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EDITORIAL // BEATRIZ SPUCH
Dean of the COIN and Board Member of ACLUNAGA

CT INGENIEROS // Nuclear Propulsion:
an Increasingly Realistic Alternative

SIEMENS // From Noisy Ship Cabins to Restful Nights:
Tackling Noise and Vibrations for Smoother Sailing

AISTER // AISTER delivers the Sixth HS60 Interceptor
to the Guardia Civil: Río Antas

FFT TECHNOLOGY // Integrated Digital Architecture for Vessels:
from Edge Computing to the Maritime Data Space

FUNDACIÓN MARINNLEG // Public Support for Shipbuilding in 2026:
How to Structure a Fundable Project

IBERCISA // ROBERTO RODRÍGUEZ ORRO (Managing Director)
(The Interview)

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Galician Maritime Technologies

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El grupo se estructura como una organización multidisciplinar y multisectorial, formada por unidades de negocio altamente especializadas que cubren de manera integral toda la cadena de valor, desde la ingeniería y el diseño hasta la fabricación, el montaje y el mantenimiento.

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Galician Maritime Technologies

Naval Engineering: The Bridge Between Tradition and Innovation

It could be said that ships are among the most complex systems built by the industrial sector: autonomous structures that float, move, transport goods or people and, for decades, operate in one of the most demanding environments that exist.

Behind the construction of each of them is an essential and fundamental figure, a kind of professional who masters multiple areas of knowledge and is capable of integrating the most advanced technologies.

And this profession, which women and men in Galicia carry out throughout the entire value chain of shipbuilding, is Naval Engineering, and it is worth standing up for it without hesitation.

Naval engineers are the ones who conceive the ship in its earliest stage, who respond to the shipowner's requirements, who design its hull forms in accordance with the regulations imposed by classification societies, who carry out the detailed design of its layout and oversee its construction on the building slipway.

The work of naval engineers lies behind a sector that, according to the Xunta's Strategic Plan for Shipbuilding, supports around 14,000 direct jobs in Galicia. Few professions combine such technical rigour, an overall perspective and responsibility.

If we broaden the perspective slightly, the shipbuilding sector in Spain leads the world in the construction of fishing vessels and ranks second in terms of research vessels, areas in which it also represents the leading European power. Furthermore, Spain is the European leader in the construction of passenger transport vessels and those dedicated to offshore wind energy. It should be noted, however, that most of these achievements originate in Galicia.

Today, more than ever, the responsibility of naval engineers is critical. The dual energy and digital transition is changing the shipbuilding paradigm. The entry into force of FuelEU Maritime, an EU regulation that seeks to reduce greenhouse gas emissions and promote the use of renewable and low-emission fuels in the maritime sector, requires new pathways towards methanol, ammonia and hydrogen; floating offshore wind opens up a market in which naval engineering is essential; and digitalisation turns each ship into a network of connected systems whose cybersecurity is now a matter of safety on board.

However, the shipbuilding sector faces a shortage of professionals, putting at risk the growth of a sector in Galicia with strong prospects, its technological development and the ability to take advantage of new opportunities.

Working in naval engineering offers the opportunity to develop an attractive professional career that integrates many technologies, but we struggle to attract young people, and especially women, to a profession that society is not always familiar with.

In this regard, the Colexio de Enxeñeiros Navais e Oceánicos de Galicia has a clear role to play: raising the profession's profile, encouraging new career aspirations, retaining talent and collaborating with public administrations and the university in defining the actions needed to respond to the future of the shipbuilding sector. In this respect, the visits we organise in Ferrol to Navantia, the Military Arsenal and EXPONAV, as well as the specialised technical conferences, which are very well received, stem from this conviction: those who see what we do up close understand why it is worth pursuing this profession.



BEATRIZ SPUCH

Dean of the Galicia Territorial Delegation of the Official College of Naval and Ocean Engineers & Board Member of ACLUNAGA

In this first year as Dean leading the Galicia Delegation, I have learned that our professional community has much more to contribute than society is able to perceive and that, at times, we do not dare to say out loud: professional pride.

An excellent opportunity to showcase our profession will come during the 66th International Congress of Naval Engineering and the Maritime Industry, which will be held in Vigo on 28, 29 and 30 April 2027 under the slogan "Tradition and Innovation: The Bridge to the Future of Shipyards and the Maritime Industry". It would be difficult to choose a slogan more fitting for Galicia, where naval tradition is not nostalgia, but accumulated knowledge.

Naval engineering is not just about designing ships, but about anticipating the future of the maritime industry and making it a reality. That is the bridge we want to continue building, together.



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Nuclear Propulsion: an Increasingly Realistic Alternative

José Miguel Mahía // CT ENGINEERING
Industrial PhD Candidate. ILS & R+D+i Engineer

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CT ENGINEERING DRIVEN PEOPLE

Sail propulsion drove the age of exploration, trade and wars throughout practically the last millennia of history. However, from the 19th century onwards coal began to replace wind, later giving way to oil and the diesel engines that today dominate global navigation.

In the mid-20th century, a new energy possibility emerged that would forever change the way a vessel's autonomy was understood: nuclear propulsion. For the first time in history, a ship could sail for years without refuelling.

Although its use has been almost exclusively limited to the military sphere, the growing interest in the decarbonisation of maritime transport and the reduction of polluting emissions has once again brought this technology back to the table.

The recent development of small modular reactors (SMRs) also opens up new possibilities for their application in civilian vessels.

Ships such as the USS Nautilus, the world's first nuclear submarine, which entered service in 1955 in the United States, the merchant vessel NS Savannah launched in 1962, or the Russian icebreakers operating in the Arctic since the 1960s, were the first vessels to use nuclear energy as a means of propulsion.

Despite these examples, during recent decades nuclear propulsion remained almost exclusively restricted to the military sphere. High initial costs, the complexity surrounding its regulation and concerns about safety limited its adoption in commercial navigation.

Nevertheless, the current energy context has once again revived interest in this technology.

One of the factors that has most conditioned the development of nuclear propulsion in the civilian sphere has been the international regulatory framework.

Unlike other energy technologies, nuclear reactors are subject to extremely strict regulation, designed to guarantee the highest levels of safety.

In the maritime field, the international body responsible for regulation is the International Maritime Organization (IMO), which in 1981 adopted the Code of Safety for Nuclear Merchant Ships; a set of recommendations aimed at establishing technical and operational requirements for this type of vessel.

However, this code was never generally implemented. The main reason was that there were practically no operational nuclear merchant vessels, which limited the development of more detailed regulation.

In addition to maritime regulations, nuclear reactors are subject to the international standards established by the International Atomic Energy Agency (IAEA). This organisation develops safety guides, inspection procedures and recommendations for the peaceful use of nuclear energy.

In practice, a civilian nuclear vessel would have to comply simultaneously with requirements from three different regulatory spheres:

- international nuclear regulations
- international maritime regulations
- national legislation of the countries whose ports it visits

This regulatory framework represents one of the greatest challenges for the commercial adoption of nuclear propulsion and, today, it has already begun to be addressed in order to make it a reality.

In recent years, several international organisations and classification societies such as American Bureau of Shipping (ABS), Det Norske Veritas (DNV) or Bureau Veritas (BV) have begun to study how to adapt the existing regulatory framework to the possible emergence of small modular reactors applied to maritime transport, as well as the development of good practice guidelines.

SMRs are nuclear reactors smaller than traditional power plants. They are designed to be manufactured modularly and to offer high levels of passive safety, that is, systems capable of keeping the reactor in safe conditions even without human intervention or external power supply.

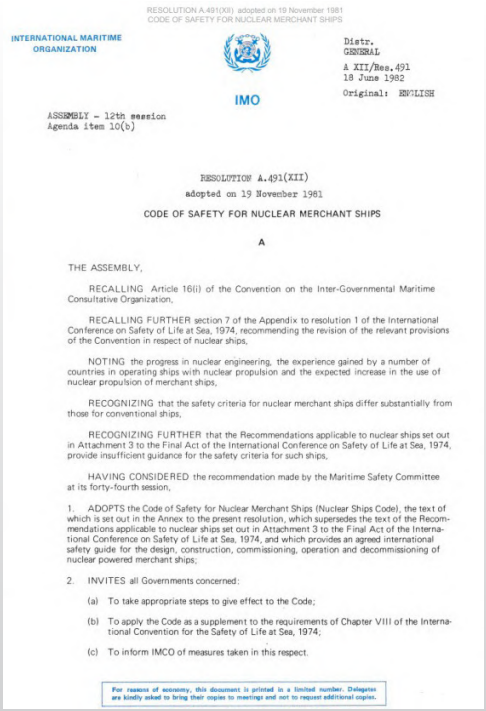
This type of design could be especially suitable for applications in remote or mobile environments, such as offshore platforms or vessels.

At present, several technologies are being analysed as possible candidates for marine nuclear systems. The most prominent are:

• Advanced pressurised water reactors: Pressurised water reactors continue to be the most mature technology for naval applications. Modern versions of these reactors incorporate passive safety systems, greater efficiency and more compact designs than their predecessors. Since there is extensive operational experience accumulated over decades in submarines and aircraft carriers, many experts consider that SMRs based on pressurised water reactors represent the most realistic option for the first future commercial nuclear vessels.

• Lead-cooled fast reactors: Lead-cooled reactors represent one of the most promising technologies for compact nuclear systems. Instead of using water as coolant, these reactors use liquid lead to transport the heat generated in the core. Lead has several interesting properties from a safety perspective: it does not react violently with water or air and allows the reactor to operate at atmospheric pressure. In addition, the reactors can make better use of nuclear fuel and reach higher operating temperatures.

• Gas-cooled fast reactors: These reactors use helium as coolant; a chemically inert gas that reduces corrosion problems or unwanted chemical reactions. In addition, these reactors can operate at very high temperatures, improving the efficiency of power generation systems. However, their techno-



RESOLUTION A.491(XII) adopted on 19 November 1981
CODE OF SAFETY FOR NUCLEAR MERCHANT SHIPS

INTERNATIONAL MARITIME ORGANIZATION

IMO

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18 June 1982
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ASSEMBLY - 12th session
Agenda item 10(b)

RESOLUTION A.491(XII)
adopted on 19 November 1981
CODE OF SAFETY FOR NUCLEAR MERCHANT SHIPS

A

THE ASSEMBLY,

RECALLING Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization,

RECALLING FURTHER section 7 of the Appendix to resolution 1 of the International Conference on Safety of Life at Sea, 1974, recommending the revision of the relevant provisions of the Convention in respect of nuclear ships,

NOTING the progress in nuclear engineering, the experience gained by a number of countries in operating ships with nuclear propulsion and the expected increase in the use of nuclear propulsion of merchant ships,

RECOGNIZING that the safety criteria for nuclear merchant ships differ substantially from those for conventional ships,

RECOGNIZING FURTHER that the Recommendations applicable to nuclear ships set out in Attachment 3 to the Final Act of the International Conference on Safety of Life at Sea, 1974, provide insufficient guidance for the safety criteria for such ships,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its forty-fourth session,

1. ADOPTS the Code of Safety for Nuclear Merchant Ships (Nuclear Ships Code), the text of which is set out in the Annex to the present resolution, which supersedes the text of the Recommendations applicable to nuclear ships set out in Attachment 3 to the Final Act of the International Conference on Safety of Life at Sea, 1974, and which provides an agreed international safety guide for the design, construction, commissioning, operation and decommissioning of nuclear powered merchant ships;

2. INVITES all Governments concerned:

(a) To take appropriate steps to give effect to the Code;

(b) To apply the Code as a supplement to the requirements of Chapter VIII of the International Convention for the Safety of Life at Sea, 1974;

(c) To inform IMCO of measures taken in this respect.

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.

Figure 1. IMO Resolution A.491(XII), of 19 November 1981, approving the "Code of Safety for Nuclear Merchant Ships". Source: International Maritime Organization (IMO).

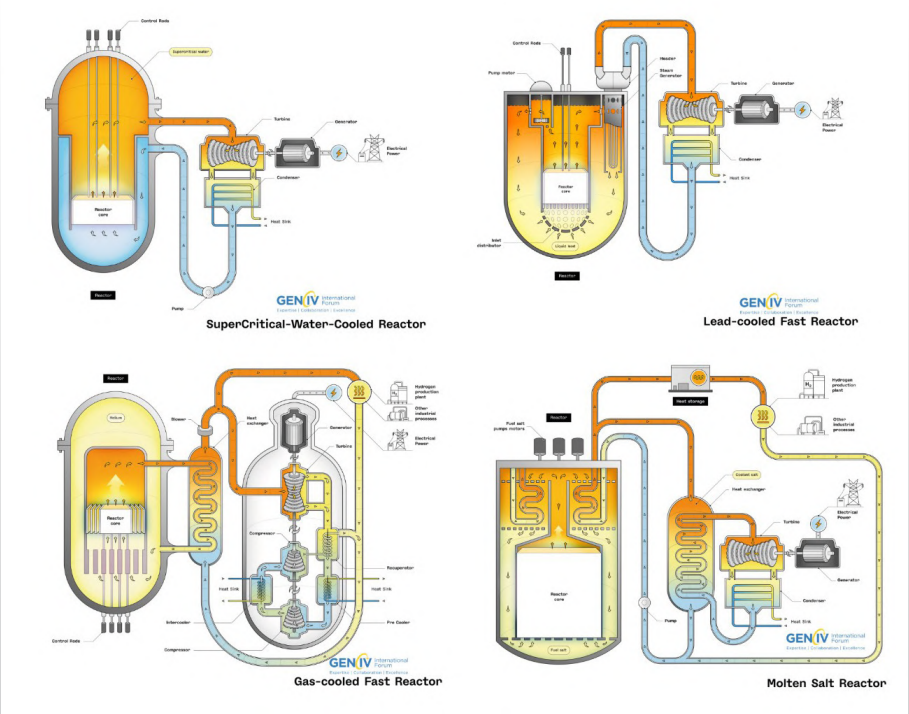


Figure 2. Models of pressurised water reactors, lead-cooled reactors, gas-cooled reactors and molten salt reactors. Source: Gen. IV International Forum.

logical development is still at a relatively early stage compared to other nuclear technologies.

• Molten salt reactors: They represent a radically different approach. In these systems the nuclear fuel is dissolved in a mixture of liquid salts circulating through the reactor. This allows operation at low pressure and the achievement of high temperatures. Some designs include passive safety systems that allow the fuel to be drained into safe tanks in the event of overheating.

The history of naval propulsion is marked by the constant search for more efficient and reliable energy sources. From sails to coal, from coal to oil and from oil to nuclear energy, each transition has made it possible to expand the capabilities of human navigation.

Today, the maritime sector faces a new challenge: reducing its environmental impact without compromising the efficiency of global transport. In this context, the combination of small modular reactors, advances in nuclear engineering and new energy needs could open a new stage in maritime propulsion.

If these developments become consolidated, it is possible that in the coming decades the oceans will once again become the scene of a significant energy transformation. And, once again, that transformation could be driven by the energy released in the heart of a nuclear reactor.

In this context of growing international interest in nuclear propulsion applied to maritime transport, work is being carried out from the Galicia offices of The CT Engineering Group on the technical analysis of the challenges associated with this technology in the naval field.

Specifically, it is planned to present at the next annual conference of the International Association of Maritime Universities (IAMU), which will be held in the last quarter of the year in Croatia, together with the Higher Technical School of Nautical Science and Marine Engineering of the University of A Coruña (UDC) and the Escola Superior Náutica Infante D. Henrique (ESNIDH) of Portugal, the progress made in the field of risk analysis linked to nuclear systems applied to maritime propulsion.

In this way, we not only contribute to the development of this type of technology in the propulsion of civilian vessels, but also to the academic and industrial debate on the feasibility and safety of these energy solutions, which are attracting increasing interest every day in the international maritime sector.

From Noisy Ship Cabins to Restful Nights: Tackling Noise and Vibrations for Smoother Sailing

Mostapha Choukri
Siemens Digital Industries Software

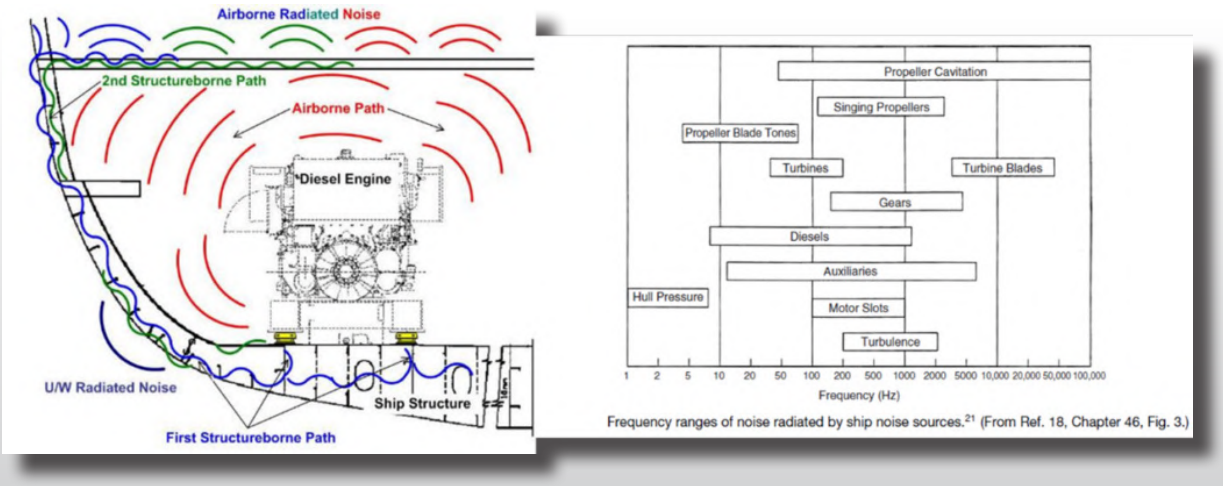
SIEMENS

Senior Test Industry Specialist, Aerospace, Defence & Marine

Have you ever tried sleeping on a ferry? I often travel to Morocco with my family. To get there, we take a ferry from one of the ports in Spain. Depending on where we depart from, the journey can take up to eight hours. We usually choose the night ferry, which allows us to sleep in a cabin.

During our most recent trip, something really stood out—the comfort. We slept soundly through the night, almost as if we were at home, barely noticing any noise or vibrations. It was a wonderful experience. The ferry we were on was new, and that made all the difference. In previous travels, however, the story was quite different. The deep, low-frequency vibrations from the ship's engine used to shake us, making sleep almost impossible. We would arrive at our destination feeling exhausted.

Noise and vibration on ships are more than just annoying—they can have a big impact on the safety of the crew, the durability of the ship, and even marine life. Noise can come from things like the engines, machinery, and the movement of water around the ship, while vibrations are often caused by unbalanced rotating parts. These disturbances can travel through the air or the ship's structure, sometimes causing lasting damage.



Ship engine noise and vibration propagation paths (left) and different ship noise sources (right)

For the crew and passengers, constant exposure to high levels of noise can lead to hearing loss, make communication difficult, and result in fatigue and stress, all of which increase the risk of accidents. Over time, vibrations can weaken the ship's materials, loosen key parts, and lead to costly repairs.

But it's not just the ship—underwater noise pollution can also disrupt marine animals, affecting their ability to communicate and navigate. To reduce these risks, strict regulations are in place to limit noise and vibration levels, ensuring the safety of both the crew and the environment.

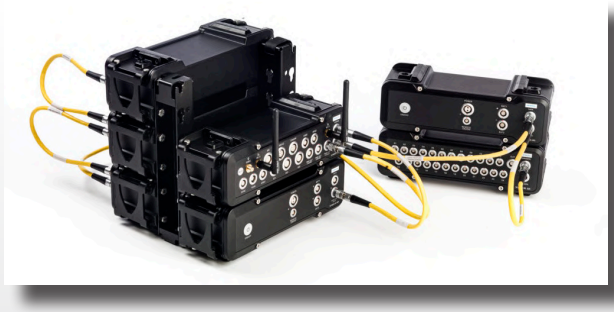
Looking back at my recent trip to Morocco, I can't help but think about the design and production journey this new ship has taken, from its initial concept through engineering and testing, all the way to its final delivery. As an engineer at heart and an Industry Specialist for Marine at Siemens Digital Industries Software, I'm very familiar with the advanced tools engineers use to build the ships of the future. It's your lucky day: my expertise focuses on physical testing. So let me introduce you to some of these fantastic techniques.

Acquire your ship´s noise and vibration data

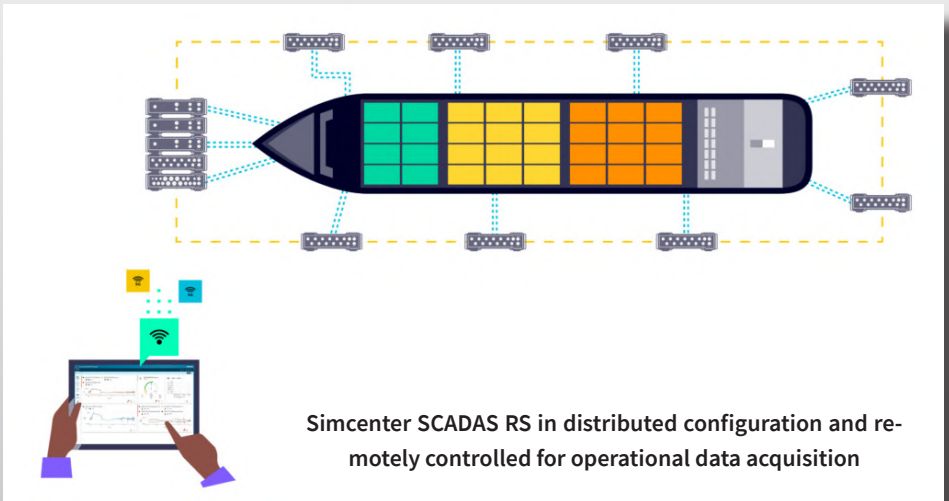
If you've ever travelled on a large ferry, you've probably been struck by its immense scale and strength. These impressive vessels can stretch over 300 meters in length and 50 meters in width, driven by one or more massive engines. As an engineer, you might wonder—how can the NVH (noise, vibration and harshness) performance of such a colossal structure be effectively verified and optimized, especially in rough seas or near the intense heat and roar of the engines?

Well, let's have a look at one of our solutions: Simcenter SCADAS RS hardware—a next-generation data acquisition system designed precisely for this challenge. Engineered for extreme conditions, it features a rugged, durable design that withstands harsh temperatures and intense vibrations. Its flexible architecture allows for seamless configuration, whether centralized or fully distributed, making it the ideal solution for acquiring NVH data on ships.

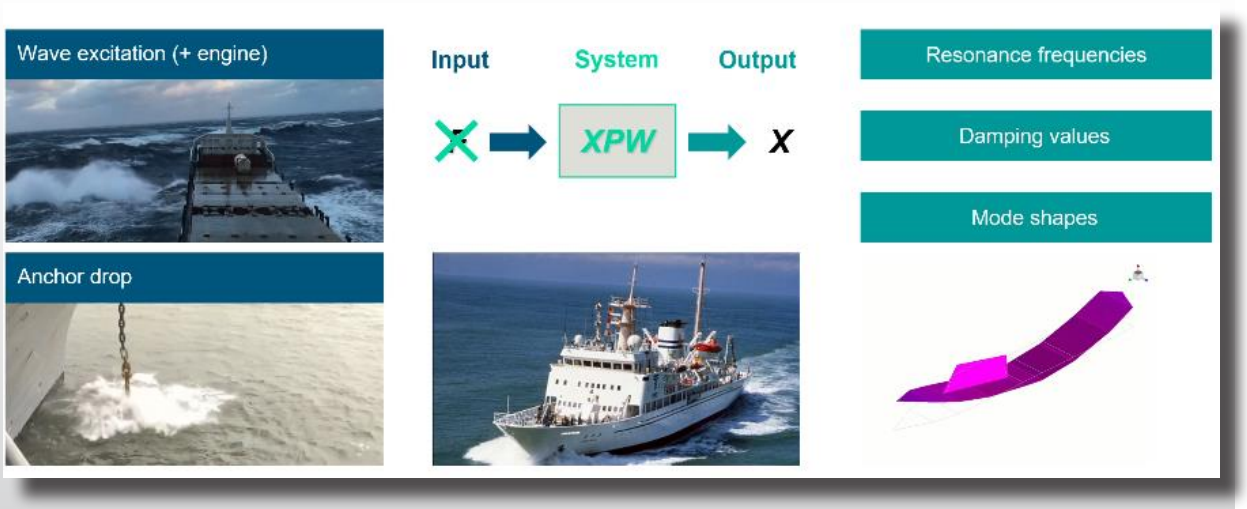
It's a truly unique device that provides both wired and wireless access for remote control—perfect for



Simcenter SCADAS RS Hardware



Simcenter SCADAS RS in distributed configuration and remotely controlled for operational data acquisition



Simcenter Testlab Operational Modal Analysis allows the identification of modal parameters from output-only data

testing near a noisy, heat-intensive ship engine. It also seamlessly integrates into automation processes by automatically uploading data for cloud computing and advanced engineering analysis, significantly enhancing test productivity.

Understand your ship´s NVH data with advanced analysis techniques

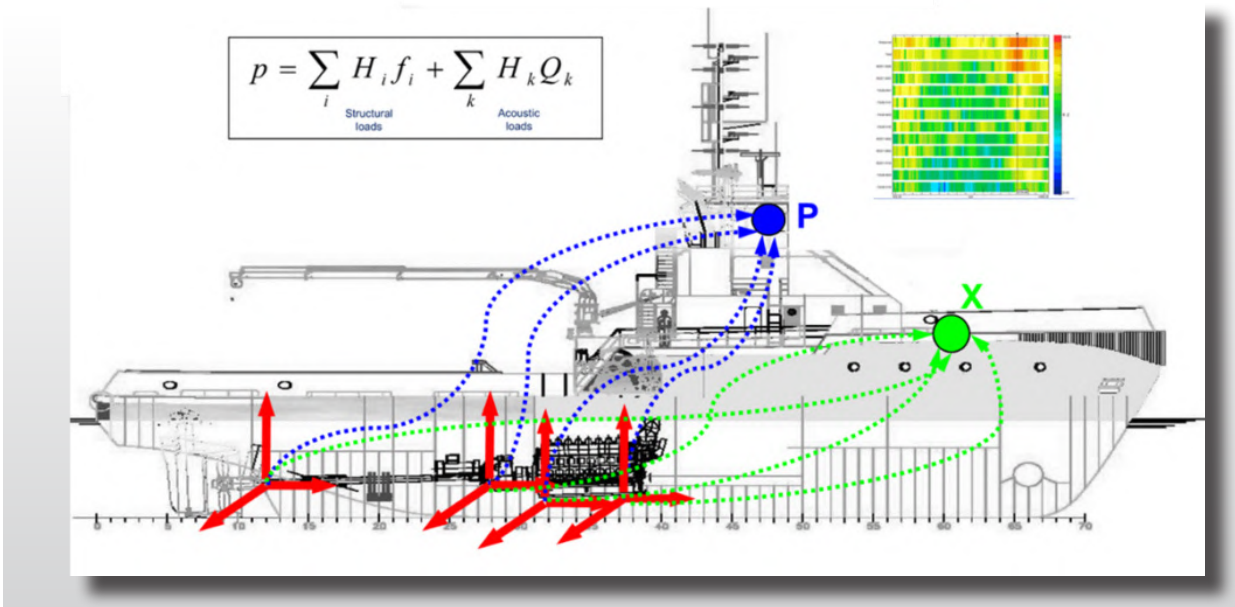
So, what can we do with all this data?

Once collected, the data undergoes further analysis to extract meaningful insights. During sea trials, for example, it helps verify whether the vessel meets construction specifications, ensuring noise and vibration levels remain within acceptable limits. In case of non-compliance, this or additional data is used to identify the root cause. This is where advanced analysis techniques, such as operational modal analysis (OMA), transfer path analysis (TPA) and torsional vibration analysis come into play.

OMA is a powerful tool for understanding a structure's vibration behavior—such as that of a large ship—under real operational conditions. Unlike traditional modal analysis, which requires knowledge of excitation forces, OMA relies solely on output data. These insights are also invaluable for validating digital twins of the ship, enhancing predictive accuracy.

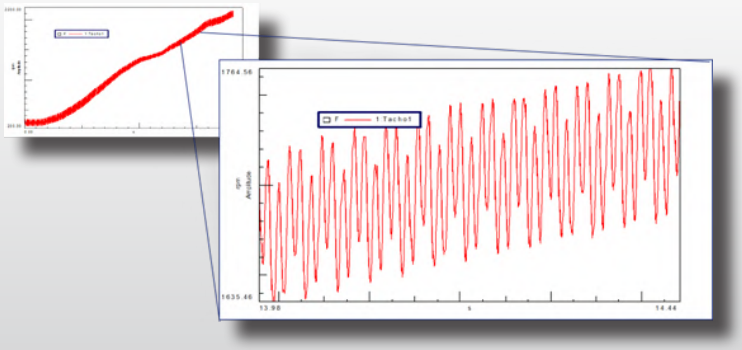
Another technique I find particularly fascinating is TPA. It breaks down the ship's noise and vibration behavior into three fundamental components: source, transfer and receiver. By analyzing these elements, engineers can pinpoint which component contributes most to the issue. TPA also serves as a foundation for more advanced methods like component-based TPA (CTPA) and virtual prototype assembly (VPA). These techniques enable engineers to predict how design changes or component performance—such as that of an engine—will affect the entire vessel by combining test data with simulation data.

The comfort issues I mentioned earlier during my ferry crossings are often linked to torsional vibrations from the ship's engine, which can be a major source of noise, vibration and fatigue-related problems. To analyze this in depth, precise rotational speed measurements are crucial. This is achieved using specialized encoders that generate a high number of



Simcenter Testlab Transfer Path Analysis permite desglosar un problema de ruido o vibración en sus principales contribuyentes

pulses per revolution. Simcenter SCADAS HW offers state-of-the-art capabilities to interface these encoders, ensuring accurate rotational speed measurements for detailed torsional vibration analysis with Simcenter Testlab.



Vibration on top of the main rotational speed is caused by torsional vibration, inducing NVH issues

Curious to know more?

All these technologies and more are part of the Siemens Simcenter Testlab software suite, seamlessly integrated with Simcenter SCADAS data acquisition hardware.

By tackling these challenges, ship owners can make their vessels safer, more efficient and better for the environment. Properly managing noise and vibration not only protects the ship and crew but also contributes to a more sustainable and responsible maritime industry.

If you are interested in any of these solutions, please contact Juan Oliveira, Technical Director of the Center of Excellence for the Marine Industry (CESENA) at:

juan.oliveira@siemens.com

AISTER delivers the Sixth HS60 Interceptor to the Guardia Civil: Río Antas

AISTER HS60 Interceptor:
Setting a New Standard in High-Speed Performance

contact@aister.es



AISTER delivered, last December, to the Headquarters of the Maritime Service of the Spanish Civil Guard (SEMAR) the sixth unit of the HS60 model, one of the most advanced high-speed interceptors in the world. The vessel, named RÍO ANTAS, is the first of the third contract awarded to AISTER and follows the RÍO GUADALMEDINA, presented at the latest edition of the international defence exhibition, FEINDEF 25.

The delivery took place at AISTER's facilities in Moaña, in an event attended by representatives of the Civil Guard. Following the final preparations,the vessel was incorporated into maritime surveillance, control and drug-trafficking interception operations.

A pioneering interceptor on a global scale

The HS60 is a vessel developed and built by AISTER that has set a global milestone in its class. It was the first interceptor capable of exceeding 60 knots with waterjet propulsion, combining extreme speed, advanced manoeuvrability and unique dynamic performance in tactical operations.

Its most notable capabilities include:

- Over 60 knots top speed, with excellent operational reliability.
- Crash-stop manoeuvres in under two boat lengths, even at high speed.

■ Tight turns and precise control, essential for pursuit operations.

■ 18-metre hull, built in high-strength aluminium and optimised for maritime security missions.

■ Advanced navigation, communication and safety systems, fully adapted to SEMAR standards.

These features make the HS60 a strategic asset in the fight against drug trafficking, particularly in high-risk operational areas.

A project progressing at a strong pace

With the delivery of RÍO ANTAS, AISTER has now completed six of the eight units, further consolidating its position as a leading Spanish shipbuilder in aluminium vessels for security and defence missions.

"*Each new HS60 we deliver represents a step forward in the operational capability of the Civil Guard and demonstrates AISTER's commitment to innovation and excellence in the maritime domain. RÍO ANTAS is a vessel designed to make a difference where it is needed most*", emphasised AISTER´s technical team.

The remaining two units are currently under construction and will be delivered over the coming months.





AISTER HS60 Interceptor: A Qualitative Leap in High-Speed Performance

The AISTER HS60 is a high-performance aluminum interceptor patrol boat custom-designed for Spain's Civil Guard Maritime Service.

Thanks to its entirely innovative development, this interceptor is a global pioneer, exceeding 60 knots with waterjet propulsion. It combines exceptional acceleration capacity with the ability to perform agile maneuvers at high speeds.

The AISTER HS60 is designed for maritime security missions such as patrolling, anti-drug operations, and surveillance.

Features and Propulsion

The HS60 offers outstanding maneuverability and acceleration at very high speeds. It can come to a complete stop from 55 knots within 2 boat lengths, and its controlled maneuverability allows it to execute turns with a radius of less than two lengths while maintaining stability.

With an aluminum hull measuring 18.12 meters in length and 4.50 meters in beam, it displaces just over 20 tons. It is powered by two inboard MAN V12 engines, each delivering 1800 HP at 2300 RPM, connected to twin Hamilton Jet HTX42 waterjets. The vessel features ZF type 3055 gearboxes with a 1.250:1 reduction ratio. Forced ventilation in the engine room provides 21,000 m^3/h across two fans.

The exhaust system, custom-built by Halyard, is a fully wet type. The vessel also includes a protective rear platform for the jets.

Propulsion is controlled by next-generation electro-



nic AVX controls with dual-redundancy architecture. Onboard power is supplied by a Fischer Panda single-phase generator providing up to 14kW.

The hull, deck, and bulkheads are made from a lightweight and durable aluminum alloy, giving the vessel a service life of over 20 years and robust resistance against the “ramming maneuvers” that some vessels attempt when intercepted.

The HS60 can remain in patrol mode at sea for up to 12 hours, with a range exceeding 400 nautical miles. Its cruising speed surpasses 40 knots.

All these features make it highly effective in its primary role: intercepting other vessels.

Turning Point

The HS60 is equipped with state of the art systems, inside and out. Thanks to AISTER’s experience and flexibility in adapting to project-specific needs, the client can define the ideal configuration.

This patrol boat can achieve operational positioning in minimal time, features full low-speed maneuverability thanks to its maneuvering joysticks, and can access shallow waters due to its low draft.

It also includes jet disengagement capability for rescuing people or retrieving objects from the water, virtual anchor functionality, and it can be transported by road.

Thanks to the Humphree interceptor system, the vessel transitions from displacement to planing in just 5 seconds without losing visibility. It allows low-speed patrolling and active stabilization control.

In terms of maintenance, it has a TBO (time between overhaul) of 5000 hours and routine engine service every 500 hours. The engines can be removed in just 4 hours via the access hatch, allowing re-engining to be completed in a single day.

The onboard experience aboard the AISTER HS60 leaves no one indifferent. It conveys a strong sense of security, exceeding 60 knots while performing tight turns like a roller coaster firmly on its rails. Precise, extremely fast, and highly maneuverable, all in one.





Habitability and comfort

The functional design of the HS60 interceptor does not compromise habitability or comfort. It features a cabin and engine room optimized with advanced thermal and acoustic insulation using next-generation Ultimate mineral wool, ensuring a safe and efficient work environment under any condition.

It is equipped with Shockwave Seats jockey-style impact-mitigation seating, adjustable to each crew member's weight, enhancing comfort and safety beyond required standards.

Below deck, there are cabins and a fully equipped galley for extended missions. Air conditioning is provided by a 12,000 BTU unit on the bridge and a 16,000 BTU unit in the forward accommodations.

This vessel not only sets a new standard in speed and maneuverability but also redefines operability with dual helm stations — interior and exterior — offering full 360° visibility, even in the engine room.

With the new HS60 model, developed specifically for the Spanish Civil Guard Maritime Service, AISTER sets a turning point in the world of high-speed aluminum interceptor boats, making the HS60 a globally pioneering model.

Navigation, comunications and more

One of AISTER's key strengths is the ability to adapt each project to the client's specific requirements, selecting the most suitable systems for their needs.

Main Equipment

- Navigation Radar: Furuno FAR-2228 ARPA
- Two fixed VHF transceivers: Furuno FM-8900S
- Two waterproof portable VHF GMDSS transceivers: Jotron TR-30
- One VHF transceiver: ICOM IC-A120E
- Satellite EPIRB distress beacon
- Four AIS SART personal beacons with DSC A-040
- NAVTEX receiver: Furuno NX-700A

Other Equipment

- Secure-mode automatic identification system (AIS): SAAB R5 Secure
- Fixed GSM phone: XACOM Easygate with booster antenna
- Satellite communication system: INMARSAT Fleet-Broadband 250 or Iridium Certus
- Color CCTV system
- DGPS receiver: Furuno GP-170
- Chart plotter with Mapmedia cartography, Furuno TZTouch 3
- Satellite-type digital compass: Furuno SC-70
- Autopilot: SIMRAD AP70
- Digital multifunction display: Furuno RD-33
- Ultrasonic wind meter WX-220 with Furuno RD-33
- Fixed megaphone with maneuvering, horn, and fog siren capabilities: Furuno LH-5000
- Portable megaphone with a 900m range and siren
- Jotron AIS-SART radar transponder with NMEA 2000 data network



AISTER Unveiled the HS60 Combat, the Military Version of the HS60

AISTER took part in the international defence and security exhibition FEINDEF 25, held at IFEMA-Madrid, where we successfully presented the evolution of our flagship vessel: the HS60 Combat interceptor. Through a promotional roller, we showcased this new configuration, specifically designed to respond to the most extreme combat conditions.

The HS60 is already a benchmark for its ability to exceed 60 knots and its extraordinary maneuverability. With the Combat version, AISTER reinforces these qualities and adapts the model to the most demanding scenarios. This 18-meter-long vessel is conceived as a multi-mission platform, used both for troop transport and for other military operations. With the Combat version, we reinforce these qualities and adapt the model to the most demanding scenarios, offering a precise, firm, and advanced response.

AISTER´s participation at FEINDEF attracted strong interest from both the media and industry professionals. Outlets such as Faro de Vigo and La Provincia highlighted AISTER's international projection and our progress in the naval defence field, while Atlántico underlined the delivery of the fifth HS60 patrol boat to the Guardia Civil, as well as our collaborative developments with Navantia. Together, these recognitions consolidated our presence at such a key event for the defence and security sector.

FEINDEF 25 was an invaluable opportunity to demonstrate our technological capabilities and reaffirm our commitment to innovation. The positive reception strengthens our determination to continue evolving our range of high-performance vessels and to deliver cutting-edge naval solutions at both national and international levels.

The HS60 Combat represents that commitment: a model designed for real missions, with greater power, enhanced control and maximum reliability under extreme conditions. Another step forward in AISTER's trajectory as a benchmark in state-of-the-art naval construction.



Integrated Digital Architecture for Vessels: from Edge Computing to the Maritime Data Space

On board IoT, edge AI and offline first systems: what actually works when connectivity fails and the environment is unforgiving

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Abstract:

The maritime sector has been discussing digitalisation for years — too many, given how little has been executed rigorously at shipyard level. This article does not add noise to the debate: it proposes a concrete technical architecture, organised into four layers — IoT sensing, edge computing, asynchronous synchronisation and sectoral data spaces — designed for the vessel's real operational constraints rather than for commercial brochures. It describes components already validated under real operating conditions, presents use cases deployed in fishing and merchant fleets, and quantifies the impact with field data. It also addresses, without euphemisms, the barriers that continue to hinder adoption.

Keywords: *maritime digitalisation, edge computing, on board IoT, naval artificial intelligence, maritime data space, offline first, vessel automation, regulatory compliance, maritime sustainability, maritime Industry 4.0.*

Introduction

Let's begin with a figure that invites reflection. A medium sized fleet — twenty vessels, for example — generates more than one hundred million operational data points every day. Temperatures, positions, fuel consumption, engine hours, sea conditions. Much of that information is still not being used: it is written down in a notebook, stored on a local drive or scattered across equipment that does not share protocols. It is 2026, and the margin for improvement is enormous. That is the good news.

And regulation? It tightens a little more every quarter. Regulation (EU) 2015/757 (MRV), Regulation (EU) 2023/1805 (FuelEU Maritime), the inclusion of maritime transport in the emissions trading scheme through Directive (EU) 2023/959, the MARPOL Convention in its continuous revision. Each new requirement demands data that, today, either are not captured, or are captured poorly, or are captured but arrive late. And "late" in this context means they are no longer useful for decision making.

It is understandable that the sector shows a certain caution toward the digitalisation narrative. We have been hearing it for years, with proposals of uneven maturity. But something has changed — and it is worth paying attention to this: the technology is already mature. Or almost. The challenge stopped being purely technical some time ago and has shifted toward approach and design. Because digitalising a vessel is not the same as digitalising an industrial plant in Vigo with fibre optics at every corner.

Two hundred miles offshore, with satellite windows of only a few minutes, the "connect everything to the cloud" approach loses meaning. A different strategy is needed.

Something else works. And that is what the following sections address.

1. The problem: Fragmentation, Opacity and Risk

It is worth keeping our feet on deck. The daily operations of many vessels — trawlers, tuna vessels, bulk carriers, support vessels, regardless of type — still rest on three pillars that could be modernised with immediate benefit. The first: paper based records. Engine logbooks, catch reports, on board medical inventory control, often managed manually. The second: communications with shore via email, radio or instant messaging, depending on urgency and the captain's judgement. And the third, perhaps the most relevant from a technical standpoint: electronic equipment from different manufacturers that often do not share common protocols. The GPS works on its own, the echo sounder on another, and the catch management system — when it exists — on a third. Each device tends to operate as an autonomous unit.

Consequences? All measurable. Verified estimates place between fifteen and twenty five percent the share of operational time officers devote to administrative tasks on board. A bridge officer spending part of their watch manually transcribing readings that were already available on a screen. Valuable time that could be dedicated to higher value functions.

Then there is the regulatory dimension. Having verifiable digital records significantly facilitates Port State Control inspections and reduces the risk of deficiencies associated with formal documentation issues. A digitalised oil record book, with signature and timestamp, eliminates many of the observations typically found in audits. It is a direct gain for the shipowner and for the crew itself, who work with greater peace of mind.

And there is a third aspect — a deeper one — that deserves attention: vessel data do not always flow to shore optimally. Shipping companies sometimes plan with partial information. Sectoral authorities work with statistical coverage that could be substantially improved. The entire ecosystem would make better decisions with more complete, real time data. Solving this point is probably one of the most promising opportunities ahead for the sector.

2. Integrated Digital Architecture: Layered Design

The first temptation when facing the digital challenge is often the accelerated purchase of technology. More sensors, more screens, more applications. It is worth resisting it. Before spending the first euro, there is a question that deserves a clear answer: what happens when there is no connectivity? If the answer is "the system stops working," the design needs to be reconsidered. A vessel's architecture must be born offline and add connectivity as an extra, not the other way around. It sounds obvious when stated like this, but it is a principle that is not always respected — and one that marks the difference between a system that withstands real world operation and one that remains a laboratory demonstration.

The solution, in any case, is no mystery. It consists of four layers which, when aligned, work with a robustness that surprises those coming from the terrestrial world.

First layer: IoT sensing and data capture

There is no magic here. Temperature in holds and refrigeration chambers, fuel flow meters, accelerometers for vibration analysis, differential GPS, weather station, water quality. In fishing vessels, monitoring of gear and catches is added. Standard industrial components, nothing exotic. What truly matters — and this does require thought — is how they are connected: robust protocols such as Modbus, NMEA 2000 or CAN bus, concentrators with local preprocessing capability, and temporary storage that can withstand a power outage or a heavy sea state without losing data. Because on board, things break. And when they break, the system must continue capturing what is essential.

Second layer: Edge Computing —The on Board Brain

This is where the core of the approach resides. An on board edge server (nothing spectacular is needed; an industrial ruggedised unit is enough) runs the system's full logic: database, crew applications, artificial intelligence models, user interfaces. All local.

All operational without relying on external connectivity.

Third layer: Intelligent ship-to-shore synchronisation

Communication with shore is not conceived as a permanent link. It is designed as a message queue with priorities. Is there a satellite window? Pending items are sent starting with the critical ones: safety alerts first, regulatory data next. Routine information waits for the next window or until the vessel connects to Wi Fi in port, which is the cheapest route. Differential compression, conflict resolution, prioritisation by criticality. None of this is revolutionary. All of it is essential. And it is precisely this detail — not very glamorous — that separates systems that withstand real world operation from those that freeze as soon as the signal drops.

Forth layer: Shore Platform and Shared Data Space

On shore, a platform receives data from the entire fleet, runs heavy analytics, generates dashboards for management and automates regulatory reporting. Up to this point, nothing that any modern fleet management system cannot offer.

What is truly transformative comes next: sectoral data spaces. The underlying idea is simple to state, more complex to execute. Shipping companies, ports, administrations, scientific bodies and suppliers share information under clear rules of governance and data sovereignty. Each actor maintains control over its data: it decides what to share, with whom, under what conditions and for how long. European initiatives such as Gaia X, together with the framework of the International Data Spaces Association, provide the technical scaffolding. Deployment is advancing cautiously, but the direction is set. Those who position themselves early in these environments will gain a significant competitive advantage in the value chains now taking shape.

3. Applicable uses cases

■ Intelligent On-Board Pharmaceutical Management (MEDSHIP case).

A concrete example, developed within Galicia's technological ecosystem, illustrates this approach well. MEDSHIP is an intelligent on board medical cabinet compliant with BOE A 2021 21104 that monitors in real time more than 800 different medicines: stock, expiry dates and unit level traceability of each dispensing. It integrates directly with the AEMPS database, incorporates user identification with three differentiated roles, electromagnetic locking, a touch screen and IP65 resistance — because on board, dust, humidity and impacts are part of the usual environment. Installation is plug and play, communications are encrypted and software updates are deployed remotely. And, most relevant from an architectural standpoint, it operates offline: it remains functional without connectivity and synchronises with shore as soon as a satellite window appears or the vessel connects to Wi Fi in port. Edge computing applied to a real operational problem. The artificial intelligence module includes inventory optimisation, configurable restocking alerts and semi automated order generation. Compliance with the Maritime Labour Convention (MLC 2006) is documented automatically. The system has been recognised as an Innovative Company at Foro Transfiere 2024 and is already operating on real vessels.

■ Catch Recording and Biological Sampling.

Weight sensors, computer vision for species identification, a rugged tablet with a haul by haul recording application. Georeferenced data: species, sizes, discards, oceanographic conditions. The same information feeds both the electronic fishing logbook and the scientific sampling programmes of the corresponding sectoral bodies. The captain avoids administrative duplication, and researchers receive structured, analysis ready data that improve fisheries management. A long requested improvement by the sector, now technologically viable.



■ Predictive Maintenance.

Vibration, temperature, electrical consumption of the main engine and auxiliary equipment. A model trained with historical data detects degradation patterns weeks before a gasket blows, a bearing seizes or a roller fails. It generates a preventive work order and allows planning the intervention in port, when the vessel is already stopped. Pilot fleet data point to reductions in unplanned downtime between twenty and thirty five percent. A wide range, true, because it depends heavily on vessel type and machinery age. But the trend is solid across all documented cases.

■ Automated Regulatory Compliance.

MARPOL requires the oil record book, garbage record book and emissions record. The ISM Code requires documented non conformities and corrective actions with follow up. All of this can be generated automatically from the data the system is already capturing, with digital signature and timestamp. Documentation is produced ready for audit, freeing officers from repetitive administrative tasks and allowing them to focus on higher value technical and safety functions.

4. Operational, Economic and Regulatory Impact

And how much impact does all of this have? Because if it is not quantified, it is just discourse. Field data available from pilots in fishing and coastal fleets are compelling. A reduction of thirty to forty percent in time spent on administrative tasks on board. And this measured on real operations, not on laboratory scenarios. An improvement of eight to twelve percent in energy efficiency, combining route optimisation with engine regime optimisation based on real consumption data. A drop of more than fifty percent in deficiencies detected during inspections. These are measurements, not projections.

The economic return, for fleets of more than five vessels, ranges between eighteen and thirty months. With a relevant nuance that is rarely mentio-

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ned: it improves over time. Predictive models gain accuracy as they accumulate historical data, meaning the third year performs better than the second, and the second better than the first. Something that does not usually happen with conventional equipment investments, where depreciation pushes in the opposite direction.

Even so, the strongest argument is not only the positive return. It is also the opportunity cost of postponing the decision. Fines that could be avoided. Breakdowns that predictive models allow to anticipate. Operational inefficiencies that can be corrected once the right data are available. And, increasingly, access to markets that already incorporate end to end digital traceability requirements.

The regulatory direction is clear: FuelEU Maritime, the inclusion of maritime transport in the European ETS, the digital certificates already requested by classification societies. Everything points in the same direction. In the not too distant future, full vessel digitalisation will shift from being a competitive advantage to becoming an enabling requirement for operation. Fleets that anticipate this change will start with a clear advantage.

5. Challenges and Barriers

■ Interoperability: The Main Bottleneck.

If one had to identify a single major technical challenge, this would be it. On board equipment from different manufacturers does not always share common protocols: each one works with its own format and interfaces. ISO standards 19847 and 19848 for vessel data description are moving in the right direction, although their industrial adoption still has a way to go. Each integration currently requires developing custom gateways. A workable solution, but the real leap will come when standardisation gains ground and integrations can scale more easily.

■ Cibersecurity.

A digitalised vessel is, by definition, a vessel with greater exposure surface. IMO guidelines on cyber risk management in safety management systems (MSC FAL.1/Circ.3) and Resolution MSC.428(98) establish the reference framework. In the European context, Directive (EU) 2022/2555 (NIS2) also applies directly to maritime operators considered essential. The technical recommendation is clear: incorporate network segmentation, end to end encryption and audit capability from the initial design. Adding security afterwards is always less efficient than integrating it from the start — a lesson the terrestrial industrial sector has already had the chance to learn.

■ The human factor.

Crew rotation, diverse training backgrounds and long standing operational practices are elements that any digitalisation project must consider from the outset. Experience shows that success depends on designing very simple interfaces, conceived to work with gloves, under direct sunlight and in conditions of significant vessel motion. The reasonable goal is that any crew member can operate the tool after a brief explanation, without prolonged training. If an application requires extensive manuals for everyday use, its design should be revisited.

■ Investment Model.

Equipping a vessel represents a significant investment, whose scale depends on fleet size and initial configuration. Satellite connectivity and maintenance of the shore platform are recurring costs that must be planned. Pay per use models similar to maritime SaaS help absorb the initial investment, as do European funding lines for transport digitalisation (Connecting Europe Facility, Horizon Europe) and tax deductions for R&D&I under national regulations. There is, therefore, a favourable financing framework. The challenge lies in structuring technically solid projects that can fully leverage it.

6. Conclusion

Let's close as we began: with our feet on deck. The digitalised vessel is not a trade fair concept or a glossy render to finish a presentation. It is a technical architecture that can be implemented today, with validated components and prices that are no longer prohibitive. Industrial IoT, edge computing, on board artificial intelligence, asynchronous synchronisation, sectoral data spaces. The pieces are on the table. The question is how to assemble them with sound judgement.

And here, the Galician naval sector starts from a privileged position. Shipyards that build vessels of all types and tonnage. Engineering firms with deep knowledge of on board systems, the result of decades of specialised work. Naval electronics compa-

nies with extensive experience. First rate maritime research centres. And, above all, a real, diverse and active operational fleet that serves as a permanent testbed. That direct knowledge of operations, earned tide after tide, is the true competitive advantage. Not an algorithm. Not a platform. The knowledge of the trade.

The question is no longer whether the fleet will be digitalised. That decision has already been made, driven by regulation, the market and the sector's own dynamics. The relevant question is how to do it well. And doing it well requires embracing an essential principle: the vessel is not an extension of the office ashore, but an autonomous, intelligent node, sovereign over its own data. Those who design with that premise will be best positioned to lead the transformation ahead.

About the Author:

Juan Carlos Lago Giráldez *has more than 25 years of professional experience in engineering, innovation and digitalisation applied to industrial and maritime sectors. He serves as Director of FFT Technology, leading technological transformation projects in the naval, fisheries and sectoral documentary intelligence domains from Galicia*

Public Support for Shipbuilding in 2026: How to Structure a Fundable Project

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MarInnLeg
FUNDACIÓN - CENTRO DE INNOVACIÓN DE ESTUDIOS JURÍDICOS MARÍTIMOS Y PESQUEROS

The European Union's Maritime Industrial Strategy, presented on 4 March 2026, confirms the strategic importance of shipbuilding, ship repair and marine equipment to Europe's economic security, industrial autonomy and technological transition. This recognition does not, however, herald the return of general subsidies for vessel construction.

For shipyards, shipowners and equipment suppliers, the opportunity lies in identifying the technological, industrial, environmental and financial elements of each contract that may qualify for support in their own right. The key question is not whether a vessel as a whole is eligible for aid, but which investments it involves, who bears their cost and when the parties commit to carrying them out.

This approach is particularly relevant to Galicia. According to the Spanish Ministry of Industry and Tourism's shipbuilding bulletin for the first quarter of 2026, Galician shipyards accounted for 27 of the 64 vessels in Spain's private-sector orderbook as at 31 March. They represented 131,764 compensated gross tonnes (CGT), or 39% of the national total. Across Spain, 49 of the 64 vessels on order were intended for export. The ability to combine public funding, buyer finance and technological collaboration may therefore strengthen the competitiveness of a bid.

The Vessel is not necessarily what receives Funding

Following the expiry of the last specific EU framework for State aid to shipbuilding on 30 June 2014, support for the sector came to be channelled primarily through horizontal instruments covering R&D&I, environmental protection, energy efficiency, investment in production capacity and access to finance.

Standard vessel construction is not eligible for aid in itself. Individual elements of a project may, however, qualify for support. These might include developing equipment that is not yet available on the market, integrating a new propulsion solution on an experimental basis, automating a shipyard process, adapting facilities or investing to reduce energy consumption and emissions.



This distinction determines who may receive the aid and which costs may be claimed. A low-emission vessel may involve several separate projects: the shipowner may bear the additional cost of the environmental solution compared with a conventional vessel; the shipyard may undertake the development work required to integrate a technology that has yet to become standard; and an equipment manufacturer may design and validate its own component.

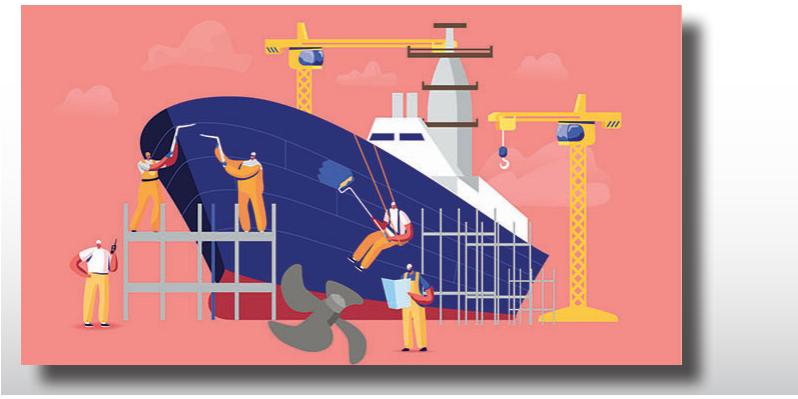
These costs do not necessarily belong to the same beneficiary or qualify under the same funding instrument. The contractual allocation of costs, risks and intellectual property rights must reflect the economic substance of the project. If a company applies for aid for an investment that is contractually the responsibility of another party, it will be difficult to establish its eligibility.

Three types of investment, three different approaches

Installing equipment that is already available on the market does not normally constitute R&D&I. To qualify for aid, the applicant must identify the remaining technological uncertainty, the development work required and the risk of failure borne by the company. This distinction matters in projects that are close to market: an activity presented as industrial research may instead be classified as experimental development or an ordinary investment in production capacity, resulting in a lower aid intensity or no entitlement to aid.

Technical documentation should therefore do more than describe a solution as “innovative”. It should explain the state of the art, the existing alternatives, the challenges involved in integrating the technology and the advance that the project is intended to achieve.

The automation of shipyard processes raises a different issue. Purchasing machinery or software does not qualify for aid simply because it improves productivity. Eligibility will depend on whether the expenditure forms part of a research, digitalisation, energy-efficiency or environmental improvement project that meets the requirements of the relevant scheme. An energy-efficiency investment, for example, will require evidence of baseline consumption, expected savings and the alternative investment that would have been made without the aid.



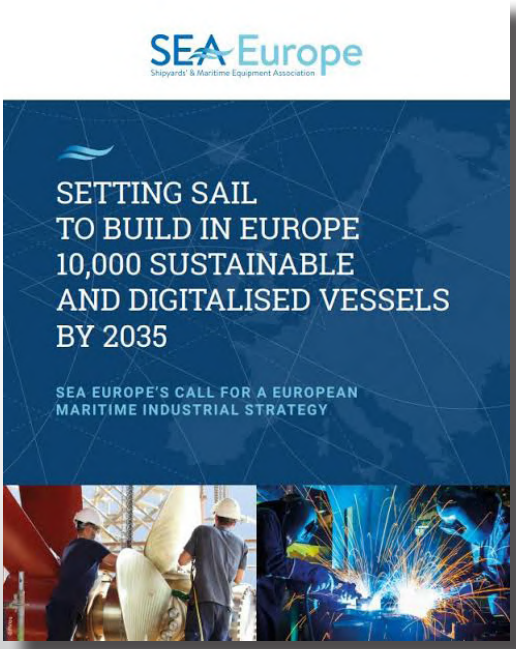
The development of equipment by a supply-chain company also has its own implications. Involving manufacturers, engineering firms and technology centres allows capabilities and risks to be shared, but requires the parties to agree who will own the results, what rights the other participants will retain and how the technology may subsequently be commercialised. Collaboration should involve a genuine contribution of expertise and address access to data, licensing, confidentiality and liability arising from testing.

Two Spanish schemes serving different purposes

Spain maintains two aid schemes specifically for the shipbuilding sector. They are not interchangeable: one supports particular technological, industrial or environmental investments, while the other improves the financing terms available for shipbuilding contracts.

Royal Decree 1071/2021 governs direct grants for R&D&I projects carried out by shipyards and, in collaborative projects, by equipment suppliers and other companies providing technological expertise. The 2025 amendment extended the scheme to environmental protection and energy-efficiency investments and allows applications to be submitted until 31 December 2026.

Aid intensities depend on the size of the company and the nature of the activity. They range from 50% to 70% for industrial research, 25% to 45% for experimental development, 40% to 60% for environmental protection investments and 30% to 50% for energy-efficiency measures. Certain collaborative projects may qualify for higher rates.



These ceilings do not indicate how much aid a project will automatically receive. R&D&I projects must demonstrate their novelty, the technological risks involved and the costs attributable to the innovative element. They must also be accompanied by a report from a certification body accredited by Spain's National Accreditation Body (ENAC). Environmental and energy-efficiency investments must identify the additional cost compared with the alternative that would have been pursued without the aid.

Royal Decree 874/2017 serves a different purpose. It subsidises the interest payable on loans used to finance the construction or conversion of metal-hulled vessels at Spanish shipyards. Loans may be granted to shipowners, shipyards or third parties, although the financial institution is the beneficiary of the subsidy. Financing may cover up to 80% of the vessel's value, with a maximum repayment period of 12 years. The subsidy is capped at one percentage point and may not exceed 6.5% of the vessel's value. The scheme will remain in force until 31 December 2029.

A single transaction may therefore combine support for its technological or environmental elements with financing designed to facilitate the purchase of the vessel. Combining these instruments requires the relevant costs to be clearly separated and the conditions of each scheme to be checked, but it may improve both the project's technical viability and the commercial attractiveness of the bid.

Decisions that must be made before the contract is signed

One of the main risks is considering public support only after the contract has been concluded. As a general rule, applications must be submitted before work begins or binding commitments are made. Signing a shipbuilding contract, ordering equipment or commencing an investment may render ineligible expenditure that could otherwise have qualified with appropriate advance planning.

Before a bid is finalised, the parties should identify which activities go beyond standard vessel construction, which company will undertake and account for each investment, the additional costs associated with the technological or environmental objective, and who will own the equipment and project results. They should also determine which grants, loans and guarantees may be combined without covering the same costs twice.

Funding thus ceases to be an administrative matter addressed at the end of the process and becomes part of the contractual and financial structure of the project.

New European priorities

The 2026 Maritime Industrial Strategy announces the creation of an EU Maritime Industry Value Chain Alliance, greater use of existing funds and measures to strengthen export finance. It also envisages making greater use of public demand and introducing criteria that are not based solely on price as part of the forthcoming revision of the public procurement directives.





Criteria relating to resilience, technological content, security of supply and sustainability could reduce the emphasis placed on price alone. Their use in public procurement will nevertheless require them to be linked to the subject matter of the contract, proportionate and verifiable. A company's European origin does not in itself remove the need to meet those requirements.

Increased European defence spending and financing may also generate demand for naval shipbuilding and dual-use technologies. SAFE can mobilise up to €150 billion in loans to Member States for joint procurement, while EDIP and the expansion of the European Investment Bank's security and defence activities may facilitate investment in industrial and technological capabilities. For shipyards and suppliers, the opportunity will depend on their participation in specific programmes and supply chains.

The Clean Industrial Deal State Aid Framework (CISAF), which will remain in force until 31 December 2030, allows Member States to establish support schemes for clean energy, industrial decarbonisation, clean-technology manufacturing and measures to reduce the risks associated with private investment. It is not a funding programme to which companies can apply directly. Its relevance to shipbuilding will depend on the schemes introduced by Spain and whether individual investments fall within their scope.

The Horizon Europe Shipyards of the Future call, which closed in April 2026, provides an indication of the EU's priorities. It sought near-market solutions, demonstrations in at least three shipyards and results that could be replicated in shipbuilding, repair and retrofitting. Robotics, artificial intelligence, predictive maintenance, circularity and interoperability were among the areas covered. Although the call is no longer open, it illustrates the types of projects and consortia that companies should prepare for future funding opportunities.

The international dimension

Compliance with EU State aid rules is not the end of the analysis. WTO subsidy rules must also be observed. Aid contingent on export performance or the use of domestic rather than imported goods is particularly sensitive, while other targeted measures may be challenged if they have adverse effects on foreign competitors.

For a strongly export-oriented industry, this is not merely a theoretical consideration. Buyer-support arrangements, guarantees and officially supported export finance must be designed with due regard to both WTO rules and the OECD framework governing export credits for ships.



Industrial and organisational capabilities

Galicia's shipbuilding value chain includes shipyards, equipment manufacturers, engineering firms and technology centres capable of participating in complex projects. The challenge is not simply to identify funding calls, but to prepare a pipeline of fundable projects before calls are published and before individual shipbuilding contracts are concluded.

This requires commercial, technical, financial and legal teams to work together from the bid preparation stage. It also means that supply-chain companies should not enter the process at the end as mere vendors. Where they develop technology, invest in new capacity or bear separate risks, they should be in a position to lead or participate in projects in their own right.

The opportunity does not lie in waiting for a new general subsidy for vessel construction, but in turning each shipbuilding contract into a coherent package of projects, beneficiaries and funding sources. For Galicia's shipbuilding value chain, this capability may become a competitive advantage as significant as price, delivery time or technological expertise.

The interview:

Roberto Rodríguez Orro

Managing Director of IBERCISA



IBERCISA DECK MACHINERY

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IBERCISA is a company specialized in the design and manufacture of deck machinery for all types of vessels. Founded in 1969, it has evolved from producing equipment for the fishing industry to providing solutions for merchant, oceanographic, and service vessels, while maintaining a strong commitment to R&D&I. Its activity focuses on developing tailor-made solutions following a detailed analysis of each client's technical and environmental requirements, with the aim of delivering the best possible response.

IBERCISA has an extensive network of agents and technical assistance services in strategic locations worldwide, enabling the company to respond quickly and efficiently to customer needs. Its philosophy is based on proximity, innovation, and continuous improvement, consolidating its position as a benchmark in the naval machinery sector.

• **What types of vessels are currently driving demand, and which do you believe will do so in the coming years? Which clients or niches should the Galician shipbuilding sector focus on?**

The most profitable demand comes from vessels designed for a specific mission, such as offshore vessels, defense vessels, auxiliary units for port and industrial support, etc. In Galicia specifically, the oceanographic segment is currently booming, with examples such as Freire Shipyard and Astilleros Armon. At IBERCISA, we have a solid track record and recognition in international markets. Therefore, I would say that this type of auxiliary and offshore vessel, together with fishing vessels of course, will regain prominence, even though they currently represent a smaller share.

The mass construction of large container ships does not represent the best outlook. It is a highly uncertain market in terms of future evolution. Furthermore, these vessels are not particularly attractive for our shipyards. Although we have participated in projects in Asia, this is a segment characterized by

large volumes and a high level of standardization (commodity), where our industrial model is not the most suitable.

• **From your point of view, what are the main strengths and weaknesses of the Galician naval sector, both at a business level and in terms of infrastructure, logistics, or regulation?**

I believe there are currently very strong references in segments such as oceanography, with a high level of specialization, extensive know-how, and a clear market positioning, although with limited capacity. We struggle to recruit specialized workers; training periods are long, for example, and this limits growth.

In my opinion, the sector should focus on strengthening three or four key niches: defense, offshore and offshore wind, oceanography, and also high-tech fishing vessels — in other words, vessel types that incorporate high value-added solutions. In fact, these kinds of vessels are being built even in markets with high labor costs, such as Denmark or Norway, which proves that when there is specialization, engineering expertise, and a developed value chain, it is possible to compete. Galicia has experience, export capacity, and is well positioned to work on short production series and engineering-intensive projects.

There is also the ferry segment, which may not be particularly attractive for us, but which certainly has potential for the sector as a whole, especially due to trends such as customized construction and improved energy efficiency.

Lastly, there is the repair sector, which I believe everyone is currently looking at. It is an interesting segment because it keeps you closely connected to customer needs and allows you to monitor the entire lifecycle of the vessel. It also helps cushion the cycles of new shipbuilding projects. And here I am not only referring to shipyards, but to the entire auxiliary industry as well.



• How has the way of competing and securing contracts in the naval sector changed, both nationally and internationally?

Traditionally, competition was often seen as being solely about price. However, in our case — and increasingly in general — competition is more about value. There will always be someone who can beat you on price, especially in large-volume projects.

Nowadays, it is not only about offering a good price, but about providing a complete package: reliable delivery times, production capacity, specialization, and solutions tailored to each project, among other factors. Financing also plays an important role, together with the environment in which you operate; some countries face greater difficulties due to legal guarantees or stability issues. References are also key. Demonstrated experience in certain segments makes a real difference. Increasingly, it is also important to align strategies between industry, customers, and, in many cases, even at a national level.

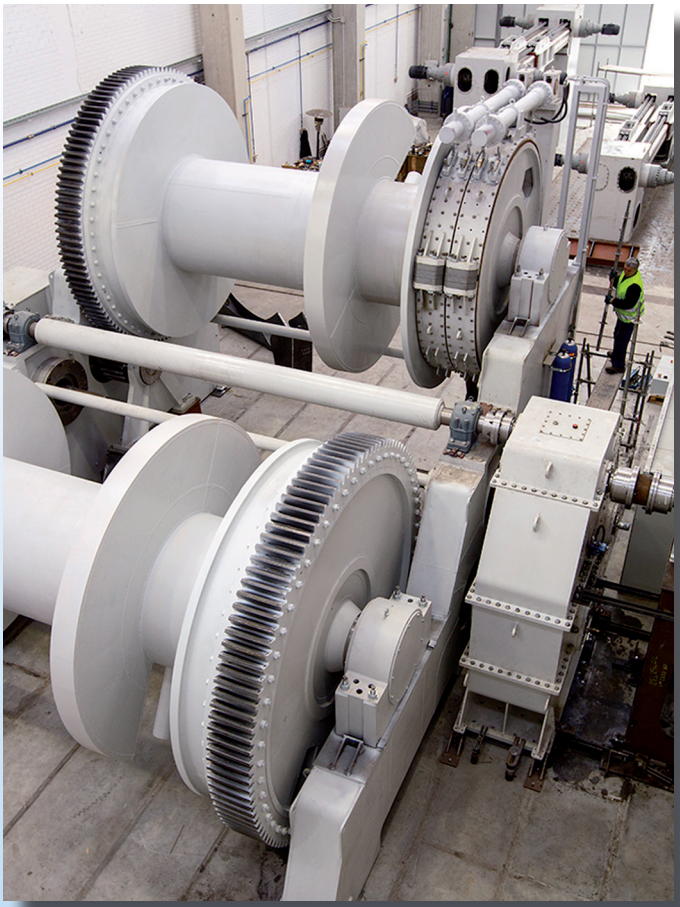
Ultimately, it is no longer just about being the cheapest, but about being the most reliable partner and the one that brings the greatest value to the project.

• What is the origin of IBERCISA? Since its foundation, have you maintained your original business lines or diversified? What currently differentiates you from your competitors in terms of products and services?

Our value proposition has always been the core of the company. We focus on customized design, durability, reliability, and strong after-sales service. We work for clients seeking this added value, and in that context reliability is essential: a small saving in the initial price is not decisive, but durability and performance throughout the equipment lifecycle certainly are, especially in the types of vessels we specialize in.

As for our origins, we began in the fishing sector, with a strong export-oriented approach from the start, for example to Scotland. By the early 1970s, we had already begun diversifying into other segments such as merchant shipping and defense.

Today, we remain very active in the fishing sector, but we are clearly a diversified company. We are a global benchmark in sectors such as oceanography, fishing, and towing. We also operate in the port sector, particularly in everything related to mooring systems, dry docks, and solutions for handling vessels on land.



• For IBERCISA, which category of vessels or projects is the most relevant? What particular characteristics does this type of construction involve?

The most relevant projects are all those that incorporate a high degree of added value. We are talking about vessels or installations that require complex systems, such as mooring solutions, docking control systems, or, more generally, equipment associated with specialized operations.

That is where we truly add value and where we differentiate ourselves for the client. Our focus is precisely on these types of projects, where specialization,



engineering, and reliability make the difference.

We are not looking to compete on price in more standardized segments, but rather in those where added value is decisive and where our proposal clearly stands out beyond small variations in final cost.

• When acquiring machinery for a vessel, which factors are decisive: price, durability, quality, service…? How has this criterion evolved in recent years?

When acquiring machinery for a vessel, the decisive factors are customized design, durability, and after-sales service. Ultimately, what the client seeks is to reduce operational costs throughout the equipment's useful life, and that is where these elements make the difference.

Tailor-made design makes it possible to adapt the solution to the specific needs of each vessel or project, while durability and good after-sales service guarantee reliability.

From our experience, these criteria have not changed substantially in recent years. What we do see is that these aspects are increasingly valued over others such as the initial price, especially in projects with greater added value and technical requirements.

• How do you plan to continue developing and expanding the business? What short- and medium-term objectives have you set?

We are currently in a phase of growth and expansion. Our strategy is based on two very clear lines: on the one hand, strengthening our focus on added value by continuously improving after-sales service; and on the other hand, improving our technological developments, with more efficient, durable machines that guarantee operability. We are also expanding our service capacity, with greater availability, 24-hour coverage, etc.

• What role has R&D&I played in IBERCISA's trajectory, and how are you addressing the challenge of digitalization?

Within the deck machinery sector, in which we continuously benchmark ourselves against our specific environment, we are among the highest ratios. We are firmly committed to developing digital systems and solutions, both in processes and products. We have strengthened the number of technical employees dedicated to digitalization and process improvement.

• Looking back, is there any strategic decision you would have approached differently?

Decisions are always made within a specific context; what truly matters is the ability to adapt and continuously learn.

• Generational renewal is one of the sector's greatest challenges. Why is it difficult to attract young talent, and how can a company like IBERCISA become more attractive to new generations?

This is a complex issue and one of the major challenges facing the entire sector, not just us. We require specialization, and that takes time. Based on our experience, it is after around two years of training that we begin to see results. It is not easy at all, but in our case we try to create a sense of belonging; we

even have second- and third-generation employees at IBERCISA.

Looking back, I remember that when we were finishing our Engineering degrees, we did not consider the naval sector the most attractive one; telecommunications or automotive industries seemed more appealing. However, the projects we are currently developing in the naval sector involve technical challenges you simply do not find in other industries, not only in terms of development but also commissioning. We are in a very interesting moment where training and retaining talent is absolutely essential. Strategies? There is no magic wand and no single solution. We collaborate with training centers, universities, etc., for example through dual vocational training programs with three different centers. Efforts are needed at every level, and all these initiatives must feed into one another to create the right conditions.

• What role does training play in the productivity of the Spanish Shipbuilding Sector?

It is undoubtedly a priority. We all agree that added value, training, and knowledge are key factors for differentiation. We do not sell volume; we must compete by providing value, and to achieve that we need trained and qualified personnel.

• The presence of women in the naval sector remains limited. Are steps being taken to encourage greater participation?

It is true that the sector is still predominantly male, but female presence has increased. In our case, it has multiplied: until a few years ago it was more concentrated in administration, but today women are also increasingly present in project management and technical areas. Growth has been particularly noticeable in more technical fields and, for example, we have recorded a significant increase in automation and production.

• Environmental protection is a key challenge for industry. Are the appropriate measures being taken? How does it affect you, and where do you think improvements could be made?

For us, it is a necessity and part of our statement of principles, especially considering the type of vessels targeted by the Galician naval sector. It is a principle we should all share, not only at the process level —where we take maximum care regarding carbon footprint, photovoltaics, energy consumption, etc.— but also in the design of hybrid products and regeneration systems.

• Is there genuine collaboration within the naval sector, or does a more competitive logic prevail? How is it perceived from an auxiliary company such as IBERCISA?

There is room to make better use of certain synergies within the sector. We have associations and clusters, and we collaborate internationally. In general, relationships are very good, although when you travel abroad you realize that there are other places where collaboration between parties is easier.

• What measures do you consider urgent to strengthen the Galician naval sector, and what advice would you give companies to face the current context?

I would insist on what I mentioned earlier: strengthening added value. We have a lot to offer, and we must continue monitoring competitiveness while also fostering a more collaborative environment wherever possible and, of course, promoting training.

• Considering current challenges, are you optimistic about the future of the Galician naval sector?

I am generally optimistic. In this case, I am optimistic for a reason, considering the current challenges. If we carry out a SWOT analysis of the current context —wars, polarization, health and energy changes, costs, etc.— we see a complex and constantly changing environment. But if there is one characteristic of Galician culture, shaped by emigration, it is tolerance toward diversity. We naturally tend to build connections and explore new markets, and that predisposes us to generate opportunities.

Furthermore, due to our size in terms of costs and volumes, we are small enough to adapt and grow.

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