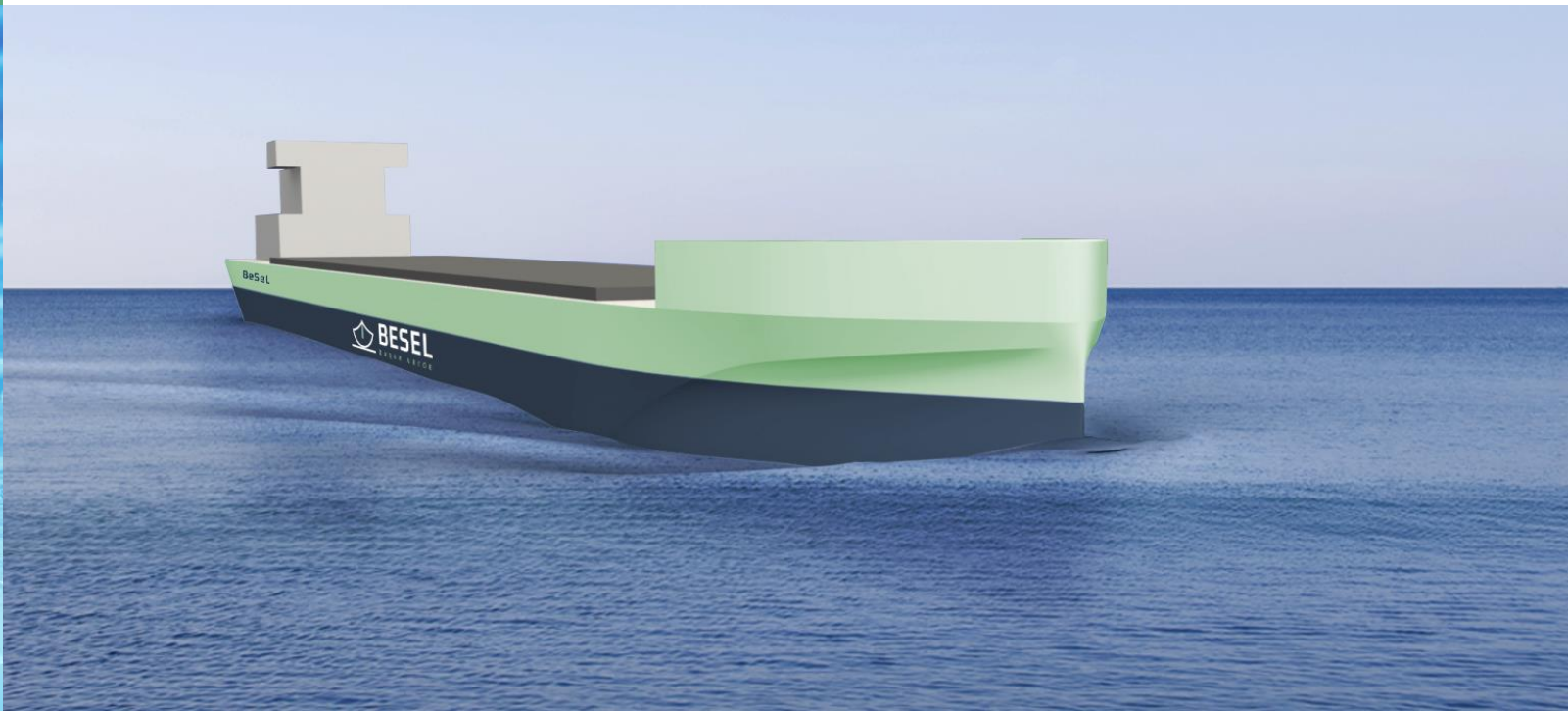
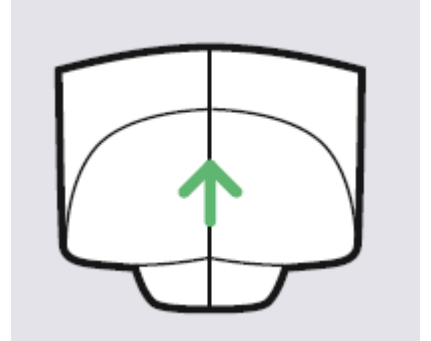
Completely eliminate the necessity of ballast water onboard an empty vessel, ensuring stability, better performance, less energy consumption and same operativeness



Invention and novelty

How

- BALLAST-FREE => RE-SHAPE & RE-SIZE vessel design
- Integrated electric propulsión – 1 or 2 azipull propellers
100% electric motors
- Hybrid mode based on lithium-ion battery energy storage
- Methanol ready and easy to integrate future energy generation onboard
- Connected ship & Cloud service (consumption, emissions and much more)



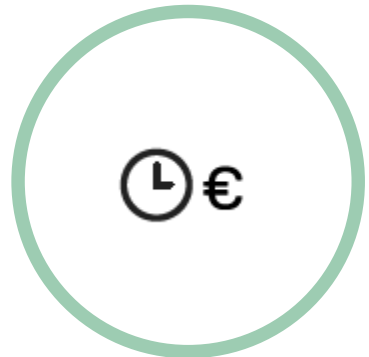
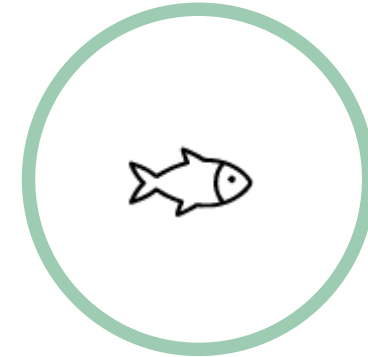
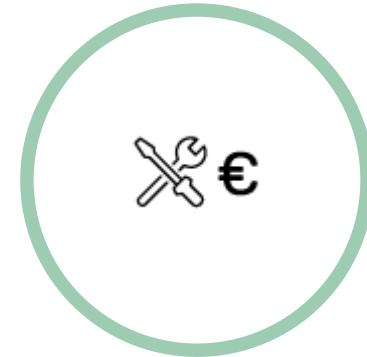
Main characteristics and advantages

Completely eliminate the ballast water system means avoiding ballast tanks, tank coating and specific inspections, ballast piping, pumps and accessories, but also avoiding the ballast water treatment plant, filters and rest of equipment.

This means less investment, less consumption, less maintenance... and *less is more*

Thanks to this...

- **Fuel consumption and emissions reduction up to 30%** thanks to a better hull resistance performance (only related to BeSeL design: *not included here improvement thanks to new propulsion systems and energy generation and management onboard)
- **Load/Discharge operations optimization in time and effort** (no need to ballast/unballast)
- **Cost reduction in terms of newbuilding and operation:** purchase and maintenance





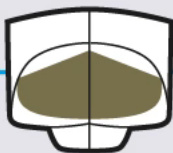
**Conventional
ballast system**



START



 **BeSeL**



**BeSeL is a concept engineering design,
allowing its development for (m)any vessel
types and sizes**



BeSeL is a new opportunity to recover capabilities and strategic position in naval engineering and ship building, a very strategic Market for EU

EU know-how, potential development in different shipping markets and countries



Status

- ✓ **Patent submitted in Spain**
- ✓ **12 Utility models submitted:**

France, Germany, Grece, Irland, Italy, Poland, Portugal, Spain, Turqey, Australia, China & Japan.

- ✓ **over 30 NDAs signed with potential collaborators**
- ✓ **2 AIP ready to be submitted**



Actual situation

- ✓ **Basic Project**
- ✓ **Stability check**
- ✓ **Hull resistance CFDs**
- ✓ **Seakeeping analysis**
- ✓ **Detail engineering**
- ✓ **Model testing**
- ✓ **Class AIP**
- ⚙ **Ready to Class approval**
- ⚙ **Looking for Project funds**
- ⚙ **Ready to build 1st unit**

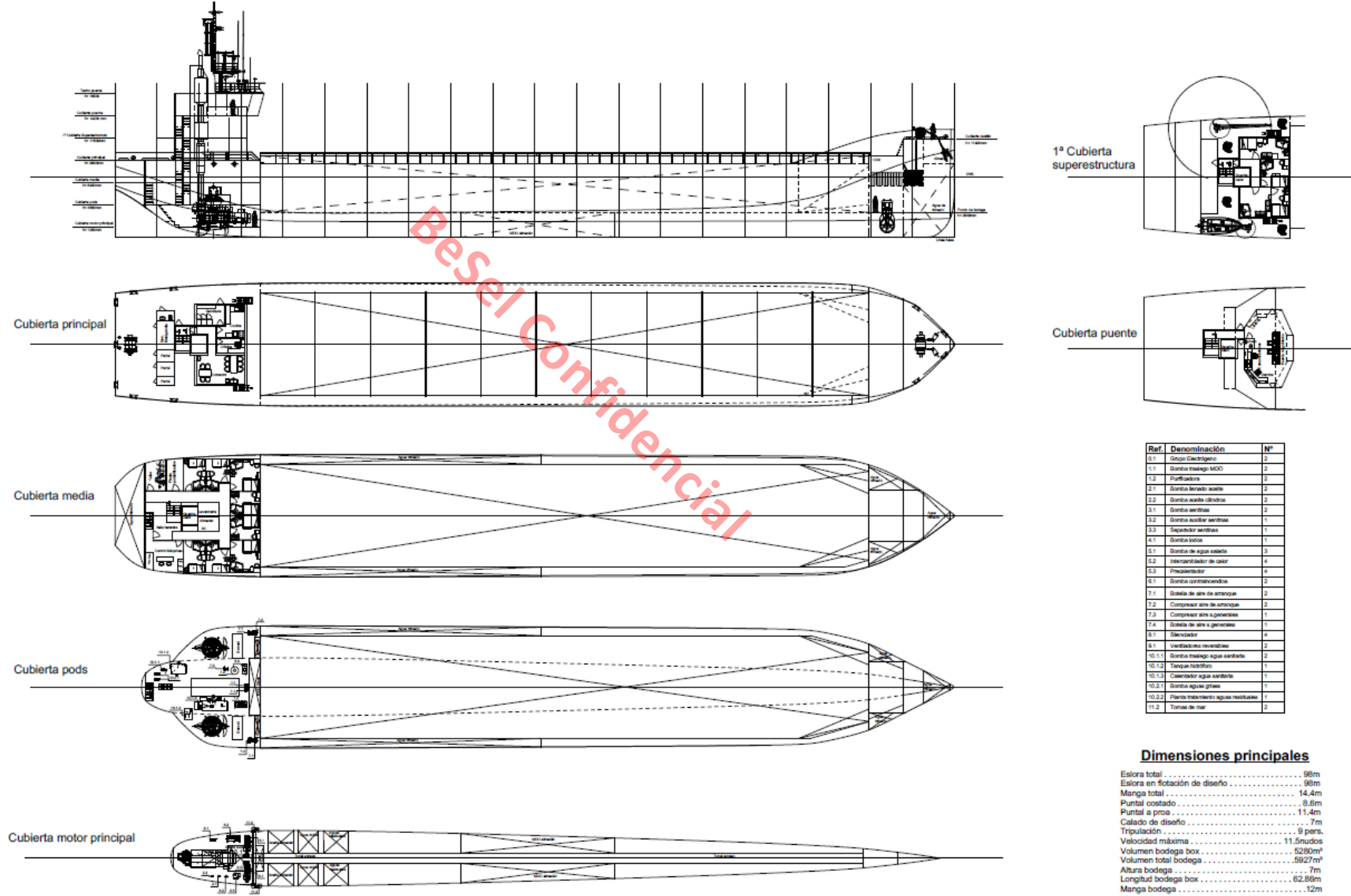


CONFIDENTIAL CONTENT UNDER SIGNED NDA PROTECTION

PATENT PENDING UNDER ECOEFICIENCIA E INGENIERIA S.L. PROPERTY

UTILITY MODEL REGISTERED IN SEVERAL EUROPEAN COUNTRIES UNDER ECOEFICIENCIA E INGENIERIA S.L. PROPERTY

General Arrangement



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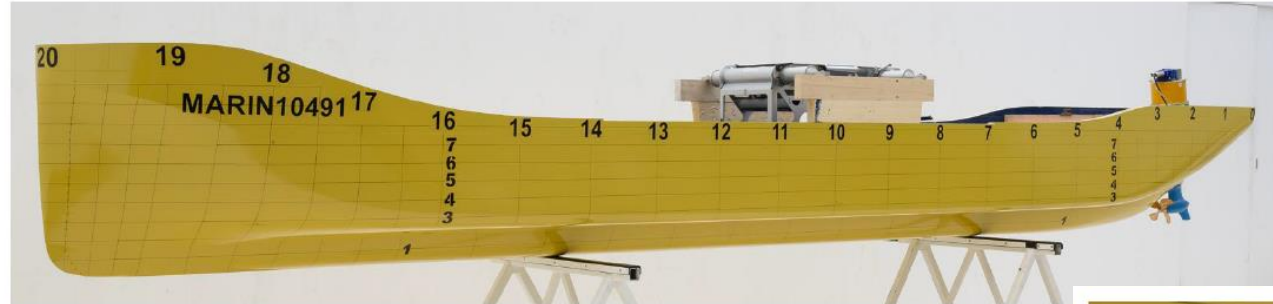
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Model testing results

4.1.2 Information for model manufacture

One large wooden ship model was constructed, denominated model No. 10491, as shown in the figure below. The model was equipped with all appendages, except bilge keels. The particulars of the ship as represented by ship model No. 10491, for the conditions presented in this report, are listed on page T1.



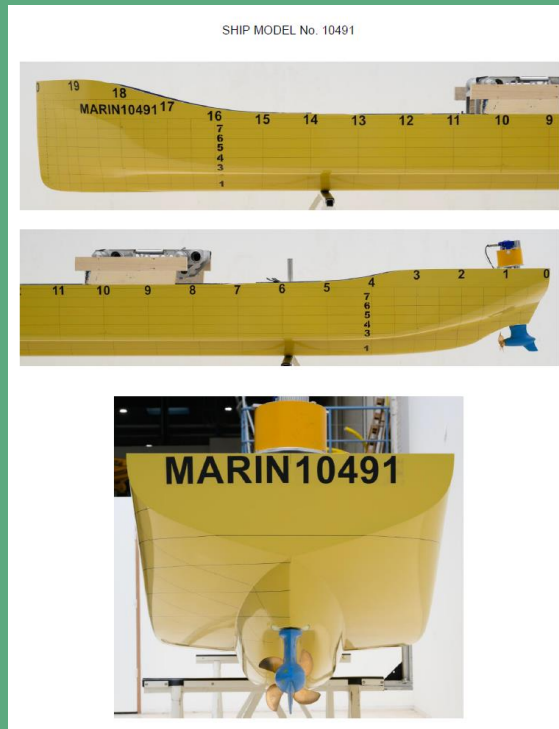
Overview of ship model No. 10491

4.3 Test facilities

The resistance and propulsion tests have been conducted in the Deep Water Towing Tank (DT), which measures 250 m by 10.5 m by 5.5 m in length, width and depth respectively. More information about the Deep Water Towing Tank can be found in the documentation sheet.



Deep Water Towing Tank



PROPELLER MODEL No. 7542R AND THRUSTER MODEL No. 1133

Model testing results

PROPULSION TEST No.	: 34963002	DRAUGHT FP	: 2.672 m
SHIP MODEL No.	: 10491	DRAUGHT AP	: 3.528 m
PROPELLER MODEL No.	: 7542R	SHIP SPEED	: 12 knots
THRUSTER MODEL No.	: 1133		



✓ Hull resistance validation of CFDs calculation success

✓ Sea-keeping performance tests done and 2 improvements to be developed found

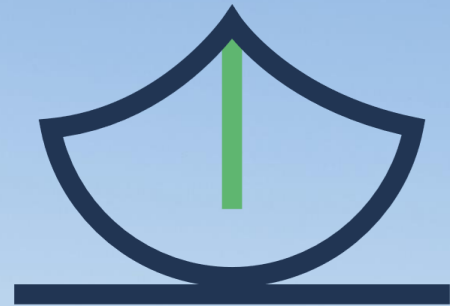
Close to our goal: newbuild a general cargo vessel (*1st BeSeL unit*) to demonstrate viability in a EU Shipyard

Total Budget: EUR 20 MM

- Financial capacity to develop the Project with own resources and high potential to be bankable, but risk associated to high innovation in the 1st commercial unit to be helped by Innovation Fund.

Thank you.

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