

The reality
of a new port



Innovation
Report **2023**



Welcome to our Innovation Report 2023

A summary of the main actions and achievements in innovation-related matters by Algeciras Bay Port Authority (APBA), including their Innovation Ecosystem throughout 2023.



01 Foreword by the Chairman and Director

- 07 ■ **Gerardo Landaluce**, Chairman of the Port Authority and **José Luis Hormaechea**, General Manager of the Port Authority.

02 Innovation at APBA

- 11 ■ The Port of Algeciras Innovation Committee becomes a reality.
- 13 ■ APBA Renews its UNE 166002:2021 RD&i Management System certification.
- 12 ■ The Port of Algeciras will host an entrepreneurship programme in Artificial Intelligence applied to port logistics.

03 Voices of innovation

- 17 ■ **Carlos Moreira**. «Cybersecurity & satellite technology in the port-logistics sector».
- 24 ■ **Anjaney Borwankar**. «Collaboration platforms as a vertebral Axis for port-maritime process efficiency, coordination and decarbonisation».
- 31 ■ **María del Mar Cerbán**. «Regional talent and its future in the port-logistics sector».

04 Figures & Milestones

List of indicators and values for the year 2023.

05 RD&i Projects

- 41 ■ Simulation of the OPE Process Project.
- 43 ■ AMURA-ZIDAY: Intelligent tool for advanced hydrocarbon and sewage spill Ddetection.
- 45 ■ Underwater noise pollution monitoring & cetacean tracking system.

06 Initiatives

- 50 ■ APBA and UCA launch the Expert in Digital Transformation Applied to port-logistics Course.
- 52 ■ The european AspBAN project draws to a close showing signs of its potential to accelerate the dgital transformation of ports.
- 55 ■ The Bay of Algeciras port-logistics ecosystem reinforces its commitment to creating and holding on to digital talent.
- 58 ■ The Algeciras Bay Port Authority and WISeKey join forces to implement a pioneering digital transformation project.

07 Innovation awards

- 61 ■ Sara Robledo wins the III Algeciras BrainPort prize in Port Innovation for her End-of-Master's Degree Dissertation.
- 63 ■ The APBA launches the 4th edition of the Innovation Journey Ideas Competition.

08 Conferences & Events

- 65 ■ The Port of Algeciras participates in the 12th edition of the 2023 European Transfiere Forum.
- 67 ■ REMESA presents the proof-of-concept test of the "Apolo" project with APBA's backing.
- 68 ■ APBA present at the "Agora: digitalisation, blue economy & smart ports" Conference, organised by UCA and Telefónica.
- 69 ■ APBA – Key player at the "Digital twins in the port environment" conference held at UPM.
- 71 ■ The Port of Algeciras - Epicentre of the Energy Transition Debate at the "European Harbour Masters' Committee Seminar."

- 73 ■ APBA – Key player during the XV edition of MEDPorts & Shipping summit at SIL 2023.
- 74 ■ The Port of Algeciras presents the PROAS MVP at the XIX ATPYC young professionals conference.
- 75 ■ APBA makes its case as a Blue Economy Hub at the European Parliament.
- 77 ■ APBA hosts the VII panel of experts for the Andalusian Sustainable Blue Economy Strategy.
- 78 ■ The Port of Algeciras showcases its dgital solutions for operational optimisation & decarbonisation at Ningbo.
- 79 ■ The APBA takes part in the I Innovation and Digital Transformation Fair organised by the Campo de Gibraltar Chamber of Commerce.
- 81 ■ The Algeciras Bay Port Authority hosts an ICEX workshop on technological solutions for integrated value chains.
- 82 ■ The Port of Algeciras presents Artificial Intelligence cases at the 1st Andalusian AI Congress Held in Granada.

09 Collaboration with start-ups

- 86 ■ The second round of Puertos 4.0 Funding ends with the selection of 10 APBA-backed proposals.
- 87 ■ Just-in-Time Bunkering Operations project.
- 89 ■ Safety tech Accelerator, Awake.AI and APBA partner up to promote maritime sector innovation.
- 90 ■ The APBA collaborates in the development of the Smart Mobility Analytics (SMA) project.

10 Press Release

- 95 ■ **Press Release**



01

Foreword by the Chairman and Director



Once more last year, the underlying fragility of world supply chains came to the fore, having collateral effects on the integration and connectivity of the world's cargo flows and – for that matter – business at logistics and maritime hubs.

Political, economic and commercial tensions; the Red Sea Crisis; the reorganisation of heavy industry on inter-regional trade because of phenomena such as nearshoring and reshoring; the emerging realignment of global maritime services from the future completion of the Consortia Block Exemption; and the re-mapping of shipping alliances: just some of the palpable examples of the winds of change blowing towards ports, to persuade them to be even more resilient – to rise as guarantors of the continuance of trade, and enablers of the race towards energy transition and decarbonisation of the industry.

If that were not already a complicated enough scenario, it has been compounded by the European Union's ETS

(Emissions Trading System) coming into force, which threatens to tilt the balance of the once-level playing field enjoyed by aspiring European ports. The likely flight of container transshipment traffic and – consequently – the foreseeable connectivity and investment drain towards third party countries, whose presence and activities are currently soaring, could provide the hammer that may drive the last nail into the coffin of the industry's decarbonisation aims.

Despite this panorama of tremendous complexity and uncertainty, the Port of Algeciras Bay has been able to continue to provide competitive, benchmark port and logistics services that generate added value. Without looking much further, our port has broken significant barriers in handling almost 105 million tonnes of throughput in 2023, and **over 100 million tonnes for the eighth year running**. We renewed our title as the **most efficient port in Europe** in container traffic according to the World Bank, and strengthened our position as a **digitalised logistics hub** within the Strait of Gibraltar



Megahub itself. These are all factors that show the strategic importance of our port as a world maritime gateway.

Nevertheless, none of this would have been possible without our organisation's firm commitment to channelling **innovation as a key business process**. The ability to learn, innovate and improve is comprehensively embedded in our DNA: our organisation is a systemic innovative port. We continue along the path that leads to the **Next Generation Port of Algeciras** – a concept that will help us reach operational excellence, and a greater degree of customer and user satisfaction, in its final stages.

This Report describes the main lines of work carried out in the field of Innovation in 2023, a year when innovation continued to play a key role in our organisation. We undertook projects that will maximise the impact of our activities, and started up initiatives that will encourage open innovation and partnership within our port-logistics ecosystem.

To cite some of the initiatives carried out under **competitiveness and logistics orchestration**, we undertook innovative projects based on Artificial Intelligence and optimisation models geared towards decision-making and traceability support; and to provide predictive and prescriptive capabilities in areas such as rail-port traffic, Operation Cross-the-Straits, and bunkering services. Alongside this, we drove projects forward in the fields of **sustainability and biodiversity conservation**, such as the implementation of smart tools to provide an early warning of hydrocarbon spills on the sea surface; and the development of a digital system to track whales and monitor underwater noise pollution, which will periodically analyse the impact of our port's activities.

We should also showcase the establishment of the **Port of Algeciras Bay Innovation Committee**, set up as a knowledge-sharing think tank to align, coordinate and drive innovation partnerships forward within our port-logistics ecosystem; and aim to improve competitiveness, sustainability and the value proposition of our Port and



Port & Logistics Community. At the same time, the **Port of Algeciras Digital Academy** scheme – a project to create a powerful local digital ecosystem – continued to consolidate itself as a fundamental tool to aid the digital transformation of the sector, thanks to the inclusion of lines of work such as the Expert in Digital Transformation Applied to Port Logistics course, partnered by the University of Cadiz.

We would like to end this foreword by thanking all of our staff at the Port Authority, the companies that make up our Port of Algeciras Community, and our customers and partners for making our Innovation Journey possible, and for allowing the success we have enjoyed together give us the strength to face our future challenges with confidence.

We are facing times at once full of problems and prospects. With everyone's commitment and endeavour, we can **secure the Port of Algeciras Bay's place as a world benchmark in port-logistics innovation, and build a centre of excellence in the field of technology and digital talent to help drive Andalusia's economic growth onwards.**



Innovation at APBA



■ The Port of Algeciras Innovation Committee becomes a reality.

As the port-logistics sector has become more complex and dynamic, **partnerships between various supply chain players** have come to the fore as a fundamental pillar that can encourage support bonds of coordination, efficiency and optimisation between them, in order to tackle today's business challenges: challenges that are marked by growing competitiveness in the port-maritime industry.

Such partnerships do not only prompt discussion, but also promote synergy among the partners, helping them to adapt more easily to shifting market demands, and to sharpen the cutting-edge of strategic port-logistics evolution.

Aware as we are of these facts, the Port of Algeciras Bay (APBA) launched a **Port of Algeciras Innovation**

Committee – made up of a **co-working think-tank and knowledge-sharing forum** among Port Community member companies – whose mission is to align, coordinate and drive innovation partnerships at the Port of Algeciras that will **improve competitiveness, sustainability and the value proposition** of the Port and its port-logistics Community.

The specific aims that the initiative pursues are: to **identify common challenges in the industry, evaluate innovative solutions; back and partner innovation created in the region, identify ways to partner schemes; and fund innovative projects.**

The Committee's **functions and activities** are founded along **four main lines**: (1) the development of **open innovation** to identify and solve priority innovation challenges; (2) **knowledge management and digital reinforcement learning** to share ongoing projects and find synergies between Community port-logistics



The specific aims that the initiative pursues are: to **identify common challenges in the industry, evaluate innovative solutions, back and partner innovation created in the region, identify ways to partner schemes and fund innovative projects.**



companies; (3) **digital capacitation and talent enhancement** to identify needs and design specialised training courses, (4) the **communication and broadcasting** of events, conferences on innovation and communication tasks.

Various **specialist Working Groups** may be set up within the Committee to align with specific axes of port business at the Port of Algeciras Bay, or the specific needs of the Committee, in order to deal with any subject of interest in terms of partnering innovation in a more specific way,

which could include container traffic, digitalisation and open data ecosystems, and sustainability and climate neutrality.

The Committee held its inaugural session last October, starting off with **36 members** – made up of Bay of Algeciras port ecosystem players and expert consultants – and will be chaired by The Algeciras Bay Port Authority for its first two years, the responsibility falling into the hands of Jesús Medina (Chief Innovation & Information Officer).



APBA Renews its UNE 166002:2021 RD&i Management System certification.

The Algeciras Bay Port Authority (APBA) renewed its RD&i Management certification for the **fifth time running**, having first been awarded in December 2019. This certifies that APBA complies with all the requirements pursuant to the UNE 166002:2021 Standard for research, development and innovation activities in the fields of port and logistics operations.



Awarded by AENOR, the **UNE 166002:2021 "RD&i Management: RD&i Management System Requirements" Standard** certification's objectives are to organise, systemise and permanently improve RD&i activities to achieve the maximum effectiveness and efficiency in research, development and innovation work. The certificate's renewal confirms APBA's commitment to RD&i and the quality standards reached over the last few years in terms of the **coordination and**

systemisation of innovation processes focused on attaining excellence and a greater degree of Port of Algeciras Bay customer and user satisfaction.

It also acknowledges: that the port authority continues to maintain a quality, mature RD&i Management System that is competitive and sustainable over time; that it guarantees best practices in this field, banking on continuous improvement; and that it favours a high level of quality in the innovation activities and projects it undertakes.

The RD&i Management System does not only help APBA to **regulate and systemise key processes – from project ideation to execution – and transversal initiatives**, but it has also helped new procedures be put in place to improve issues such as **technological surveillance, knowledge management, open innovation and the launch of innovation support tools, which are key for evolution and growth**. All of the above ensures that APBA complies with the strategic directives that distinguish a Next-Generation Port.





■ **The Port of Algeciras will host and entrepreneurship programme in Artificial Intelligence applied to port logistics.**

Following a Ministry for Economic Affairs & Digital Transformation proposal, the Spanish Cabinet Office approved a €260-million investment in March 2023 to launch a total of thirteen pioneering digital transformation projects, to be led by Spain's Autonomous Regions under the **RETECH (Territorial Technological Specialisation Network)** programme.

The programme's specific aim is to set up projects to digitalise the Spanish mainland by harnessing the



potential of each region under the **2026 Spanish Digital Agenda** scheme, leading to an inclusive, sustainable disruptive change and focusing the digitalisation initiatives on key economic sectors.

Among the projects selected was the "**Digital Enterprise Network**", coordinated by the Andalusian Government and in which The Algeciras Bay Port Authority is a participant. Partnered by the Community of Madrid and the Autonomous City of Ceuta, the project has a total budget of €23.6 million. It focuses on: the **development**



of partnered and open innovation ecosystems; the promotion of technical support and support networks; the deployment of financial instruments; and the generation of synergies among regions, with around eight specialist sectorial hubs in all.

The project has a total budget of €23.6 million. It focuses on: the **development of partnered and open innovation ecosystems; the promotion of technical support and support networks; the deployment of financial instruments; and the generation of synergies among regions, with around eight specialist sectorial hubs in all.**

In this light – and due to the Port of Algeciras Bay's specific weight in the port-logistics sector – it was decided from the very beginning that the port would house one of the **digital enterprise networks**, centred on **artificial intelligence applied to port-logistics.**

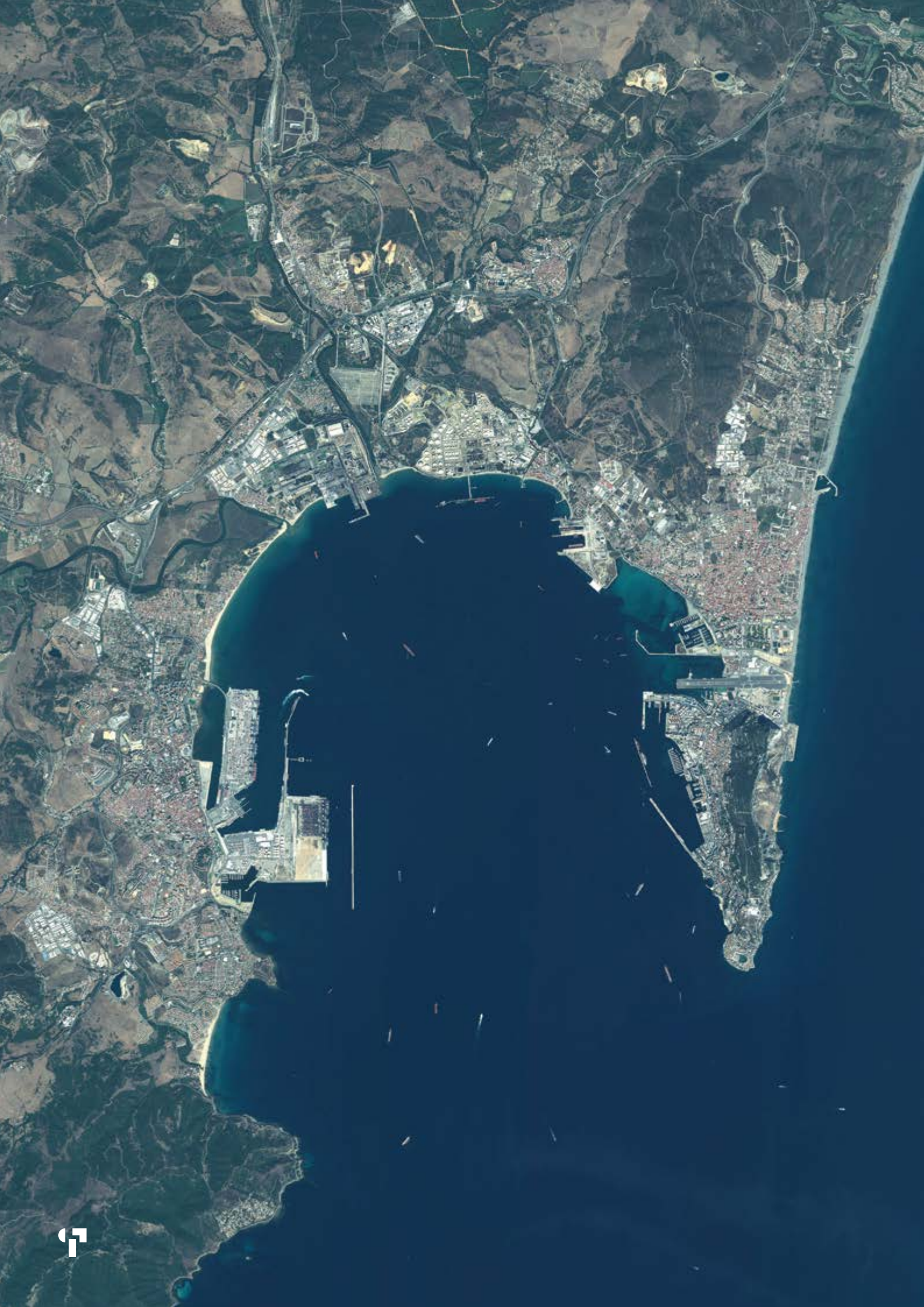
This is evidently because of the port's total cargo throughput in general, but – more specifically – because of its role as a driving force for innovation as a key business factor, which has increased its competitiveness and created added-value wealth.

With a **budget of €3 million**, this particular hub – set to be one of only four that the Andalusian Government sets up – will be located at the Port of Algeciras Bay's facilities to help **deploy support services for start-ups, dynamize artificial intelligence innovation projects and drive open innovation schemes forward** in the port-logistics sector. One of the Andalusian Government's top priorities is to harness the potential of its ports as much as possible to serve as strategic pillars of the Andalusian economy and critical links in global logistics.

Finally, it is worth noting that RETECH was launched by the Minister for Digitalisation & Artificial Intelligence in 2022, and is financed with NextGenerationEU funding under the Spanish Government's Recovery, Transformation & Resilience Plan.

03

Voices of innovation



Carlos Moreira,
Founder & CEO
in WISEKey

Carlos Moreira is an Andalusian from La Linea who moved to Switzerland to train in the world of technology. He then worked for the United Nations as a cybersecurity expert. In 1999, he founded **WISEKey**, a cybersecurity and digital ID protection company that is listed on **NASDAQ**. Furthermore, he has taken an active role in the World Economic Forum and other international projects related to technology and cybersecurity.

An entrepreneur and investor in Deep Tech, AI, Blockchain, IoT and Cybersecurity, he also author of several books, and is a renowned conference speaker and leading voice in his field. He is married with six children and speaks five languages.

■ Cybersecurity & satellite technology in the port-logistics sector .

[Q⁰¹] Carlos Moreira – La Linea’s son who decided to emigrate to Switzerland to study catering and now manages WISEKey, a tech company listed on NASDAQ – can you tell us more about tools and business lines that are being developed at WISEKey?

[A⁰¹] With its headquarters in Switzerland, **WISEKey** is one of the world’s main cybersecurity and Internet of Things (IoT) tool companies. We have several branches that deal with different tech areas: e.g., **SEALSQ Corp** focuses on semiconductors, Public Key Infrastructure (PKI) and post-quantum technology. WISEKey SA, specialises in Root of Trust (RoT) and PKI tools to ensure IoT, Blockchain and AI (Artificial Intelligence) authentication and identification; then we have WISESAT AG, dedicated to space technologies for secure satellite communication, specifically for IoT;



and WISE.ART Corp, who focuses on Blockchain Non-Fungible Tokens (NFTs) and runs a secure NFT market.

What we do is integrate all these advanced technologies on our platform to ensure digital ID ecosystems, both for people and things. We have already deployed more than 1.6 billion microchips over various IoT sectors. We use Blockchain, AI and IoT to prevent equipment failure through predictive analytics. Our cryptographic RoT at OISTE/WISEKey ensures authentication and identification on IoT, Blockchain and AI-based applications, thus guaranteeing transactions on secure lines.

[Q⁰²] Given the growing importance of protecting our digital systems, what would you say are the main cybersecurity risks that industry faces today?

[A⁰²] The protection of digital systems is more important now than ever, due to the increase of ever-more frequent, sophisticated cyberattacks. Industries face several significant cybersecurity challenges: one of the main ones being ransomware, which encrypts data and then demands a ransom, meanwhile leaving the company without access to critical information.

Another one is phishing, where attackers try to trick users into revealing personal or financial details. Data breaches are another great worry, since unauthorised access to sensitive information may lead to ID theft and fraud. At the same time, IoT devices are particularly vulnerable due to their great number and diversity, and often lack suitable security measures. Internal threats, which may come from disgruntled employees or contractors who have access to sensitive systems, are another significant risk.

Day Zero threats that exploit previously-undetected weaknesses in software are especially dangerous, because there are no patches available to counter them. In the same light, supply chains – involving multiple agents – are another weak spot, because attackers can infiltrate themselves through any one of a number of unsecure suppliers.

And, finally, geopolitical risks like cyberespionage and critical infrastructure attacks are becoming more frequent, affecting governments and large corporations. The challenges require constant adaptation and updates to cybersecurity strategies in order to protect digital systems effectively.

[Q⁰³] Usually, when we talk about security in the port environment, we first think about physical security. However, in recent years, we have seen several large maritime transport companies, and even some ports, be victims of cyberattacks. Do you think that, from a maritime sector – and, specifically, from a port – perspective, cybersecurity is being given the sufficient level of criticality that matches the dangers? Are they ready, or is there a long way to go?

[A⁰³] It's true that the maritime and port industries have always been more concerned with the physical side of security. However, recent cyberattacks on big maritime transport companies – such as the ransomware attack on Maersk in 2017 – have highlighted the importance of digital security. Such incidents have demonstrated the vulnerability of the maritime sector's digital infrastructure. In the present day, there is growing concern about the need for cybersecurity in the sector.

Many companies and ports are investing in updating their defences via network segmentation, data encryption and multi-factor authentication, together with round-the-clock threat surveillance. Nevertheless, challenges do persist, such as the lack of uniform standards, the need for continuous training and insufficient investment in cybersecurity.

The integration of IoT and AI at ports is essential to improve both efficiency and security; but, also, to increase the attack surface area, which makes cybersecurity even more crucial. Moreover, process decentralisation via DePINs (Decentralised Physical Infrastructure Networks) is key to improve resilience and security, by eliminating single-point failures and increasing resistance to cyberattack.

Even though progress is being made, there is still a long way to go before ports are completely ready to deal with the cyber threat.

[Q⁰⁴] Putting the spotlight on the human factor in the field of security in terms of education and awareness, what would you recommend for employees who work in the industry and particularly in the port-logistics sector?

[A⁰⁴] I think that it's essential to tackle employees' training and awareness in the maritime industry, and especially in this particular sector. Port personnel and their mobile devices are critical terminals that need protection, as penetration via a mobile device is child's play, yet can be extremely damaging. In order to heighten security, I recommend implementing continuous cybersecurity training programmes that educate employees about current threats and best practices. This would include identifying phishing e-mails, recognising suspicious behaviour and knowing how to respond to security threats. Carrying out regular cyberattack drills is also essential to prepare employees and assess the effectiveness of response protocols.

Furthermore, it is important to make everyone aware of the secure use of mobile devices. Showing employees how to protect their devices by means of secure passwords, by making regular software updates, and not hooking up to unsecure public Wi-Fi networks can significantly reduce the risk of attack.

[Q⁰⁵] Let's leave the subject of cybersecurity and talk about space tech, because – apart from WISEKey – you also create satellite tools under the name of WISESAT, hand-in-hand with an ally like FOSSA Systems, a company headed up by another La Linea native like yourself, Julian Fernandez. When and why did this partnership begin?

[A⁰⁵] WISESAT.Space is a WISEKey initiative focused on the creation of innovative satellite tools together with FOSSA Systems, a company led by Julian Fernandez,

who also hails from La Linea de la Concepcion, where WISEKey has invested in the past. The opportunity of this partnership arose in 2021 to combine WISEKey's cybersecurity experience with FOSSA Systems' advanced satellite technology.

Our aim was to harness the synergy between both companies and create a comprehensive tool to link up and secure IoT devices via satellite. The idea to partner up was based on a growing demand for secure, reliable global connectivity that we had identified, particularly in remote areas where traditional infrastructure is not viable. WISESAT.Space develops and deploys nanosatellites that allow secure communication between IoT devices anywhere around the world. These satellites are fitted out with the latest WISEKey cryptography and authentication technologies to ensure that any data transmitted is protected against interception and unauthorised access.

Additionally, the capacity of FOSSA Systems to build and launch efficient, low-cost satellites makes this a strategic partnership for the globalisation of secure IoT tools.

[Q⁰⁶] It's precisely with Julian that you are trying to set up an Innovation & Know-how Centre in the borough of La Linea, which will put the town at the hub of the Fourth Industrial Revolution. Can you tell us more about the initiative? Where is the project at, at the moment?



[A⁰⁶] Under the partnership framework that we have, we have launched an ambitious project to start up a Fourth Digital Revolution Satellite Centre in La Linea de la Concepcion. The aim of the centre is for it to become a tech-hub for the research, development and deployment of advanced satellite technology. The creation of such an organisation not only drives innovation and technological development in the region forward, but also promotes education and job creation in the fields of technology and cybersecurity.

The project for La Linea stretches to the wider Campo de Gibraltar area, to integrate the region into a state-of-the-art ecosystem. The end-goal of its expansion is to take advantage of local infrastructure and talent to develop a tech-cluster that spans everything from nanosatellite manufacture to implementing IoT and cybersecurity connectivity tools.

WISeSAT.Space has already underwritten agreements with several great ports, including the Ports of Dubai and Algeciras, and is currently readying agreements with other ports in Asia and Latin America. These agreements will allow secure, efficient satellite tools to be implemented and improve worldwide port operation connectivity and security.

In short, the partnership between WISeKey y FOSSA Systems in WISeSAT.Space doesn't just address the need for secure, global connectivity tools, it will also help drive the evolution of regional technology with La Linea de la Concepcion's new Fourth Digital Revolution Satellite Centre and its growth to the wider Campo de Gibraltar area. With seventeen satellites launched, and plans for eighty-eight in total by 2026, this initiative – backed by international agreements and EU funding – is an important step towards the creation of an advanced tech ecosystem that will make the region a leader in satellite and digital innovation.

[A⁰⁷] Let's stay on the subject of technology. With the constant, ground-breaking innovation that exists in the space industry, what are the most significant advances in satellite technology and

use cases that have cropped up recently? Can satellite technology bring improvements to port operations in terms of efficiency and security?

[A⁰⁷] Progress in satellite technology in the space sector has been remarkable and has generated a lot of innovative use cases. One notable example is the post-quantum semiconductor project we have carried out at **SEALSQ**. These semiconductors are designed to resist future quantum attacks by ensuring the long-term security of communications and data. Outsourced Semiconductor Assembly and Test (OSAT) centres are being set up in Murcia and Arizona to help production along and trial these advanced semiconductors.

Besides that, satellite tools are already providing significant improvements to port operation efficiency and security. In terms of efficiency, they supply continuous connectivity and allow ports to monitor real-time cargo handling, optimise transportation routes, and manage inventory with greater accuracy. All of this reduces downtime and operating costs.

As for security, satellites equipped with technologies such as ours can guarantee that only authorised devices and users may access port systems, prevent unwanted access and combat cyberattacks. All in all, satellite technology progress – together with other breakthroughs such as the evolution in post-quantum semiconductors – is already providing significant improvements to the efficiency and security of port operations, strengthening connectivity and protecting critical infrastructure in a digitalised environment.

[A⁰⁸] Do you think that companies and organisations who don't commit to these new technologies to solve their business challenges may lose their competitive edge? What advice would you give them towards their employment from your experience?

[A⁰⁸] Yes, I do think that companies that don't invest in what we call the Fourth Industrial Revolution run the gauntlet of losing their competitive edge. Emerging

technologies, such as AI, IoT, Blockchain and satellite tools are revolutionising industries by permitting higher levels of efficiency, security and connectivity. In that sense, businesses that don't embrace these technologies will be swiftly overtaken by their more innovative-oriented competitors.

My advice to them would be to begin with an exhaustive analysis of the specific business challenges and opportunities that can be addressed by new technologies. Having a clear vision of how digitalisation could improve operations is crucial. Accordingly, it is key to invest in cybersecurity to protect data and digital infrastructure, as they are the basis of any successful digital transformation.

At **WISeKey**, we have been able to see how cybersecurity and IoT connectivity tools can transform the efficiency and security of a multiple sectors. Companies should invest in these technologies and in attracting personnel; partnering up with tech associates could also provide the required know-how for successful deployment. In a nutshell, companies who don't adapt to the Fourth Industrial Revolution will lose their competitive edge and run the risk of being bettered by others who do use more advanced digital platforms.

[A⁰⁹] Recently, the signature of a Partnership Agreement between WISeSAT, FOSSA Systems, Bernardino Abad and our very own Port of Algeciras Bay Authority was published: an agreement to make up a strategic alliance and produce a smart container monitoring and tracking innovation tool. What is the WISeSmartContainers project exactly? What changes or benefits is this tool going to bring to the logistics sector table?

[A⁰⁹] Our **WISeSmartContainers** project is an innovative approach to tracking and locating smart containers – a partnership scheme between WISeSAT, FOSSA Systems, Bernardino Abad and The Algeciras Bay Port Authority. The project employs advanced satellite and IoT technology to offer real-time tracking

of any container fitted out with a device that transmits critical data about their location, status and ambient conditions. This data is then sent via the WISeSAT nanosatellite network to guarantee global, secure connectivity, even in the remotest areas.

One of the greatest assets of the project is the partnership among important players such as DPWorld and the Port of Algeciras. This synergy has facilitated the integration of technological solutions in different areas of the port, to enable knowledge exchange and best practice improvements.

WISeSmartContainers brings numerous benefits to the logistics sector table. Real-time tracking improves supply chain management, and increases operational transparency and efficiency. Smart devices and secure connectivity reduce the risk of container theft or tampering, ensuring that only authorised parties can access data via advanced cryptography.

At the same time, companies are able to optimise their resources, reduce downtime and improve logistics planning with accurate, updated information, meaning fewer operating costs and more profit. Additionally, the ability to be able to monitor the containers' ambient status ensures that delicate products, such as foodstuffs and medical supplies, can be kept under optimum conditions and reduce waste, thus improving sustainability.

To sum up, **WISeSmartContainers** means significant progress for the logistics business, providing an innovative tool to track and locate smart containers and boosting benefits by means of strategic partnerships.

[Q¹⁰] As for the role of The Algeciras Bay Port Authority, what areas do you think this alliance contributes in terms of value?

[A¹⁰] The Algeciras Bay Port Authority has become a Fourth Industrial Revolution digital platform through its alliance with WISeSAT, FOSSA Systems and Bernardino Abad in the **WISeSmartContainers** project.

APBA wanted to improve their port management and operations significantly through partnerships like this, and add value to various crucial areas. Firstly, by implementing smart container tracking and location technology, the Port Authority is banking on advanced satellite and IoT devices to monitor the location, status and ambient conditions of smart containers. This data is then sent via a nanosatellite network to guarantee secure global connectivity. This increases operational transparency and efficiency, allowing better management of the supply chain to reduce downtime and operating costs.

Moreover, the digital platform incorporates post-quantum semiconductors – like the ones mentioned above – that protect communications against future quantum attacks. The semiconductors – together with advanced cryptographic tools and secure authentication – guarantee that only authorised parties can access container data, thus heightening security and reducing the risk of container theft or tampering.

Finally, I consider it key that the Port Authority is acting as an aircraft carrier for startups, providing a solid and advanced infrastructure from which these new companies can take off.

Finally, I think it is key that the Port Authority is acting as an aircraft-carrier for start-ups. This lays the foundations for solid, progressive infrastructure where these new companies can take flight. The metaphor actually highlights how a digital platform or ecosystem can aid innovation and development by offering start-ups an environment conducive to accessing advanced technology and the global marketplace. This not only promotes the growth of new tech companies, but also enriches the port ecosystem with innovative, efficient solutions.

[Q'1] Finally, looking towards the future and possible further innovation, what advances

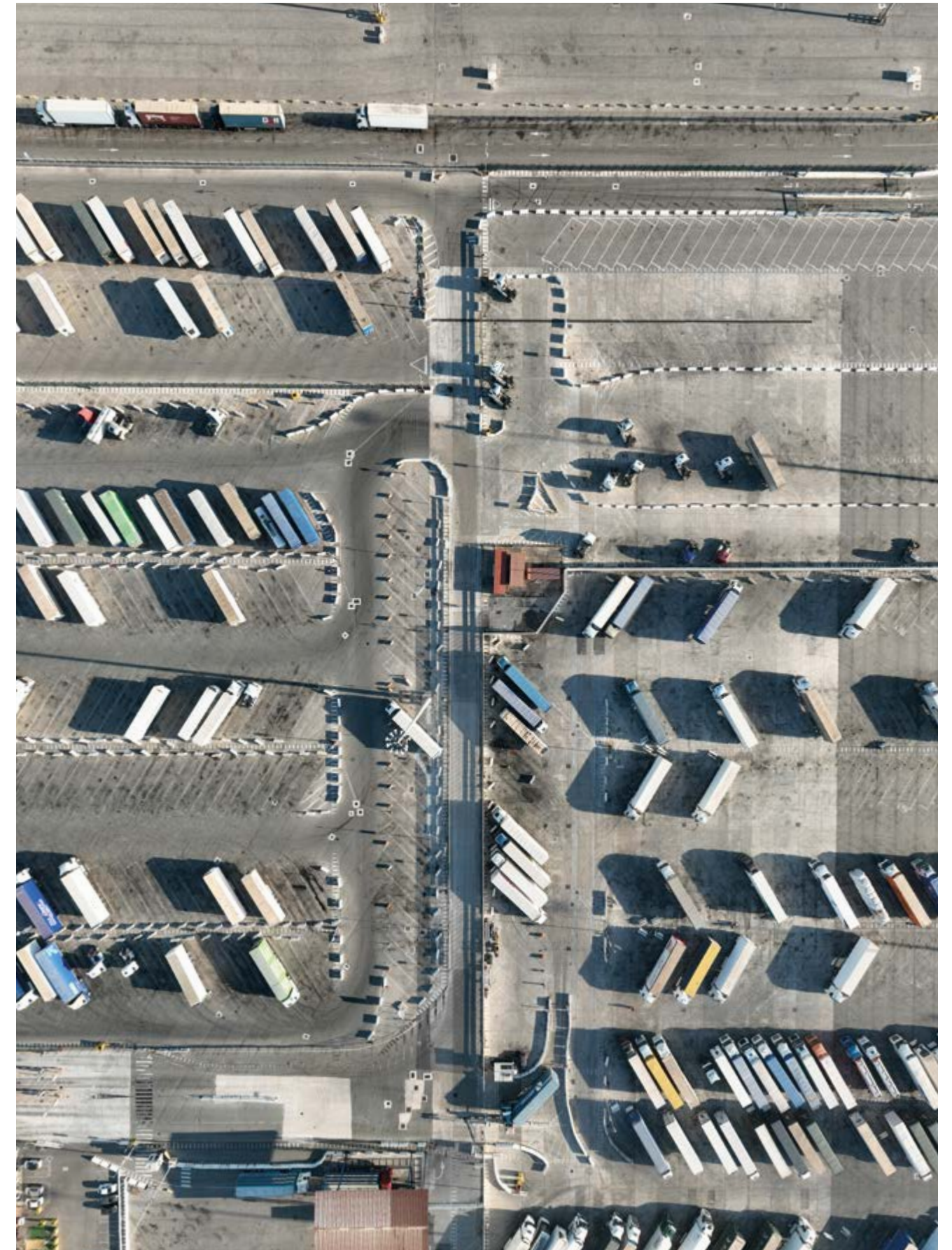
in satellite technology do you view as most promising for logistics and port security? What is looming over WISeSAT's horizon?

[A'1] The future of satellite tools for port logistics and security is very promising. Digitalisation and satellite connectivity with IoT devices provides us with real-time cargo tracking that improves accuracy and reduces downtime. Likewise, the remote-controlled automation of equipment will increase security and efficiency by reducing operating costs.

On the other hand, infrastructure decentralisation will increase resilience to combat cyberattacks by eliminating single-point failures and distributing control and data through a secure, encrypted network. Post-quantum semiconductors, for instance, can guarantee secure communications against future quantum attacks, thereby protecting operations and data.

Advanced tracking technology will allow the complete traceability of the port business by improving transparency and enabling global supply chain partnerships. Digitalisation will allow the global interconnection of maritime players to create a network of smart ports who optimise their operations via Big Data, IA, IoT, Blockchain and 5G Connectivity. Digital Twins – the virtual rendering of ports – will be able to provide a better management of resources and operations.

It is in this scenario that satellite tools like WISeSAT can offer secure global connectivity to track containers and resources in real time to improve efficiency and security in the port-logistics sector. With plans to deploy eighty-eight satellites by 2026, WISeSAT is well-prepared to spearhead management and security innovation in the port-logistics sector.





Anjaney Borwankar,
Chief Executive and Co-Founder in Navozyme.

Anjaney Borwankar (Anjan) is a former navigations officer and experienced entrepreneur who has worked at world-renowned organisations, such as McKinsey, AP Moller (Maersk) and IESE Business School.

Anjan co-founded **Navozyme** – an award-winning High-tech company supplying pioneering tools – in 2017. The company's mission is to facilitate decarbonisation and accelerate the maritime industry's digitalisation process on a worldwide level. Currently, Anjan is CEO of **Navozyme** and spearheads the company's international growth and expansion.

Anjan is also considered a leading voice in the area of digital transformation, and a benchmark speaker at top international conferences. Together with the Nautical Institute of London, he designed the first course on the use of Blockchain technology in the maritime industry, and – among other many achievements – he is noted for being a distinguished guest at the IMO when he offered a workshop to all the association's members on the application of Blockchain technology in the maritime industry and – in particular – on how maritime cyber security could be improved by the implementation of e-certificates.

■ Collaboration platforms as a vertebral axis for port-maritime process efficiency, coordination and decarbonisation

[Q⁰¹] Navozyme can rely on its experience in the development of deep-tech enabled digital tools for the maritime sector, especially with Blockchain and Artificial Intelligence. Could you tell us more about your scale-up and its lines of business?

[A⁰¹] Navozyme is a scale-up established by professionals in the sector that designs innovative tools to try and improve the sector's standards in terms of circularity, security, reputation, productivity and sustainability.

Navozyme relies on a portfolio of digital products that simplify complex maritime certification processes: Port Clearance via NMap, MARPOL Declarations via NSwap; Maritime Certification via NCap; Ship Registration via VRT; and Bunkering Operations via NBunker.



They facilitate data exchange among the port-logistics chain players. This is why Navozyme has become specialised in the use of innovative technologies, such as DLT (Distributed Ledger Technology) and Artificial Intelligence: their capacities and characteristics make them the best tools for these use cases. These products are oriented towards different user and customer profiles, e.g., consignees, MARPOL operators, ship-fuel suppliers and maritime institutions issuing certifications in the name of flag States, among others; and always putting the spotlight on the ship.

Navozyme's experience and know-how in Blockchain technology and digital transformation has been acknowledged worldwide by numerous companies and institutions, like the International Maritime Organisation (IMO). In 2019, Navozyme designed and taught a Blockchain course to IMO members at its headquarters in London, during which Navozyme demonstrated the capabilities of Blockchain-Enabled E-Certificates (BEEs) – a Navozyme in-house technology.

In particular, BEEs link up the different data fields from source, guaranteeing the data's integrity and validity and protecting the certificate from any subsequent tampering. World-renowned institutions, such as the Maritime Academy of Asia & the Pacific (in the Philippines) and the International Association of Maritime Institutions (in the UK) – among many others – have adopted this new certification standard and are reaping the rewards of its capabilities.

Navozyme is also firmly committed to training the sector's professionals and offers several programmes on Blockchain technology in association with the Nautical Institute (UK) and Singapore Management University (Singapore).

[Q⁰²] Your tools are rooted – among other things – in real-time data exchange in various port processes and among several maritime players. As a scale-up that has won awards in distinguished innovation competitions, could you explain exactly what your differentiated value proposition consists of?

[A⁰²] Navozyme's DVP goes beyond technological innovation itself: technology that endeavours to assure data integrity and reliability from source, and which we apply to certain maritime processes where there is a notorious regulatory component. There are several DVPs that have helped us to get where we are. To start with, we have a multi-disciplinary team with a command of the main areas of know-how that our products and services span: maritime transport, port logistics and deep-tech itself. They know first-hand where the sector's challenges lie. Furthermore, we can rely on the networking effect that has been built up thanks to public and private organisations that have worked together with and backed Navozyme's initiatives both nationally and internationally. These circumstances have enabled prominent Spanish Port Authorities to encourage the integration of our systems into theirs, which offers a significant competitive edge for our customers.

Finally, there is the fact that our products have evolved in a modular way: i.e., any customer can start by using one single product; but, when they use several products simultaneously, the tools self-integrate and provide even greater benefits. This is why Navozyme is always ready to do everything in our hands to work together with each and every customer – or interested party – to guarantee the maximum benefits from our tools.

[Q⁰³] You addressed the mission to accelerate the digital transformation process and decarbonise the maritime industry. From experience, how would you assess the steps that the sector is taking in that respect? What challenges and obstacles currently lie along that path?

[A⁰³] In the last half-decade, it is clear that there has been a lot of progress, despite the fact that it is hardly a secret that the maritime industry moves forward at a very slow pace. I think that – in general, and as far as changes in the maritime sector are concerned – the intentions are good, but implementation isn't. One well-known example in this sense could be the Emissions Trade System (ETS) as promoted by the EU.

Even if the final goal were coherent and desirable, its very implementation could give results that are nowhere near the original proposal.

Because of that, one of the challenges that the maritime industry faces is that we should come up with transformations and solutions that allow us to continue to be competitive. If all these changes glean a lower level of competitiveness, we will obviously be much less keen to implement them. In the given example, Navozyme would be able to help players measure or determine their carbon footprints through technology.

[Q⁰⁴] The port-maritime sector – fortunately, less so today – is marked by a tendency to be wary of sharing their data and process information. What would you say to those who are reluctant? What are the possible benefits to those who do share, as opposed to those who don't?

[A⁰⁴] It is true that the various maritime industry players in general are very protective of their data and processes. This is why the Navozyme business model does not hinge on retrieving, storing, transforming and selling their data to others. Navozyme's aim is to connect all the interested parties up to their final users.

The mere idea of trying to convince people and organisations to change poses a great challenge, but – when doubts arise from privacy and data protection worries – we can harness technology to lessen them.

It is also important to bear in mind how data-processing implementation works. As you know, one of the main technologies that feature in Navozyme's tools is blockchain; and, in this case – and related to our DVP – we do not store data in blockchains. We only store the digital footprint of the data, which allows us to check their authenticity and integrity without exposing them from source.

Organisations who we work with discover that – on implementing our solutions instead of sharing data from source – they find significant improvements in speed, process optimisation, human error and process

check reductions, a reduction in the carbon footprint, and so on.

[Q⁰⁵] Focusing on concepts such as PortCDM (Port Collaborative Decision-Making), what type of data do you think is essential to improving operational coordination and optimisation? How do aspects like data availability, data quality or the data-sharing moment influence this?

[A⁰⁵] From our point of view and in our professional experience, we think that information related to operational planning – be it at a port terminal or scheduling done by a ship-service provider (bunkering, for instance) – is key to coordinating and optimising operations, especially if we put ourselves in the shoes of the main port customers – ships and cargoes. If a ship knows exactly when it is going to be catered for at the port, this can have implications in terms of huge cost and gas emission savings, both en-route to and in the vicinity of the port.

It is in this very light that our NBunker product comes into play, providing great value and making a huge contribution to the sector by providing recommendations and instructions about which bunker barges should attend which ship in which specific time window, and by taking scheduling into consideration for all the players involved. All of these processes can be refined to adjust the real operation as data comes in from the various information sources.

[Q⁰⁶] What are the next steps we can expect to this effect?

[A⁰⁶] Of course, once the sector's multiple users and players understand how these new technologies can help them make their operations quicker, safer and more efficient (via blockchain), we really think that they will be more predisposed to make their data available on Collaboration Platforms. At the same time, this gives technologies such as AI a greater role, as more available data and higher-density digitalisation come to the fore. This will then help to provide improved pattern recognition, better learning and – simultaneously –

higher value for the platform itself: a real "vicious circle". It is important to point out that, recently, we have started building bridges to link these players up. Although we currently can't anticipate it, we know that it will eventually create added-value opportunities.

As an example, we could look back to the Internet of the 80s and 90s and what it is capable of today: nobody could have predicted it.

[A⁰⁷] The sector is steeped in an environmental revolution, desperately reaching for highly-ambitious decarbonisation goals. Nevertheless, there are multiple fleets of ships with a long service-life ahead of them that are currently powered by fossil fuels. Retrofitting them is going to require a huge investment. Would it be possible to use these platforms to encourage this transition in some way? What impact could they have in terms of environmental efficiency?

[A⁰⁷] It is true that the hardware – ships – will take a long time to be replaced, but that doesn't mean that we can't make changes. By using our software tools, we can achieve instant gains regards our environmental impact. Think about NBunker – our bunker operation optimisation tool – for a second. The use of this tool will allow for better planning and should be able to optimise the service: less manoeuvring will be necessary, and – similarly – carrying an exact number of bunkers to several ships means less fuel will actually be consumed by the barges themselves per operation. Its impact could be even greater by reducing ships' down-time and the fuel they use up while idling. This is the advantage of digital tools: they can be implemented immediately and have an immediate effect on reducing the carbon footprint, with no need for adding more ships to the fleet or retrofitting the older ones.

[Q⁰⁸] APBA in particular has been working with Navozyme for some time and has recently developed a so-called J-i-T Bunkering Operation PoC. How would you evaluate this type of public-private partnership?



[A⁰⁸] Navozyme – and I personally – would like to thank APBA for all its support, both inside and outside of the Puertos 4.0 scheme.

We firmly believe in this type of public-private partnerships, because each party brings something to the table that the other party needs, but doesn't have. From the private side, we can see the human resources (the time and know-how required to undertake this type of project) and the desire to help with rapid decision-making. The public side – on its behalf – provides data and information that is conceived as an essential raw material – key for projects like ours – and an interconnected ecosystem that functions as a whole.

It is important to point out that we can see that both parties back-feed between themselves: the aftermath of such partnerships can only mean positive gains for all the ecosystem, at the same time as it raises standards and reputations. The most important thing of all is that, if these types of partnerships are to be a success, the leaders involved need the right mentality. It is fundamental that leadership exists looking forwards. Without this, these projects never lift off.

[Q⁰⁹] In your opinion, are ports ready to incorporate this type of Just-in-Time solutions into their operational management system, or do they simply not have the digital and technological maturity?

[A⁰⁹] Unfortunately, the majority of ports are still not on the right footing. This is generally down to two reasons: firstly, a lack of resources – maybe there isn't an innovation division, or there isn't anyone with enough power to take the decisions needed to lead the adoption of this type of tools; and, secondly, a lack of awareness about what Blockchain technology or artificial intelligence can bring to the table. We need to underline that this may not be their fault: ports and their ecosystems are, by their very nature, more focused on operations. This means that there is less – if not precious little – time to focus on innovation.

However, ports that do in fact do this can position themselves in a place where they can get a competitive edge, both for themselves and all their ecosystems.

[Q¹⁰] Changing tack a little – from your profile as an enterprising business, you have taken part in several open-innovation initiatives, start-up partnership schemes, and innovative project funding. What role do you think that this type of initiative has in helping ports to adopt new digital solutions?

[A¹⁰] We regard these schemes and initiatives as crucial. As I mentioned before, ports don't have much time to dedicate to innovation, as the lion's share of their attention is focused on operations. As a consequence, even ports with forward vision in terms of innovation don't want to waste time looking for trial-and-error type innovation projects. Such initiatives act as a filter, a selection of the most promising projects that will have the greatest impact. This allows ports to minimise the risk of using resources – time and money – that they have earmarked for innovation.

[Q¹¹] And – on the other hand – do you think that they are reaping the rewards that they should be? Is there a chance to improve them?

[A¹¹] Of course, especially in Spain. We can confirm that the Ports 4.0 scheme has been – and continues to be – a great success.

Nevertheless, there is always room for improvement – nothing is perfect. As an example, many of these initiatives may pose challenges for start-ups when fighting against the waves of red tape that this implies: not just in the application process, but also throughout the development and subsequent justification stages. There should also be more flexibility, once you have been chosen as a company. It is tremendously difficult to carry out something that you presented two years ago, because technology changes and evolves continually and, therefore, your product should as well.

[Q¹²] In the current scenario of unstoppable, exponential technological evolution, the global lack of talent crops up as one of the great hurdles to overcome. From your experience as a port-maritime scale-up, does the search for digital talent cause you a headache? What profile or skills does a company like yours demand?

[A¹²] The majority of existing maritime institutions specifically employ traditional roles. New jobs in companies like ours have a need for well-rounded training: job-seekers should have a good knowledge of the maritime industry, advanced technology, business, and so on.

In fact, this all means that we are actually looking at a lack of talent, since very few profiles are able to combine all these aspects at the same time.

We should also take into account the fact that, although huge opportunities can be found, the maritime industry is not seen as a "sexy" sector, which prevents high-quality candidates being attracted to it.

[Q¹³] To start to wind things up as an entrepreneur and businessman – what is the most important lesson you have learnt in your career? What advice would you give to someone who is thinking about launching his or her own business onto the port-logistics marketplace?

[A¹³] As far as I can see, I think there are two great lessons to be learned that I would like to share:

1) There are lots of opportunities to be had, given that this sector has recently entered into the beginning of a digital transformation phase. Having said that, it is a tremendously complex sector, where credibility is given great prominence. Therefore, I would recommend everyone take their time to get to understand the industry and its problems. Once these opportunities are identified and addressed, the likelihood for success will significantly increase.

2) Don't compare the maritime industry with other sectors: maritime time cycles are much longer than for the technology or food sectors, to name a couple of examples. Be patient.

[Q¹⁴] Finally, what is looming over the Navozyme horizon for the future? Where do you see yourselves in three or five years' time?

[A¹⁴] Firstly, we want to consolidate our position in the Iberian Peninsula, where the Spanish port sector is key for us, to promote data exchange and introduce high-tech solutions into the maritime industry. As part of our mission, we also want to become the benchmark for maritime ecosystems, in terms of decarbonisation and digital transformation.

Secondly, we want to employ Spain as a launch pad for the rest of the world so we can work on a global level and have a presence in the main ports of the world: to be where the great shipping lines and shipowners are, and for them to harness our tools. After all, despite our direct customers being port community companies, the main beneficiary is the ship: our tools should be on board, sailing the seas with them on their voyages from port to port, and creating a synergy and network effect.



María del Mar Cerbán,

University of Cadiz Director of the Inter-University Master's Degree in Intermodality and Port Management & Planning Course; and Director of the International University of Andalusia, University of Seville and University of Cadiz Official Master's Degree in Logistics & Operational Management Course.

María del Mar Cerbán Jiménez has a Bachelor's Degree in Economic Science & Business from the University of Seville and a Doctorate from the University of Cadiz (UCA). She is a Department of General Economics Professor specialising in the field of Applied Economics at UCA and – from 2019 to June 2023 – held the Deputy Rector's Chair at UCA's Bay of Algeciras Campus. She is currently UCA's Director of the Inter-University Master's Degree in Intermodality and Port Management & Planning Course; and Director of the International University of Andalusia, US and UCA's Official Master's Degree in Logistics & Operational Management Course.

Throughout her career, she has taken part in more than sixty events in matters of national and international teaching; and has participated in organising congresses, seminars and professional training courses. She also has great experience in the field of research, focusing her lines of work on logistics and the port-maritime sectors, and has published more than fifty articles in benchmark magazines. She has been the Principal Investigator or Co-Investigator in several competitive national and international research projects, and in more than twenty MTAs (Material Transfer Agreements).

Additionally, she has been involved in more than forty national and international presentations and communications, and has co-directed several doctoral theses.

■ **Regional talent and its future in the port-logistics sector.**

[Q⁰¹] Firstly, we'd like to get to know a bit more about María del Mar Cerbán. Could you give us a brief summary of your career up to now? Would you share some of the highlights or experiences that you consider key moments that have been fundamental to your career up to now?

[A⁰¹] I think that the team of UCA professors I've been working together with on post-graduate education in port and port-logistics management since the mid-nineties has been key to my career. Together, we started up UCA's Official Master's Degree in Port & Logistics Management in 1999, which was a pioneering course at that time. As of today, it has run continuously for over twenty-five years, training not only Spanish students, but students from all over the world.

This Master's Degree has had an ongoing journey and goals that would have been impossible to achieve without the partnership of the Bay of Algeciras and Cadiz Port Authorities, who – from the very outset – laid the foundation stones to implement and consolidate the qualification.

From this Official Master's Degree, we began to widen our educational prospectus. Another key moment was the creation of the Inter-University Master's Degree in Intermodality and Port Management & Planning Course, run by the Universities of Cadiz, Corunna, Oviedo and the Polytechnic of Madrid, and sponsored by the State Ports Department, fifteen years ago. The profile for the Degree is mainly a port-logistics sector professional with certain experience. The highlight of its track record is that several Port Managers and Departmental Heads from Spanish Port Authorities, the State Ports Department and other public and private institutions from all over the world have been our students.

[Q⁰²] Touching on the subject of education, in a scenario of such dynamic technological and economic turmoil, each sector faces its own challenges – and education isn't an exception. In your opinion, what are the greatest challenges faced by the sector today? How is UCA trying to tackle these challenges, specifically in terms

of maintaining the quality and relevance of its education in an evolving labour market?

[A⁰²] I think the main challenge we face is how fast the landscape is changing, mainly in aspects related to digitalisation, decarbonisation and the use of alternative energies, both in maritime and land transport.

The way that UCA is adapting to this changing landscape is fundamentally by teacher innovation; innovation in research as applied to the sector; and by being on the side of reality, getting to know the needs of the business environment and the labour market at first hand.

[Q⁰³] Focusing on the port-logistics sector, the University has been a benchmark in the field of port know-how for more than twenty years, ever since the development of a Master's Degree Course in Port & Logistics Management and in Port & Maritime Transport, and today with more recent post-graduate courses such as the Expert in Digital Transformation Applied to Port Logistics Course. Could you tell us more about your course prospectus?

[A⁰³] Apart from the two post-graduate qualifications that you've mentioned, UCA also runs the Official Double Master's Degree in Logistics & Operational Management Course, together with the University of Seville and the International University of Andalusia. This is the first ever official double qualification in the sector, and a groundbreaking project on a national level. We also – as I have mentioned before – run the Inter-University Master's Degree in Intermodality and Port Management & Planning Course, together with the Universities of Cadiz, Corunna, Oviedo and the Polytechnic of Madrid, which is sponsored by the State Ports Department.

[Q⁰⁴] In your opinion, how do you see the role played by UCA in developing educational fields such as logistics or maritime transport – not only the Campo de Gibraltar region, but in the

port scenario in Southern Spain? What has been achieved until now?

[R⁰⁴] I think UCA has had – and still has – a fundamental role in port sector, port-logistics and maritime transport education. Our success lies not only in the creation of the post-graduate qualifications that we have discussed during the interview, but also in the continuance and consolidation of these qualifications throughout their twenty-five year history.

[Q⁰⁵] There are many who believe that the port-logistics sector is a great unknown for the public at large. Based on what you have said, how do you evaluate the efforts of educational institutions like UCA who are trying to buck this trend in order to attract and hold on to the talent required by the sector, especially in our region? Is there room for improvement?

[A⁰⁵] Although it's true the port-logistics sector may be a great unknown for the general public, I think that in the case of our province – Cadiz – and, more specifically, in the Bay of Algeciras area, this idea has been turned around. I think today's society recognises the tremendous potential that the port-maritime and logistics sectors pose.

[Q⁰⁶] We know that the alignment of the educational supply to market needs is crucial. In this light, UCA – in its constant transformation – is proposing alliances with institutions, companies, industries and the associated fabric of our region. Firstly, could you share some examples of how the University has worked hand-in-hand with port-Logistics sector companies and organisations to promote the development of human resources? What common goals and benefits are you looking for with these dual training partnerships?

[A⁰⁶] With regard to partnerships that have a bent towards developing human resources, firstly I'd like to highlight the Master's Degree in Logistics and

Operational Management. This is an inter-university, Double Master's Degree that we run jointly with the International University of Andalusia, the University of Seville and the University of Cadiz. It is groundbreaking, due to the fact that there are only two Double Master's Degrees of similar profiles in Andalusia. It's now in its third year and has three academic pathways: intermodality, storage and rail-port terminals. Its main distinguishing feature is that part of the academic training is carried out directly in a company, but not as work experience per se: we develop a specific educational pathway that allows the student to pivot around the major subject matters, thus enabling the student to learn and develop him- or herself within the company.

Results have been exceptional: placement is limited and under great demand, because our aim is to provide extremely specialised education that is steered at all times both by the University and the company involved. We've also started up several interesting initiatives in the field of research: for example, transference contracts known generally as MTAs – partnerships that are carried out between university research groups and public or private companies.

In this light, we provide industrial chairs and educational scholarships that help students carry out their research to cover the real needs of these organisations, and – what's even better – the students end up with a UCA Doctorate.

Finally, I'd like to mention the Chairs that we have here at the Bay of Algeciras Campus, for instance at Cepsa, Acerinox, Telefonica, and the most recent one at Arcgisa; these are different from previous chairs in that they encompass various lines of joint work among the companies themselves, whether in the field of education, research or both at the same time. Likewise, we also have a chair at Navantia in the Cadiz Campus.

[Q⁰⁷] Incidentally, UCA and The Algeciras Bay Port Authority (APBA) is working together to deploy specialised academic training

programmes, as is the case of the new Expert in Digital Transformation Applied to Port Logistics Course. Could you share your vision of this new initiative and the impact that you hope to get? What do you think of having a partner like APBA in the management of the maritime industry's digital talent?

[A⁰⁷] This initiative – I think it's the perfect example of a partnership – came out of the joint work, and the series of meetings we have held with the Port Authority. We saw the need to go further. Our ongoing Master's Degree courses had offered a much more generic type of education in logistics and port management at the time, and – faced with the paradigm shift caused by digital transformation – we thought that the process needed to be coupled to human resources who possess specific skills and knowledge in certain digital tools and innovative methodology that can adapt to the needs of the sector, especially here at our Port. This is why we – the Deputy Rectorate, APBA and the Intelligent System Modelling Research Group – started the ball rolling in giving the Expert in Digital Transformation Applied to Port Logistics project a shape, and started planning its curriculum.

The current success and relevance of the initiative is because it's helping to solve a real need in the sector: meeting the highly-specialised job requirements of the sector as it continues to evolve and transform. In this light, there are other examples, such as the University Master's Degree in Renewable Energy & Energy Efficiency; and others that we are working on, like the future Master's Degree focused on the Green Hydrogen area. You can't achieve this unless you have a direct and continuous relationship with companies and institutions within the sector.

[Q⁰⁸] Along similar lines of partnership in the innovation field, UCA and APBA – together with the Andalusian Government and Algeciras Council – have driven forward the development of the Maritime Lagoon project, where UCA has recently opened its new UCA-SEA Innovation

Centre. In your opinion, what does this project bring to the city and the surrounding area's productive system? What are UCA's main aims in building this new infrastructure?

[R⁰⁹] When I was the Deputy Rector of the Bay of Algeciras Campus in 2019, among our priority goals was to improve our visibility, and raise the general public's awareness of the University of Cadiz at its Bay of Algeciras Campus. This challenge – together with the belief that we should tie our port-logistics innovation activities to the new Innovation Centre that APBA was going to build – led us to suggest this notion to the Port Authority and Algeciras Council. We were convinced that there were lots of synergies that we could create between all the players involved, and that there were a multitude of benefits that an initiative of this kind could bring to the city.

The idea was then taken to the Andalusian Government, who – on analysing the proposal – gave us the funding that was key to taking on the project. In this sense, I'd like to express my gratitude to Algeciras Council, APBA, and – of course – the Andalusian Government; without the help and interest of all of the parties, it wouldn't have been possible to bring this project to light, and we would have missed a great opportunity to develop the Algeciras area.

Additionally, if I had to underline one of the key aspects of this initiative, it would be the idea of bringing our University and Port closer to the city; that Algeciras be seen as a university and port city where all the good values that we have – what Algeciras really is – are showcased, and not tainted by the press or by other kinds of news stories, as is often the case.

[P⁰⁹] In this digital era, innovation and entrepreneurship seem to have emerged as keystones for sustainable growth and the transformation of any economic sector, including port-logistics. New technologies and business models can play an essential role in improving efficiency, competitiveness and

sustainability. We'd like to know how you at UCA encourage these values of innovation and entrepreneurship among your students. Are there specific programmes, workshops or projects that seek to instil your students with this mentality and skillset?

[R⁰⁹] The entrepreneurship theme is key for us: one of the Deputy Rector's Chairs we have is called Entrepreneurship and Employability. Moreover, we have an entrepreneurs scholarship within the University itself. As you can see, we're continually performing educational and research activities that are linked to entrepreneurship: i.e., not only organising courses, workshops and promoting co-working spaces, but also – from a research perspective – we're working jointly with other universities. For instance, we're analysing the exact stage that we're at in entrepreneurial matters in comparison with other countries, together with institutions from Switzerland and Morocco, in order to learn where we are and set down the lines of work to come.

In the same field, we're working together with the Campo de Gibraltar Chamber of Commerce so that our students can use their facilities and establish synergies with the business world, under a framework scheme set up together with La Llave Co-Working Digital Space.

Finally, I'd like to point out that – within the range of qualifications, like our Master's Degree in Logistics & Port Management Course, or our Master's Degree in Intermodality and Port Planning with the State Ports Department – we've also included subjects where students can study entrepreneurship and leadership.

[P¹⁰] Talking of the future, and bearing in mind that the long-term vision is crucial for prolonged success, what – in your opinion – should be the strategic aims of the alliance between UCA, regional talent and the port-logistics sector? What are the crucial steps to be able to meet this end-goal?



[R¹⁰] In my opinion, the end-goal of all this work we're doing together is to create a fabric between the University and public and private organisations who are involved in the Bay of Algeciras's economic activities; and that this enables us to be ready to meet the vocational training and research needs of the sector. One aspect that we've identified, through our competitiveness questionnaires, is that companies place more value on tradition and organisational capacities when they're deciding whether to relocate to the area. That's something that you can't achieve from one day to the next: it's not static; you have to build it up over years and – what's more – you have to keep up with the changes in the environment. The end-goal is that we should have all the trained-up human resources we need here, so that we can meet all the current or future needs, both from an educational and research point of view.

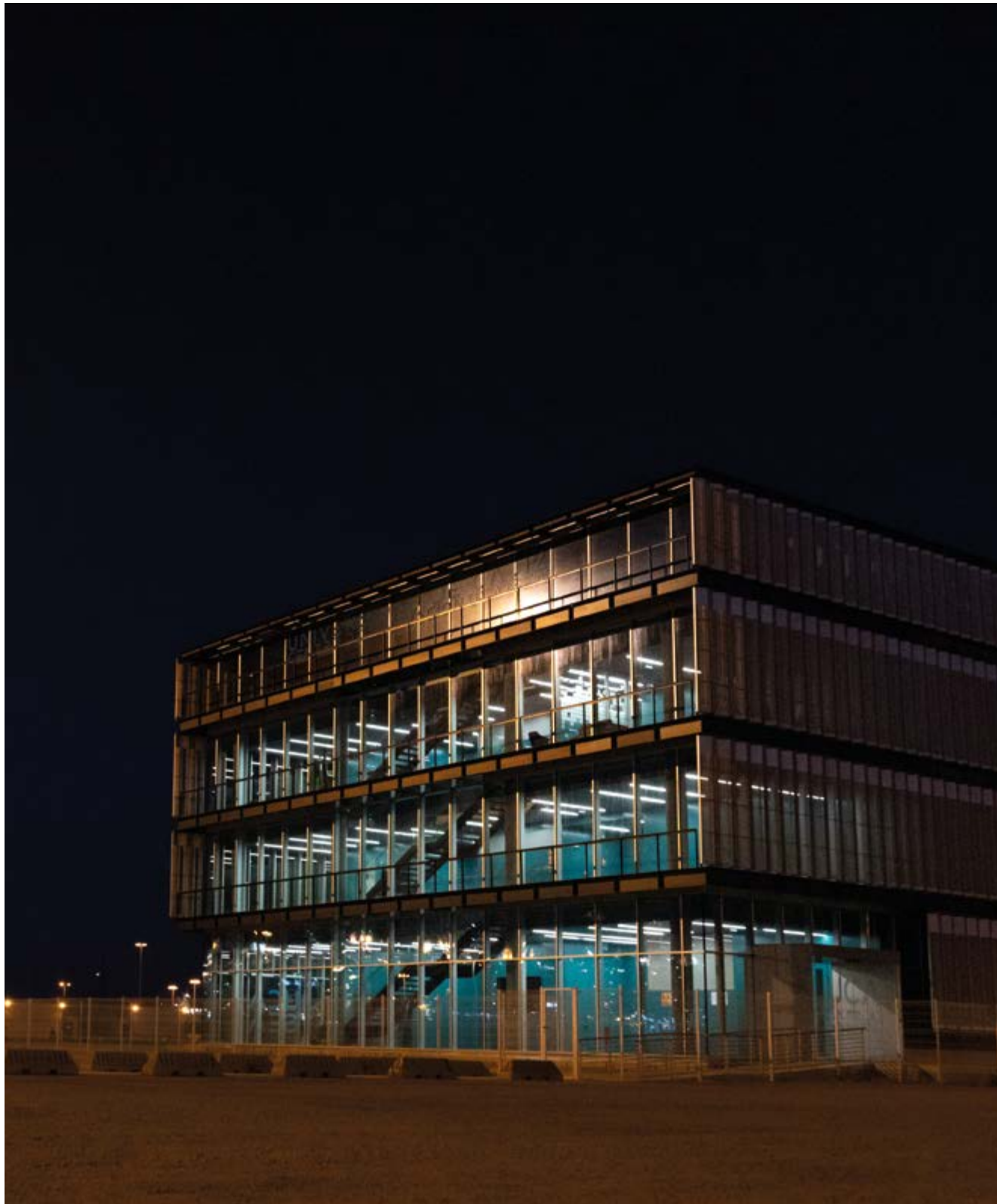
In this light, I'd like to mention another instance of how we're trying to adapt and prepare ourselves to be able to cover all the future needs that may crop up, through partnerships. This is an ongoing project – the Joint Master in Port Management & Logistics – an

international, inter-university Master's Degree course, coordinated by UCA and led by a consortium called SEA-EU (the European University of the Seas), with university involvement from France, Germany, Poland, Croatia, Portugal, Italy, Malta and Norway.

[P¹¹] To finish up, we'd like you to share a message with all of the students and young professionals who are thinking of – or are already beginning – a career in the port-logistics sector. What words of advice or motivation would you give them?

[R¹¹] First of all, I'd tell them that port-logistics, which is somewhat of a great unknown sector, is also one that has great employability for a wide range of university degrees, be that from an engineering, nautical, economic, legal or mathematical point of view.

This has been the story for the last twenty years I've been working in the sector, but now it's going beyond that. It may be true that it's an unknown sector, although it's really a great opportunity to develop your career in favourable conditions. Combined with the fact that it isn't an emerging sector that might disappear overnight



– it has a long track record, it's been consolidated for many years and, right now, it's advancing and growing – makes it a great opportunity.

Nevertheless, there is one thing that I think is fundamental, and that is the command of foreign

languages. In my view, it's important to have a high level of language skills to be able to get into the sector.

At a bare minimum, English; but then, also French – because of our geographical location – are valuable, just as other languages such as German or Chinese are.



04

Figures & Milestones



GENERATION AND SELECTION OF IDEAS

Ideas received External proposals Selected for phase 2

62 92% 12

Move to the Project Portfolio Ideas accumulated since 2017

8 (13%) 349

R+D+i PROJECTS

Projects started

06

Completed projects

02

INNOVATION PORTAL

Registered users to the portal

507

Newsletter subscribers

619

+28,000

New users

+139,000

Visits

SOCIAL IMPACT

Participation in events and conferences

19



Assistants

+1,900

Perception of APBA as an innovative company



7,333

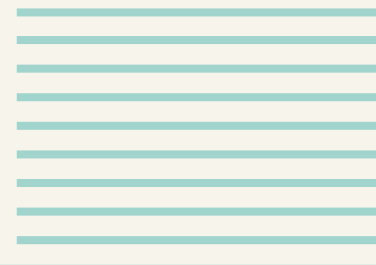
Press appearances

43



Cumulative themes

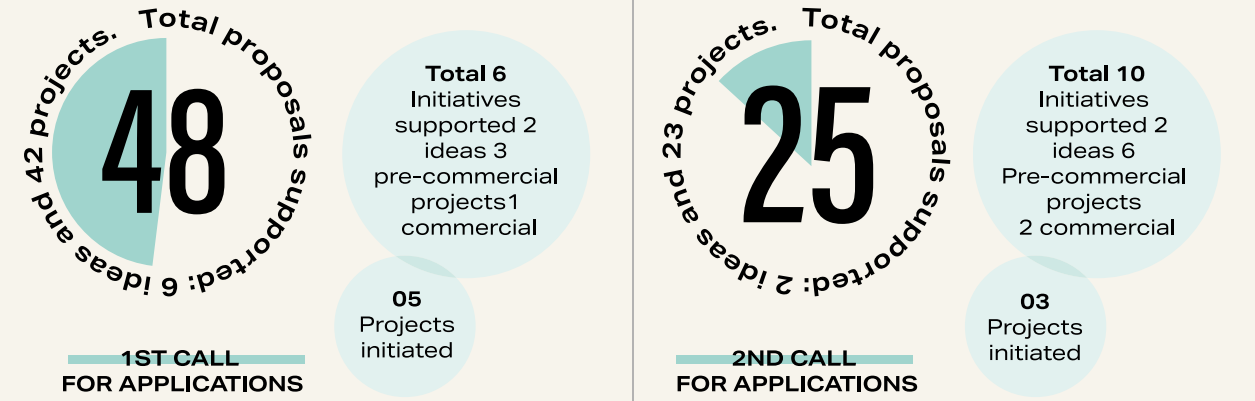
+155



INNOVATORS RANKING

1	Ignacio Serra	13
2	Daniel Andrades	12
3	Francisco de los Santos	10
	Paco Saucedo	05
	Jesús Medina	05
	Jesús Matute	05
	Maria Román	05
	Carlos Albert Sánchez	05
	Francisco Pardo	04
	Javier Warleta	04
	Enrique Martín	04
	Meritxell Souto	04
	Daniel Hernández	04
	Jorge Lopera	03
	Carlos Rodríguez	03

OPEN INNOVATION - PORTS 4.0



11 Refresher and training sessions in areas such as Generative AI, Advanced Data Analytics or Software Development.

04 We are launching the 4th edition of the 'Innovation Journey' Ideas Competition.

02 We are launching the 2nd edition of the work experience programme for secondary school students with 5 collaborating companies.

INNOVATION CULTURE

We continue with the programme of innovation workshops focusing on agile methodologies such as Agile Leadership.

We set up the Innovation Committee of the Port of Algeciras.

We collaborated in the organisation of the 1st edition of the University Expert in Digital Transformation applied to Port Logistics.

We exceeded 45 editions of our quarterly newsletter.

We have reached the 18th edition of the quarterly Technology Watch newsletter.



05

RD&i
Projects

■ Simulation of the OPE Process Project.

The operational management of Operation Cross-the-Straits poses a huge challenge for The Algeciras Bay Port Authority every year. The exact flow of passengers and vehicles arriving at the port is never very clear, and we can add to this the fact that the pre-established timetabling of ship rosters logically changes from time to time.

It is due to all the above that it becomes **very complicated to predict the degree of occupancy of road-traffic handling areas** with sufficient notice, in processing the arrival of vehicles and their subsequent transit through the port.

With this panorama in mind, the **aim of this pilot scheme** was to simulate port operations during the Operation to identify conflicts and bottlenecks. For

land-based operations, we used the FlexTerm tool – a well-known and much-used tool in the field of port process simulations – whereas for maritime operations we used in-house developed, AI tools and algorithms as designed by NextPort.

The system was able to predict such conflicts in advance and propose alternative solutions automatically, providing us with a prescriptive capability. Likewise, it showed users key performance metrics and indicators on a control panel via data analysis.

• Application for Berth Management:

This app helped with: the coordination of ferry calls; providing accurate, reliable information based on a combination of multiple data sources; historical behaviour patterns; delays; and incidences in previous ferry rosters. The app was given an AI level with predictive, machine-learning algorithmic functionalities





to generate Estimated Time of Arrival (ETA) forecasts and analyse any future overlapping clashes or delays in ferry calls to port, based on these estimations. It also recommended optimised rescheduling solutions. Once a conflict had been identified, it was indicated on the berthing schedule screen through user-friendly dialogue windows. Users could then choose one of the suggested solution options.

• Simulator:

On choosing a solution it then lets us assess the impact of the chosen option on road traffic handling areas with a simulated model, and then allows the anticipated decision-making process to be locked in via a predictive feedback loop.

The simulator takes in the forecast vehicle arrival data from ticket sales and manually filters through the number of handling areas open or closed, and their maximum level of occupancy. As a result of this simulation, we can gain an insight into the forecast occupancy level of the different handling areas and distribute waiting times for vehicles through the port. We can also anticipate events by re-sizing the number of areas to employ – thus increasing vehicle arrival and departure levels – or by modifying interior routing through the port.

• Data Analysis Control Panel:

Last but not least, the tool has been fitted out with demand-generation metrics and machine learning to complement its knowledge generation strategy: both at the level of the simulator, and – in general – from all the individual data sources and their combination, in order to analyse exactly where any ferry delays are and find out the root of the problem

The conclusions we came to reflect that the prototype software gleaned from a **Cross-the-Strait Process Digital Twin** is tremendously useful in managing ferry and RoPax ship calls more efficiently in terms of deciding berths, optimum berthing dates and times (in case of clashes), and in taking the impact of such decisions on land-based operations into account.



■ AMURA-ZIDAY: Intelligent tool for advanced hydrocarbon and sewage spill detection.

According to UNEP (United Nations Environment Programme), **the immense majority of the 2.1 tonnes of oil spilled into the seas every year goes undetected.** This lack of global awareness is mainly due to **limitations in the technology** that has been deployed to study surface waters up to now, unable as it is to detect oil spills with sufficient accuracy and reliability. The fact takes on a special interest in ports areas: maritime traffic is highly clustered; oil terminals and hydrocarbon transfer facilities operate within ports; and ships are more likely to take on bunkers there. It seems necessary that ports should have suitable means to set off an early warning of such incidents and be able to mitigate their impact on society, the environment and the economy.

This is the reason that APBA has decided to invest in the **Ziday pilot scheme** to develop a **smart tool** that can: provide early hydrocarbon spill detection on the water surface; recognise the characteristics of the spill; and investigate any ships that could be guilty of causing the spill. The tool can also **detect the dumping of bilge** in the port environment.

The project has already been awarded and is currently being carried out by **Híades**, a Spanish technological consultant specialising in innovative digital tools for the port-maritime sector, and **Orbital EOS**, a Spanish start-up founded by Maritime Safety & Salvage experts who have proven experience in designing tech tools based on satellite data analysis and remote sensing stations.



It is also interesting to note that the initiative was the winner of the **III Voyage of Innovation Idea Competition** in the "Best External Innovative Idea" category.



Funding for the pilot scheme was procured by APBA, again demonstrating

the port authority's commitment to channelling initiatives through an open innovation model. This model is the means to how the port-logistics sector can benefit from any innovation project that has a high impact on business.

The scope of the pilot scheme involves **validating the use of a digital management and support tool to take decisions, and control and monitor the marine environment** via observation of the water surface by means of satellite imagery. Its aim is to identify any stain that could be related to a petroleum product or sewage spill in Port of Algeciras waters. Machine learning

image-processing will allow us to identify a spill and classify it, in the case of hydrocarbons. In combination, Automatic Identification System data integration will be able to offer us details of any given ship's geographical location, whereby we can clarify the possible causes of the maritime spill through analysis of the vessel's routing and manoeuvres.



Furthermore, the platform is to contain automatic notification and reporting functionalities, so that a rapid response can be put in place to expedite control and protection measures for the environment.

This is how we hope to gain **improvements in monitoring and control management** of Port of Algeciras waters. The **digital tool** should not only help pre-empt the incidence of pollution, but should also detect fainter traces that go unnoticed with current methods. All of this goes towards an ultimate aim: to **improve the quality and conservation of the ocean floor in Port of Algeciras waters; reduce the environmental impact** that future spills may have; and provide an early warning of their causes.

■ Underwater noise pollution monitoring & cetacean tracking system.

Ports are crucial partners in developing and growing a blue economy – essentially the physical interface between the industrial sector and the sectors related to oceans, seas and coasts. Ports are the confluence between sectors lying on the marine environment (maritime transport, fishing, power generation) and those based on land (ports, shipyards, land-based aquaculture, seaweed production, coastal tourism).



The Algeciras Bay Port Authority is well aware of the multitude of issues faced by the marine environment and, especially, of those related to the loss of biodiversity, the appearance of invasive species on our coastlines, and the environment's decline in both port waters and in the Bay. This is how the **"Preserving the Marine Ecosystem and Biodiversity, Guaranteeing its Compatibility with Port of Algeciras Bay Activity"** challenge came to light: to **identify and implement innovative solutions** aimed at the conservation and protection of biodiversity; the upkeep of the water quality in the Bay and the Port; and the offset of human activity that creates a net effect, among other objectives .

"Preserving the Marine Ecosystem and Biodiversity, Guaranteeing its Compatibility with Port of Algeciras Bay Activity"

At the same time, the Spanish Ministry for the Environment (a junior ministry of the Department for Ecological Transition, which is responsible for the protection of the natural world and of biodiversity, for the conservation and sustainable use of natural resources, and natural habitat and ecosystems in land and marine environments) set out a series of requirements that ports had to comply with in order to achieve these goals – especially when carrying out port infrastructure works, which need **environmental and whale population monitoring plans** to be drafted: one for the ongoing execution of said works and another upon completion.

In the light of this situation, and given the volume of proposals and initiatives we received to tackle the challenge, APBA decided to invest in the **"Underwater Noise Pollution Monitoring & Whale Tracking"** pilot scheme. The project proposes the adoption of a **digital platform** that – on the one hand – allows us to monitor the underwater noise generated by port activities systematically (including the noises of ships, maintenance work and facility expansion works), and – on the other hand – monitor the impact that this noise

has on the area's marine life, both during the execution of works and following their commissioning. The project is to be developed by **Sinay**, a French start-up specialising in the design of AI digital tools that analyse, monitor and predict complex arrays of maritime data in the fields of sustainability and maritime transport.

The scope of the pilot scheme involves installing, setting up and initiating the **Sinay HUB** at the Port of Algeciras Bay's facilities and in Strait of Gibraltar waters, which will provide: (1) continuous monitoring and assessment of the noise pollution generated by ships and works carried out on port premises; (2) continuous tracking of marine mammal populations in the Bay and Strait areas by incorporating existing Ocean Biodiversity Information System (OBIS) observation and platform data, and the use of habitat modelling; and (3) mapping of acoustic hazard areas with indicators and metrics to indicate how port activity impacts marine biodiversity.

Furthermore, this tool will create automatically-generated reports with all the data that the appropriate environmental agencies require. The anticipated results from the pilot scheme will then go on to help develop an **active digital underwater noise and whale population monitoring system**, which can monitor and manage events more efficiently. This will generate a deeper understanding of the issues, whereby initiatives and strategies can be implemented to improve the conservation of marine biodiversity in the Bay of Algeciras and thus reduce the impact of port and maritime activity on the marine environment.





Initiatives



■ APBA and UCA launch the Expert in Digital Transformation Applied to port-logistics Course.



The **Algeciras Bay Port Authority (APBA)** and the **University of Cadiz (UCA)** launched the 1st Version of their **Expert in Digital Transformation Applied to port-logistics** course, a university qualification backed and organised by both institutions, last March.

With a total of 375 hours of specialist education, the new qualification is available to twenty-two students and is equivalent to fifteen European Credit Transfer System (ECTS) credits. During the 2022-2023 school year it was provisionally taught at Algeciras College of Engineering from mid-March to mid-June.

The course is part of the **Port of Algeciras Digital Academy** initiative, promoted by APBA to prepare various lines of work to attract, create and hold on to local digital talent. With this in mind, the specific aim of the University Expert Course is to train non-tech university personnel and Port Community professionals in digital subject matter, so that they may redirect their careers towards the tech sector and/or oversee the digital transformation of their companies.

The content of the course is divided into three major subjects: **Port & Logistics Management** (general issues of the sector, port traffic players, cargo throughput, proficiency and competitiveness, port and intermodal infrastructure, and rail management); **Innovation & Digital Transformation of Ports** (port sector digital transformation, innovation, enabling technologies, digital transformation and innovation strategy at the Port of Algeciras, and the digital ecosystem); and **Process Management & Simulation** (project management, Agile Scrum development methodologies, Fusion Teams, introduction to Locode/Nocode/Business Profile Modelling/Robotic Process Automation, and process simulation with BPMs like FlexTerm).

The first course had a total of seventeen students and concluded with great success, as was remarked at the closing ceremony by both institutions that had sponsored it. **Gerardo Landaluce** (APBA Chairman) stressed that "... the Expert in Digital Transformation Applied to port-logistics Course plays a fundamental role in **attracting, creating and holding on to digital talent in the Port of Algeciras area**, as a strategic part of the digital transformation and innovation drive of our logistics hub." **Jesús Verdú** (UCA's Bay of Algeciras Campus Acting Deputy-Rector at the time) underlined the fact that the course is "...yet another example that **strengthens an already consolidated partnership with a top-level strategic ally** such as The Algeciras Bay Port Authority; a benchmark for innovative academic and educational projects that we are both ready to pursue together. It is these projects that are the sector's key asset for our immediate region and wider province's present and future."

Both parties are currently working on the second version of the course, whose permanent venue is to be in the new UCA-SEA Innovation Centre built by the university at the Maritime Lagoon of Algeciras.



■ The european AspBAN project draws to a close showing signs of its potential to accelerate the digital transformation of ports.



In 2021, the **AspBAN (Atlantic Smart Ports Blue Acceleration Network)** project was chosen for European Commission (EC) Maritime & Fishing Fund financing to meet objectives set out under the Atlantic Strategic Committee (ESC) Atlantic 2.0 Action Plan. It had been deemed a **flagship project** by the EC in the development of their "Ports as Gateways and Hubs for the Blue Economy" pillar.

The project – coordinated by the Portuguese innovation consultants Beta-i – focuses on the **development of a dynamic acceleration platform** to help Atlantic ports **promote open innovation blue economy hubs**, and to **sponsor partnerships between start-ups and ports via specific pilot schemes** that should increase the

possibilities of implementing such tools in the port environment. During its two-year period, the initiative involved thirteen partners from Portugal, Spain, France, Ireland, the Netherlands, Norway and the USA – including the Galician company Kaleido Tech, among other renowned names such as Beta-i, PortXL, NOAH, GCE Ocean Technology, Forum Oceano and the Canary Islands Maritime Cluster. Additionally, it also brought together a total of **123 strategic stakeholders**, among which ports, corporations, blue accelerator clusters and trade organisations were present.

The most significant participants in the project included: The Algeciras Bay Port Authority (APBA); the Ports of Lisbon, Bilbao and Gijon; Bilbao PortLab; the Valenciaport Foundation; associations such as AIVP,



Forum Oceano, Bluewater Network, Canada's Ocean Supercluster and the Sustainable Ocean Alliance; and companies like Maeil, BNP Paribas and Faber. The programme had a marked implementing nature, not merely focused on start-up funding and investment, and began by the strategic partners **identifying a total of 147 business challenges** to align with the Atlantic Action Plan's priorities, which are grouped into the six categories, as follows:

Following this, it was time to **scout international start-ups** – both inside and outside the port-logistics sector – who could provide solutions to tackle the business

challenges that had been raised. These solutions should ideally already have a minimum viable product that could be incorporated into a pilot scheme or proof-of-concept test in a real environment, i.e., a certain degree of maturity to achieve one of the project's various strategic aims.

Of the total **180 start-ups** who featured, a **promising forty** of them were then chosen from on-line pitches to make up a boot-camp. At the boot-camp, consortium members and start-ups worked together to co-design **pilot scheme prospects** that could be implemented at **thirty-three Atlantic ports**.

Among the chosen start-ups included companies with tools based on: **digital twins, advanced connectivity hubs** for ships – such as TechBinder, EyeGauge, Captain's Eye, Sealution and Marine Digital; **IoT-based tools** for cargo tracking – such as Nuve and Shellock; and proposals in **AI and video-analytics** – such as Isarsoft, CertiCon and Digital Engineering Solutions.

The project could also rely on the presence of start-ups with great experience in the port-logistics sector, creators of proven products in several ports worldwide, as is the case of: PortXchange, Navozyme, AllRead and Awake.AI. Conversely, there was also a large group of start-ups present whose focus in on **generating clean energy, decarbonising maritime transport and increasing biodiversity** – such as WindCredible, Eco Wave Power, Resen Waves, Clean Ocean Coatings and Reefy.

- Green port and the value of environmental capital.
- Clean and off-shore energy.
- Smartports, digital transformation and infrastructure.
- Traffic, cargo and logistics management.
- Sustainable maritime traffic.
- Waste management, circular economies and new business models.





Throughout the three days of the congress held in Lisbon's Naval Hydrographic Institute from 23rd to 26th January, there was a series of activities that spanned: inspirational sessions; group workshops in the field of Business Canvas Model pilot schemes; exploratory meetings and focus groups with start-ups and investors; spaces for networking; and even workshops based on crowdsourcing ecosystems. The congress was held to focus on the **co-development of potential tool pilot schemes**, working together with a network of experts to **develop partnerships and initiatives in the blue economy sector**, and in contributing to the promotion of **open and collaborative innovation**.

Following the conference, ports and project coordinators who had participated spent the rest of the year's efforts on exploring and defining Proof-of-Concepts (PoCs) and carrying out pilot schemes, until the project's final note at a significant event that took place at the **European Parliament** on 27th June.

The event was organised through the **EC SEARica** (Sea, Rivers Island and Coastal Areas) Intergroup, entitled

"Ports as Hubs of the Blue Economy", co-organised by the AspBAN Project, and backed by the Conference Maritime Peripheral Regions (CMPR).

The conference was the epicentre of the debate on ports' potential roles as sustainable blue economy hubs, and how exactly the European Union should support their green transition, e.g., with benchmark projects such as AspBAN, to set up a dynamic collaborative networks that could catalyse **open innovation** and encourage the **diversification of business models** in the port-maritime sector.

Moreover, the conference placed high value on the milestones achieved during the first two years of the project: particularly on the continuous development of the deployed **innovation acceleration hub**, which should help ports to transform themselves into port cluster creators, along with the launch of up to **twenty innovation pilot** schemes in participating Atlantic ports. Following.



■ The Bay of Algeciras port-logistics ecosystem reinforces its commitment to creating and holding on to digital talent.

At the end of 2022, APBA launched the **Port of Algeciras Digital Academy**, with the ultimate goal of being able to count on a powerful **local digital ecosystem**, i.e., a digital talent "pool" to serve all the Port Community players, including the Port Authority itself. This is just one of the measures to provide much-needed professional training that can help **ensure a competitive edge** for the port-logistics sector – threatened as it is by the lack of digital talent – which has brought with it a heightened degree of digitalisation and technological transformation.

One of the Academy's first steps in 2022 was to set up a line of work directed towards professional educators in the technological field to **attract and hold on to young digital talent** through its existing links with the labour market and the port-logistics sector. The project began with a pilot scheme during the 2022-2023 school year thanks to the priceless backing of **APM Terminals Algeciras, Maersk Line, TTI Algeciras**

and **NextPort**, together with **El Saladillo Secondary School** in Algeciras – the latter providing students from its Senior Multi-Platform Application Development Course (CFGS-DAM). By means of several activities – internships in the above companies, visits to APBA, to the port facilities, to TTI Algeciras and Maersk's South Europe Liner Operation Cluster (SEULOC) – these students had an opportunity to **delve into the world of the port-logistics business**, which can only encourage them to join the labour market.

In face of widespread displays of acceptance from organisations and students participating in the pilot scheme, APBA upped the ante by presenting its second version in November last, **expanding both the number of students, and companies** where the former can supplement their education. The continuation of the initiative, sponsored and coordinated by APBA's Technological Development Area, will be continued in the 2023-2024 school year.



APBA detailed the developments to the project at an encounter held at the Millan Picazo Auditorium. Among the audience present were students, teachers, and companies and organisations that are set to take part in its forthcoming version.

and opportunities available to the students. The organisations that made up the inaugural version of the scheme have been joined by **Kursaal Secondary School** – specifically, students from their Senior Web Application Design Course – along with the companies **APM Terminals Algeciras** and **Sopra Steria**

The gathering also gave educational centres a chance to present their Innovation & Digital Transformation curriculum, and furthermore allowed the companies involved in the scheme to describe their lines of work



APBA training and talent programme



Internship Program

Collaboration with educational centers for attracting and retaining talent, as well as to connect it with the industry.

Student Reskilling

New master's degrees related to innovation and digitalization in the port logistics sector.

Digital Trekking Program

Training program for the upskilling of port employees regarding digital skills.

Tech Training

Specific courses on the most in-demand disruptive technologies (5G, IoT, IA & ML)

Open Campus

Innovative campus focused on fostering citizens' employability in the digital sector.



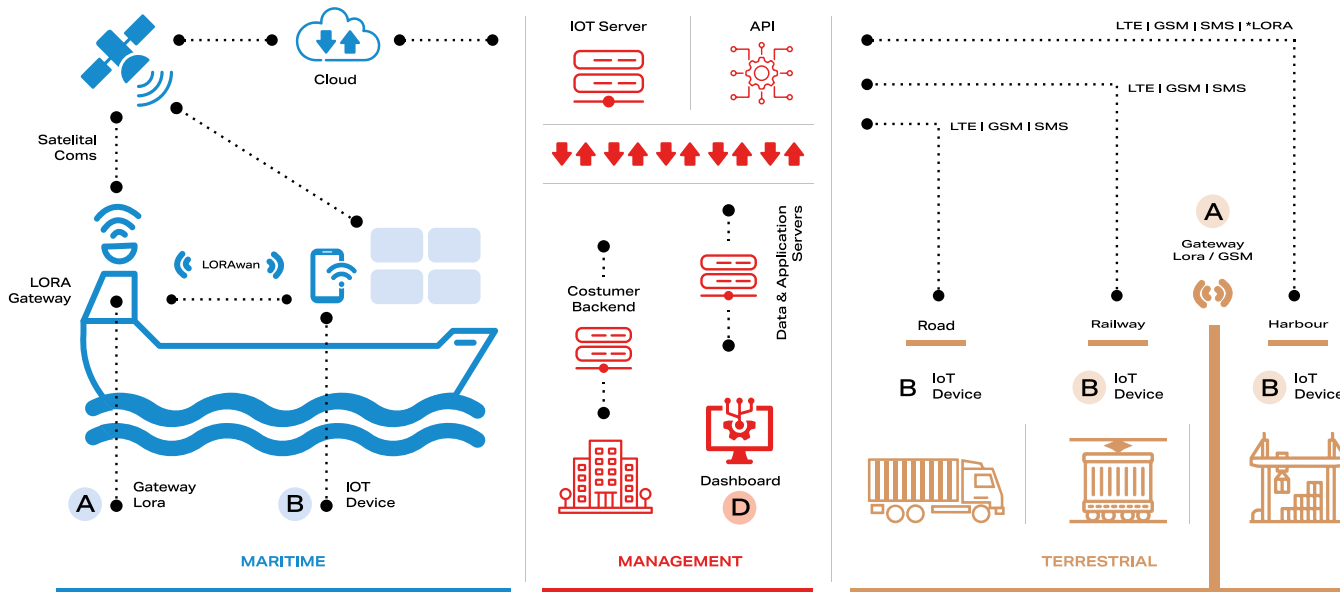


The Port of Algeciras Bay and WISEKey join forces to implement a pioneering digital transformation project.

The Algeciras Bay Port Authority (APBA) signed an agreement with **WISEKey International Holding Ltd.** (WISEKey) – cybersecurity, digital identity and IoT solution experts – for the company to join the recently-established port-logistics Digital Transformation Consortium. This follows the success of the agreement that APBA signed with DP World in Dubai to expand the influence of the WISESmartContainers Consortium initially launched in the Emirates city.



WISESmart Containers has become a **revolutionary tech platform** for the transport and logistics industry, enabling **full tracking of container movements** that in turn helps streamline port logistics. With the recent inclusion of the town of La Linea de la Concepcion, and Cadiz Free Port (ZFC), the Consortium bolstered its ability to involve participants in local and global economies on a glocal template.



This will stimulate a tech **innovation lab atmosphere** that can help new technologies be developed and tested in the Province of Cadiz , its ports, and – specifically – at the Port of Algeciras.

The agreement was signed at APBA’s headquarters by **Carlos Moreira** (WISEKey founder and Chairman) and **Gerardo Landaluce** (APBA Chairman). In so doing, Algeciras is set to become the first 4.0 port-logistics hub set up by the Consortium.

In Landaluce’s words: “...the decisive commitment to the WISESmartContainers project by the Bay of Algeciras—especially by the companies and Consortium carrying it out – is, without doubt, excellent news. The Port of Algeciras has been driving **open innovation partnerships** forwards for years, and a good example of this can be seen in the two main companies involved in the Consortium – WISEKey and Bernardino Abad – having their first meeting at the heart of the recently-created Port of Algeciras Innovation Committee that was launched by our Port Authority. We are convinced that the size, scale, characteristics and firm commitment to innovation at the Port of Algeciras makes our port a perfect, **life-size laboratory for this project**: a project that signifies the stimulus towards the transformation of logistics as we know it today.”

On his part, Carlos Moreira also shared his enthusiasm about the strategic partnership with The Algeciras

Bay Port Authority, underlining the fact that “... it is a great satisfaction for me to see the joining of forces between WISEKey and APBA in this **pioneering digital transformation project**.”

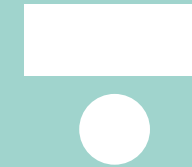
The alliance does not only constitute renewed dynamism for the Campo de Gibraltar, it also marks the beginning of an era for this region to set itself up as a leading digital innovation laboratory. This partnership lays the foundations of large-scale digital transformation process leadership: opening up new horizons and establishing a blueprint that can be imitated in the global technological field. We are at the threshold of making the **Campo de Gibraltar an international benchmark in digital innovation and progress**.”

The Consortium’s next step is to spread the active digital transformation process to other international companies and ports in preparation for the Fourth Industrial Revolution. There is to be a presentation to explain the project in depth at the Port of Algeciras next February.





Innovation Awards



■ Sara Robledo wins the III Algeciras BrainPort prize in Port Innovation for her End-of-Master's Degree Dissertation.

Sara Robledo Blasco, graduate of the Polytechnic University of Valencia's College of Industrial Engineering, received the III Port of Algeciras Brainport Innovation Prize for the Best Master's Degree Dissertation, at a ceremony held in Algeciras Technological Campus's RD&i Building in April 2023.

The aim of the international competition – sponsored by The Algeciras Bay Port Authority (APBA) and the Technological Campus Foundation of Algeciras (FCTA) – is to **promote and incentivise applied research and innovation in the port-logistics and maritime**

business undertaken at the **Port of Algeciras Bay**, and continue to acknowledge university students' and young researchers' talent.

The award ceremony – which was also streamed live – was attended in person by: **Francisco Javier Rodriguez** (Campo de Gibraltar's Andalusian Government Regional Delegate); **Gerardo Landaluce** (APBA Chairman); **Jose Ignacio Landaluce** (Mayor of Algeciras); **Juan Lozano** (Chairman of Campo de Gibraltar Boroughs Association); **Jesús Medina** (Chief Innovation & Information Officer); and **Rosa Rodriguez Cano** (FCTA Director-General), who presided over the ceremony.

APBA's Chairman reminded the audience of the three revolutions – as previously had been broadcast by the President of Andalusia – that the region is currently



immersed in: the energy, the green and the innovation revolutions; the latter being the horizontal thrust that the Port Authority's work is based on. Landaluce revisited various milestones reached in recent times to such ends, such as: the **creation of the Innovation Committee**; APBA's commitment to education, with qualifications like the **University's Digital Transformation Expert Course**; and recent progress made on the creation of the **"Unique Digital District"** project.

Jesús Medina, on his part, underlined the fact that these initiatives have all been incorporated into the project christened as the **Port of Algeciras Digital Academy**. This is a programme of activities that includes: a recent partnership with El Saladillo Secondary School (offering Intermediate-Level Training Courses on Microcomputing & Networking Systems and Multi-Platform Development Applications in Algeciras) and companies such as Maersk, TTI-A, APM Terminals and NextPort – who all share the common goals of training students, attracting local talent to their port-based businesses, and increasing their employability; and also the establishment of the **Port of Algeciras as the only 5G Training Centre in the province of Cadiz**, via an educational programme put in place by Vodafone and the Andalusian Government's Department for Employment, Business & Entrepreneurship.

Prior to awarding the prizes, several port innovation targets were given the spotlight before the two nominated projects were introduced by the candidates themselves: the eventual winner – Sara Robledo – and the other finalist, Consuelo Albarran Gomez, for

her University of Cadiz Master's Degree in Computer Engineering Systems.

The dissertations were evaluated by a panel made up of professionals from the port-logistics innovation sector, representatives of the academic world and experts in assessing business initiatives. The evaluation was carried out according to the following criteria: the technical and technological viability of the project; its degree of impact and maturity; and its innovative nature and strategic bent.

Design of a machine-learning tool to plan human resources and cargo-handling equipment at a container terminal.

Finally, APBA and FCTA awarded the prize to Robledo and her **design of a machine-learning tool to plan human resources and cargo-handling equipment at a container terminal**. She also received a €1,200 prize from FCTA and the Andalusian Government's Department for Economic Transformation, Industry, Knowledge and Universities.

The APBA launches the 4th edition the Innovation Journey Ideas Competition.

In June, The Algeciras Bay Port Authority (APBA) launched the fourth version of the "Voyage of Innovation" idea competition **to continue to promote, encourage and incentivise innovation and intrapreneurship at APBA and in its Port Community**.

Just as in previous editions, APBA encourages anyone and everyone – not only employees and direct partners – in the Port Community innovation ecosystem (companies, undergraduates, businesspersons, start-ups and individuals) to join the initiative with an innovative proposal that meets one of the predefined challenges, may improve the Port of Algeciras Bay's competitiveness, and create value for customers and users. On this occasion, the field of application

of ideas and proposals should be related to the **port-logistics and maritime activities** that take place at the **Port of Algeciras Bay**, and be aligned with one of the **three innovation focal points** that underpin the port's current 2021-2025 Innovation Strategy, specifically: logistics competitiveness and orchestration; sustainability and climate neutrality; and innovation and talent.

Competitors were able to submit their ideas on-line into APBA's Innovation Portal until the 15th November.

Competitors were able to submit their ideas through the APBA Innovation Portal until 15 November 2023, with a total of 18 ideas received, after which all the ideas received will be evaluated and the best internal idea, best external idea and most popular idea will be chosen.



Conferences & Events



■ The Port of Algeciras participates in the 12th edition of the 23 European Transfiere Forum.



The Algeciras Bay Port Authority (APBA) actively participated in the **12th edition of the 2023 European Transfiere Forum**, the main RD&i meeting in Southern Europe.

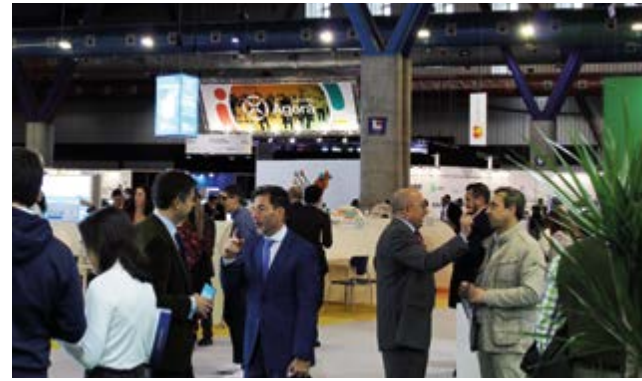
This forum, which was held on 15th, 16th and 17th February last year at the Malaga Trade Fair & Congress Centre, is a joint initiative (organised by the Ministry for Science and Innovation, the CDTI, the City Council of Malaga and the Andalusian Government's Knowledge Agency) to share scientific and technological

knowledge, promote innovation and connect the scientific community with the business ecosystem.

APBA, through **Jesús Medina** (Head of Technological Development), participated in a round table scheduled for the Andalusia Know-how Transfer slot, focused on the transfer of knowledge in Andalusia and opportunities to work together with agents of the Andalusian Know-how System and other companies.

The round table, moderated by **María Jesús Mosquera** (Vice-Chancellor for Science & Technology Policy at the University of Cadiz) and entitled "Open Innovation & Challenges in the Blue Economy", allowed attendees to learn at first-hand **how Port Authorities are facing the challenge of open innovation and what implications**





it has for the blue economy. For this, Medina was accompanied by **Mafran Martinez** (CTO at the Port of Huelva Authority), and **Elisa Oyonarte Gomez** (Head of Innovation & European Funds Division at the Port of Seville Authority).

Throughout his speech, Medina highlighted the importance of **working innovation from a holistic and systematic perspective**, contemplating all the vertices that influence the innovation process and - above all - **developing it in a sustained manner over time. In this sense, he pointed out that innovation activities should have their origin in corporate strategy and be supported by an Innovation Management System** in order to - in Medina's own words - "...give meaning to all the activities developed, from the transfer of knowledge to the development of culture and the execution of projects".

In conclusion, he described the roadmap that APBA has followed in terms of innovation, where - after an initial stage (2014-2018) of increasing digital and innovative

maturity that was not typical of the sector at that time - the next stage began to try and maximize the impact and the generation of added-value in the Port Community. This vision has not only allowed APBA to gain international recognition - as witnessed in the ESPO 2020 Award - but has also created an appeal that has been able to foster **more than 100 innovation projects and initiatives in the last five years**, in collaboration with research centres, start-ups, tech companies and universities. According to Medina, the reason for that is that, "...we have the maturity that allows our partners to move quickly to achieve their goals".

In total, Transfiere was attended by more than 420 experts who discussed topics of maximum interest for innovation ecosystems on more than 80 panels.



REMESSA presents the proof-of-concept test of the "Apolo" project with APBA's backing.

On 15th March last, The Algeciras Bay Port Authority (APBA) Technical Innovation Office attended the demonstration of the Proof-of-Concept Test (PoC) of the disruptive innovation project called "Apolo", developed by the Algeciras company **Reparaciones Maritimas Españolas SA (REMESA)**.

The project proposes the specific development of a **modular solution to supply photovoltaic solar energy** for container ships and port terminals, based on a containerised energy production system that uses **robotic technology and artificial vision to achieve self-sufficient operation**. The container would be placed on top of reefers stored in the yard - or on board ships - containing robotic solar panels that are capable of being deployed to capture solar energy and supply the rest of the containers with a power source through a connection to the switchboard that feeds them; or they could even power a ship itself.

The idea suggests that ships and terminals could swap roles in the logistics chain and - furthermore - become energy producers, making the cargo an active agent that makes clean energy available and reduces emissions.

The initiative, subsidised under the second round of the **Puertos 4.0 Fund**, was created by the State Ports Department (OPPE) in favour of entrepreneurship in the Spanish port-logistics sector and has the full backing of APBA as a facilitating agent. This once again demonstrates the port authority's commitment to a model of **open innovation**, with which it intends to harness the agility and knowledge that other external agents (start-ups, RD&i centres, Port Community and other port-logistics companies) can offer, to improve the competitiveness and service quality of the Port.

The scope of the proof-of-concept test, carried out at REMESA's facilities in Algeciras, consisted of the deployment and solar exposure of the container equipped with the modular system over the course of a day. Its aim was to validate the capacity of the installed equipment's energy supply. Once completed, the data collected will be analysed to validate the results and draw up conclusions as part of the significant milestones included on the project's roadmap.



■ **APBA present at the “Agora: digitalisation, blue economy & Smart Ports” Conference, Organised by UCA and Telefónica.**

On Friday 21st April, the Port of Algeciras Bay of Authority (APBA) hosted, the “Agora: Digitalization, Blue Economy & Smart Ports” Conference at the Port of Algeciras, within the framework of the **University of Cadiz (UCA) Telefónica Chair**.

The meeting, held in the Millan Picazo Auditorium, made up one of the UCA-Telefonica Chair activities, serving as a space for debate, reflection and research on digital transformation, innovation and new technologies. The event was specifically aimed at university students and personnel, as well as emerging companies, and economic and social agents from the province. It hinged around three agora talks, with **different specialists sharing their experiences on digitalisation, blue economy and smart ports**.

The opening ceremony was chaired by **Francisco Piniella** (UCA Rector), **Gerardo Landaluze**, (APBA Chairman), **Joaquin Segovia** (Telefonica Spain’s

Southern Territorial Manager) and **Jose Carlos Palomares** (UCA-Telefónica Chair Manager). Landaluze highlighted the role of the Port of Algeciras as an international benchmark in terms of innovation, committed to “...**teamwork, and collaborative logistics that have led the port to achieve the title of the most efficient in Europe, according to the World Bank Report.**” Likewise, the APBA Chairman highlighted the numerous lines of work carried out by the port authority in favour of a **creation of a digital pool of talent** for the port ecosystem, mainly based on the recently-created **Algeciras Port Digital Academy** initiative.

The programme carried on to the next agora talk, entitled “**Innovation & New Technologies in Smart Ports**”, with the participation of **María del Mar Cerban** (Bay of Algeciras Campus Deputy Rector), **Jose Antonio Gonzalez** (Telefonica Spain’s Southern Head of Digital Transformation), **Ignacio Moldes** (Bernardino Abad Laboratory’s Innovation & Change Manager) and **Jesús Medina** (APBA’s Head of Technological Development).

During the course of the talk, Medina highlighted the main lines and actions that the Port of Algeciras is carrying out to become a smart port, and thus



strengthen the concept of the **Next Generation Port of Algeciras: from the development of a digital platform for the orchestration of port operations** to the understanding of **innovation as a key, systematic business process, integrated into the organisation**. He also reviewed some of the present and future innovative projects, including the development of an intelligent tool for the detection of traffic queues that can calculate terminal access waiting times; the development of a predictive, prescriptive hub to optimise decision-making in operational management; and the development of the whose aim is to implement a predictive tool for port operational safety and efficiency based on physical environmental conditions.

The event ended with a guided tour given by Port of Algeciras Bay Authority experts, so that visitors could see the practical application of digitalisation and new technologies for themselves, and to learn at first-hand about the future challenges faced by the Port of Algeciras.

■ **APBA – Key player at the “Digital twins in the port environment” conference held at UPM.**

On Thursday 20th April, The Algeciras Bay Port Authority (APBA) participated in the “**Digital Twins in the Port Environment**” conference, organised by Digital Twins for the Infrastructure & Cities Agency, the Spanish State Ports Department, and the Polytechnic University of Madrid’s (UPM) Civil and Naval Engineering Colleges, held at UPM.



The event was opened by the Head of the Civil Engineers College (**Jose Miguel Atienza**) and the director of the Naval Engineering College (**Antonio Crucelaegui**). Before going on the two technical sessions of the programme, the Chairman of the Spanish State Ports Department (**Ivaro Rodriguez Dapena**) presented “The Digital Twin within the New Spanish Strategic Port Framework”. Throughout the presentation, Rodriguez Dapena stressed the **importance of data in the digital transformation of port operations**, since, in his own words, “... data-sharing among Port Community agents, public institutions and Port Authorities could optimise port operations as a whole”.

This was followed by the first of the two technical sessions, which dealt with “**A Strategic Vision for the Port Sector**”, and pivoted around several presentations, including discussions about the importance of digital twins in public and private innovation strategies in the port sector; the use of digital twins for the management of infrastructure; and



the role of innovation ecosystems in the development of digital twins. This first block, moderated by **Rafel Molina** (Civil Engineering Ph.D.), was given by **José Llorca** (State Ports Department "Ports 4.0" Technical Committee's Secretary), **Miguel Pindado** (Port of Barcelona Authority's Infrastructure Manager), **Francisco de los Santos** (Gartner's Executive Partner), and **Jesús Medina** (APBA's Head of Technological Development).

Through the presentation, entitled "**Algeciras Digital Twins**", Medina specifically exposed the Port of Algeciras's track record in digital transformation and innovation, historically linked to the development of digital twins as part of its digital ecosystem. Since 2017, the year when the Port Authority deployed its first digital twin-based solution, many more platforms have been developed with this technology, such as: the development of a 3D modelling system for the management of safety in port facilities; Port Collaborative Decision-Making (PortCDM) tools; predictive and prescriptive tools for cargo flow streamlining through the port; and ship calls.

During the presentation, he stressed the **importance of business needs over mere technology implementation**, stating that "...technology is not the solution: we must first of all be aware of the business challenges ahead; thus, technology must be the tool we use to solve them".

The second technical session of the day, moderated by **Jaime Luezas** (State Ports Department Head of Port Community Services) focused on **success stories and inspiring models of digital twins in port facilities**. APBA was also represented in this block by **Juan Gonzalez** (member of APBA's Advanced Digital Services Centre), who spoke about the . The project is focused on the development of an Advanced Prediction System for Ship-Infrastructure Operativity: a tool to aid decision-making in port planning, based on predictions of the physical environment, scheduled ship call and operational planning. Gonzalez himself pointed out that the strong innovative load constitutes the first Public Innovative Procurement through Competitive Dialogue in the Spanish Port Network. Having identified expected needs of future users, developments are currently in the last stages of Phase I to prepare a Minimum Viable Product (MVP).

The remainder of presentations were given by **Manuel Francisco Martinez** (Port of Huelva Authority's Chief Technology Officer), **Jose Luis Exposito** (Arisnova's Delegate for Eastern Spain), **Candela Sancho** (CEO of Detektia) and **Oliver Martinez** (Manager of Ghenova Digital).



■ The Port of Algeciras - Epicentre of the energy transition debate at the "European Harbour Masters' Committee Seminar".

On the 4th and 5th May the Port of Algeciras hosted the International Harbour Masters' Association's (IHMA) **XI European Edition of the Biennial Harbour Masters' Committee Seminar** which took place at the Millan Picazo Auditorium.

For two days, Algeciras became the centre of the debate on questions such as alternative fuels for ship emission reductions, or how ports should prepare themselves to comply with new environmental regulations and ,thereby, supply the means required for the maritime industry's energy transition.

The conference programme included the following presentations and debates: international legislation; requirements on ships and ports; the incentive scheme for voluntary decarbonisation; a future outlook on the energy transition towards 2050; market options available for new generation ships and engines; the availability of transitional fuels; tools that can measure ports' degree of preparation for the new energy scenario; and the sustainability strategies of the Ports of Rotterdam and Algeciras.

The formal opening ceremony was attended by **Gerardo Landaluce** (Chairman of The Algeciras Bay

Port Authority). Landaluce himself stressed during his speech that "**...Algeciras is the in the right place and this is the right time...**" to discuss the energy transition. He also highlighted APBA's commitment to sustainability, because - in his own words - "**...our goal is to achieve zero net emissions by 2050: the reason that our port has been working together with leading companies in the sector**"

Another Algeciras speaker, **Víctor Jiménez** (Chairman of the International Maritime Organisation Council), then explained the necessary steps to achieve public and private sector involvement when leading the pro-decarbonisation debate in Spain. In this sense, he pointed out important initiatives such as the **CEPSA**





Green Hydrogen Corridor between the **Ports of Algeciras and Rotterdam**, backed both by APBA and several private companies. The Green Hydrogen Corridor project's aim is to develop the infrastructure necessary to make the Campo de Gibraltar region one of the most important hydrogen distribution points in Europe.

Another project along the same lines is the firm commitment of the A.P. Moller-Maersk shipping company to generate green methanol and supply sustainable fuel to its fleet in Spain. Among the conference speakers, the event also boasted the presence of **Jesús Medina** (APBA's Head of Technological Development). During his speech, Medina explained how the Port of Algeciras is applying the **Port Collaborative Decision Making (PortCDM)** concept to achieve Just-in-Time arrivals, a subject that had previously been highlighted by **Astrid Dispert** (IMO's Technical Project Manager) as one of the keys to reducing emissions in the industry.

Medina went on to point out that - thanks to the technological tools that have implemented this concept in the Port of Algeciras - it has been possible to reduce **the number of ships awaiting berth by 12% and GHG emissions by 10%** during the 2021-2022 period. However, as he pointed out, there is still wide room for improvement, given that "...this type of solution has the potential to reduce waiting times by 50% and - therefore - emissions by 50%". To achieve these results, Medina stressed that **"...both a change of mentality and a change in procedure is necessary, so that all parties can work together under a common objective"**.



■ APBA – Key player during the XV edition of MEDPorts & Shipping summit at SIL 2023.

On 8th June, The Algeciras Bay Port Authority (APBA) took part in the XV **MEDports & Shipping Summit** at the Mediterranean Logistics & Transport Week (Medalogistics Barcelona), under the umbrella of the 2023 International Logistics Exhibition (SIL).

The event was organised by the Barcelona Free Trade Zone Consortium, the Association of Mediterranean Chambers of Commerce & Industry (ASCAME) and the MEDports association, together with the collaboration of the Barcelona Chamber of Commerce, and took place at SIL's Knowledge Pass Auditorium.

On this occasion, the debate focused on the reflection of the main macroeconomic and geopolitical trends, and analysing their impact on different port hubs: from shifts that have occurred in global supply chains to digitalisation, climate change and energy transition.



The day centred around three key-note debates in the form of round tables and featured a selection of top-level speakers, industry leaders and renowned experts, including representatives from ESPO, OMMP, the Valenciaport Foundation, and the Ports of Algeciras, Barcelona, Tanger-Med and Marseille.

On behalf of APBA, **Jesús Medina** (Head of Technological Development) participated in the last keynote debate - **"Intelligent Ports of the Mediterranean: Driving Digital Transformation"** - together with **Javier Gallardo** (PORTIC Barcelona's Manager), **Eduard Rodes** (Founding Director of Escola Europea), and **Ana Rumbeu** (Valenciaport Foundation Training Manager), and was moderated by **Santiago Garcia-Mila** (Deputy Manager of the Port of Barcelona). They tackled points of interest, such as: the new profiles needed in the maritime transport sector, the digital transformation of ports and the application of new technologies.

Medina was specifically charged with highlighting the **impact of digital transformation** at the Port of Algeciras: how to meet the wide range of needs required by an extremely competitive environment such as the Strait of Gibraltar and the desire to supply



a **distinguishable top-level service quality and efficiency** on the one hand; and the important role that **digital training in the port-logistics network** will play in the future of consolidating this metamorphosis - how ports should implement in-house initiatives to

manage and promote their organisational capacities, educate and attract local talent, and make the port logistics sector attractive to technological profiles - on the other.



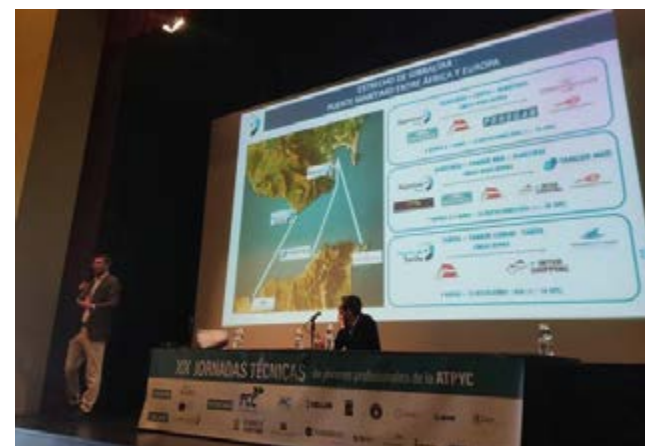
■ The Port of Algeciras presents the PROAS MVP at the XIX ATPYC young professionals conference.

On 8th and 9th June, the Port of Algeciras Bay Authority (APBA) took part in the **XIX of Young Professionals of the Technical Association of Ports & Coasts (ATPYC) Conference** with the collaboration of the APBA representatives and held at its port facilities at the Alameda Municipal Theatre in Tarifa.

The event contained a high-level, techno-scientific programme and was focused on bringing the Port Community closer to different innovative initiatives as developed by ATPYC members. In addition to APBA participation, the conference was attended by other organisations and companies such as Siport21, IH Cantabria, Mapei, SATO OHL, Proes and McValnera.

After the formal opening, the inaugural speech was given by **Juan Pablo Perez** (APBA Head of Port Planning), who was tasked with presenting the Port of

Algeciras to the audience, specifically infrastructure and existing throughput: factors that have enabled the port authority to become a maritime, passenger service, ship and cargo centre of excellence on the Strait of Gibraltar. **Juan Gonzalez** (member of APBA's Advanced Digital Services Centre) gave a talk on the **PROAS (Port Risk Optimised Advanced System)** project, focusing on the development of an Advanced Prediction System of Ship-Infrastructure Operativity as a **tool to support decision-making**. It incorporates predictive capabilities for levels of safety, reliability,

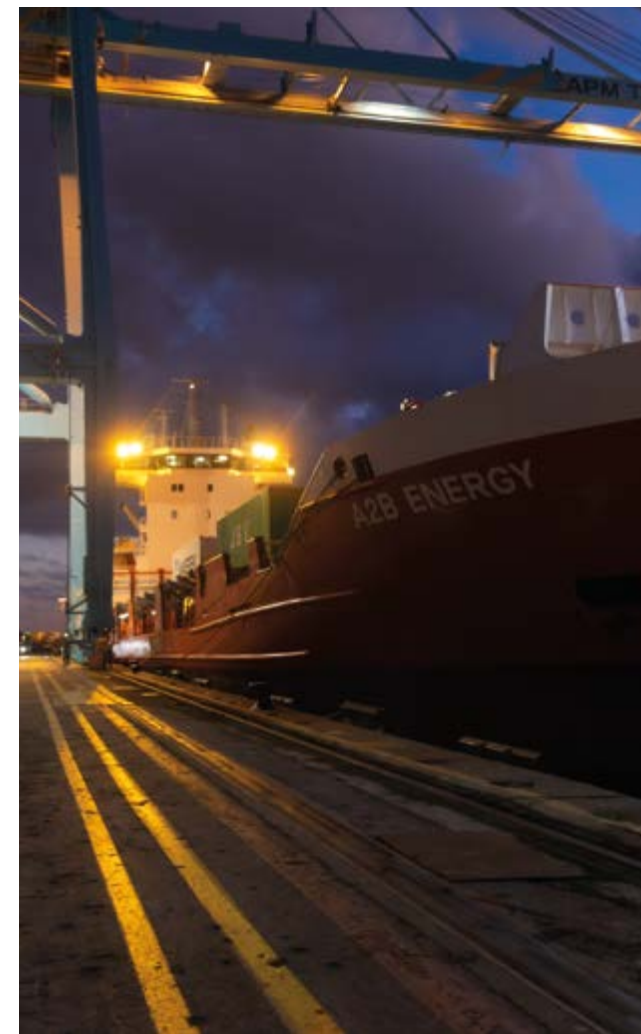


efficiency and streamlining of port operations, based on specific data for each berth (from predictions of the physical environment, ship dimensions and operational scheduling). During the presentation, Gonzalez **presented the system's MVP (Minimum Viable Product)**, capable of obtaining specific ship movements at a designated APBA facility berth, and under a defined mooring configuration and loading situation. He also pointed out the work carried out to date, which has focused on the design of a

technological platform to support the tool, and on an analysis of the Ocean-Meteorological Information System (SAMPA) prediction models' reliability.

Among the remainder of speeches presented by ATPYC professionals, current issues in the port environment were addressed, such as: new methodologies for maritime weather forecasting in the face of climate change; MARPOL waste management; the technical challenges of off-shore wind power in the Iberian Peninsula; or even the automation and digitalisation of new-generation of ports.

Finally, the conference rounded off with an opportunity of making a technical visit to the facilities at the Port of Algeciras.



■ APBA makes its case as a Blue Economy Hub at the European Parliament.

On June 27th, The Algeciras Bay Port Authority (APBA) was the key-note at the European Commission SEArca (Sea, Rivers, Island & Coastal Area) Intergroup **"Ports as Hubs of the Blue Economy"** event. The meeting was organised and backed by the Conference of Peripheral Maritime Regions and co-organised by the AspBAN Project - a project that the Port of Algeciras is involved with - and held at the European Parliament headquarters in Strasbourg.

The conference, presented and moderated by **Deirdre Clune, MEP** (SEArca Vice-Chair for the Atlantic), served as the epicentre for the debate on ports' roles as centres of sustainable blue economies and how the European Union could support the green transition: e.g., with the development of flagship projects such as AspBAN, that establish dynamic, co-working networks that can catalyse **open innovation** and promote **business model diversification** in the maritime and port sectors.

The opening speech was given by Clune herself, who presented the potential that port environments have to be able to achieve European decarbonisation goals; and highlighting, not only their role in the transition to a green economy, but also their capacity to attract other sectors' innovative solutions and thus strengthen their own business.





During the turn of **Ana Pinela** (Beta-i Senior Innovation Consultant and AspBAN Project Manager), who began by pointing out the milestones achieved in the course of the project's two years of life, she specifically highlighted the continuous development of the **innovation acceleration platform** set-up, which can help ports become **creators of port clusters**. She concluded by sharing the successful results of the project with the audience: the development of up to **20 pilot schemes** in Atlantic ports.

The second part of the day was attended by several project members, who presented the results achieved, and reflected on the future of such initiatives to be the basis of promoting further, real changes in the industry. Representing APBA was **Jesús Medina** (Head of Technological Development), who centred the focus of his speech on detailing how the Port of Algeciras has worked to evolve towards the concept of the **Latest-Generation Port of Algeciras** - mainly through innovation, digitalisation and data; and sustainability and energy transition. Medina valued the end results of the programme positively.

With several pilot schemes on the table, and several solutions already implemented, it will allow **the Port of Algeciras to stake a claim as an active Blue Economy Hub**. To conclude, he stressed the importance of these initiatives that can help **accelerate the digital transformation** of ports and **identify innovative**

solutions on an **international level** to promote the competitiveness of the sector.

The event was rounded off with the participation of learned voices from the European Commission, including **Christos Economou** (Director of the Sea-Basin Strategies, Maritime Regional Cooperation & Maritime Security - MARE - Unit), **Eddy Liegeois** (Director of the Transport Networks Unit, and Director General of DG MOVE), and **Josianne Cutajar**, MEP (SEArca Vice-Chair for SMEs & Digitalisation. They all expressed how the **collaboration between ports** can yield great results, and expand their impact beyond regional dimensions to advance sustainability by means of open innovation maritime spaces that lean towards transport decarbonisation.



■ APBA hosts the VII panel of experts for the Andalusian Sustainable Blue Economy Strategy.

The Algeciras Bay Port Authority hosted the latest **VII Panel of Experts** for the development of the **First Andalusian Sustainable Blue Economy Strategy**, promoted by the Andalusian Government's Department for Sustainability, Environment & Blue Economy at APBA's headquarters on July 14th.

This conference - organised under the **"Ports, Logistics & Maritime Transport"** tagline - was attended by experts, associations, and representatives from the port, logistics and maritime transport sectors - as well as by professionals from the academic and research fields - to gather knowledge and experience that will be essential to determine the actions that are included in the future Strategy.

The formal opening of the session was attended by **Gerardo Landaluce** (Port of Algeciras Bay Authority Chairman), **Jose Ignacio Landaluce** (Mayor of Algeciras), **Rafael Merino** (Director General of the Andalusian Public Ports Agency), and **María del Mar Plaza** (Andalusian Secretary General for Sustainability, Environment & Blue Economy).

During his intervention at the Conference, Gerardo Landaluce highlighted the fact that **ports are critical, strategic infrastructure**: "...[ports are] powerful economic engine-rooms that **facilitate and give competitiveness** to foreign trade, especially in the current world geo-economic situation where both the

energy transition towards a decarbonised economy and European Union energy self-sufficiency have become a priority".



The participation of APBA representatives throughout the session was significant: Francisco Iglesias (Head of Electrotechnical Infrastructure) discussed APBA's implementation of On-Shore Power Supply (OPS) technology during the "Sustainability & Energy Transition - The Role of General Interest Ports and their Port and Industrial Communities" panel; **Nicolas Martinez** (Head of Business Development) was tasked with highlighting the capacities of the Port of Algeciras to become a geostrategic logistical hub in Southern Europe in general and on the Strait of Gibraltar in particular, during the "Andalusia - Proximity Logistics Operational Base in the Context of European-North African Relations" panel; and **Jesús Medina** (Head of Technological Development) presented "Digitalisation, Innovation & Newly-Associated Port Ecosystems as Levers for Competitiveness and New Business" at a round-table discussion. Medina himself highlighted the **fundamental role played by innovation** to support the energy transition, the decarbonisation of the industry and the development of sustainable blue economies during his speech.





He went on to emphasise how the Port of Algeciras is carrying out its digital transformation process, structured as it is on the pillars of **competitiveness, operational orchestration, sustainability, climate neutrality and innovation**.

Currently, this process is allowing the port to have the precise tools that are able eliminate waste in favour of **operational and environmental efficiency**. Medina was joined at this round table by **Dr. Oscar Pernia** (Co-Founder and Chief Technology & Innovation Officer of NextPort), **Manuel Barral** (REMESA's Chief Information Officer) and **María del Mar Cerban** (Andalusian Government's Director General for Research Planning).

■ The Port of Algeciras showcases its digital solutions for operational optimisation & decarbonisation at Ningbo.

A delegation of The Algeciras Bay Port Authority (APBA), headed by **Nicolas Martinez** (Commercial Manager) and **Jesús Medina** (Head of Technological Development), participated in the **VII International Maritime Silk Road Port Cooperation Forum**.

The internationally-renowned event brings together leaders from the port and maritime industry - including port authorities, port operators, shipping and logistics companies, maritime industry associations and academic institutions - and returned once more to the **Port of Ningbo** on the 17th and 19th of July, following a one-year lapse after the 2022 edition had been cancelled due to the Covid pandemic.



On this occasion, the Forum - set up to establish a **platform to promote communication and cooperation for port and shipping ecosystems** - focused on: investment in port and shipping industry chains and the adjustment of business models; the development of energy transformation and new technology applications; and - last but not least - current industry strategies and challenges.

Medina took part on the panel entitled **"Smart Ports Innovation Summit"**, together with **Eranda Kotelawala** (CEO of the Solomon Islands Ports Authority), **Gaurav Sharma** (CIO of MMCC Port Holdings) and **Ying Liu** (the German Logistics Association's Head of China Representative). The panel was moderated by **Nico de Cauwer** (International Port Community Association - IPCSA - Secretary General) and tackled issues such as: the definition of a Smart Port; key factors during



such a transformation; and investment made by ports globally to achieve Smart Port status. The panel also highlighted current issues such as: cybersecurity; the duality of operational efficiency versus the commitment to decarbonisation; and the sector's sustainability.

This edition of the forum was attended by more than 3,000 representatives of some 400 organisations spanning over 50 countries, including nearly a hundred Port Authorities, eighty percent of the Top Twenty shipping companies worldwide, and sixty percent of the Top Twenty global logistics operators.

Finally, it is worth remembering that the **Ports of Algeciras and Ningbo** signed a Memorandum of Understanding in 2018 to promote trade flow increases between Southern Europe and Asia, and to **exchange experiences and know-how** regards emerging technologies applied to port management.

■ The APBA takes part in the I Innovation and Digital Transformation Fair organised by the Campo de Gibraltar Chamber of Commerce.

On Wednesday September 20th, The Algeciras Bay Port Authority (APBA) was present at the **I Innovation & Digital Transformation Fair**, part of the "2023 Digital Campo de Gibraltar" Project. The Fair addressed a series of actions to promote innovation and business digitalisation, with the aim of achieving a higher level of competitiveness for the region's businesses. Aimed at **distributing trends, sharing know-how,**



connecting entrepreneurs and organizations, and fomenting the general public's knowledge of **technological solutions** and strategic projects for the region, the meeting was held at the Chamber of Commerce and was backed by the 2020-2022 DipuActiva Plan via the Provincial Council of Cadiz Strategic, Productive & Social Development Coordination Department.

A formal welcome was given by **Carlos Fenoy** (Chairman of the Campo de Gibraltar Chamber of



Commerce), who stressed the importance of "... encouraging SMEs and entrepreneurs to commit to the world of innovation and new technologies". The first block of presentations continued, with presentations by renowned experts such as **Silvia Leal** (Adviser to the European Commission on Digital Skills), **Antonio Perez** (Spanish Cryptology Centre), **Francisco Javier Gomez** (AI and Big Data Specialist), and **Ami Bondia** (Personal Branding & Digital Trend Expert).

They covered aspects such as: the urgent need for the business world to innovate; the challenges and threats posed by cybersecurity; how smart cities are being transformed; and the tools and attitudes necessary for success in the digital era, respectively.

APBA was the main feature of the event's exhibition hall, represented by Juan Antonio Herrera (APBA Head



of Innovation) and **Ignacio Serra** (Member of APBA's Technical Innovation Office). They highlighted **APBA's strategic commitment to innovation**, underlining different **technological and disruptive project success stories**, and noting the implementation of initiatives in favour of the revitalization and coordination of open innovation in port-logistics ecosystems, such as the **Port of Algeciras Innovation Committee**. The Fair also saw the official launch of APBA's recently published **2022 Innovation Report**.

APBA was accompanied in the exhibition hall by organizations, such as Acerinox, NextPort or WISEKey, who all have a strong presence in the Port Community and the technology sector.

The second block of presentations took place during the afternoon, including a series of workshops on generative artificial intelligence tools, immersive gamification and STEAM methodologies.



■ The Algeciras Bay Port Authority hosts an ICEX workshop on technological solutions for integrated value chains.

On Wednesday November 15th, The Algeciras Bay Port Authority (APBA) – in collaboration with ICEX – held a conference entitled "**Technological Solutions for Integrated Value Chains**". On this occasion, the Millan Picazo Auditorium was the stage where discussions were held about how supply chains can increase their competitiveness, resilience, and boost their internationalization from an innovative and technological point of view.

The conference was part of a series of roving series of sessions throughout Spain, organized by ICEX's new Value Chains & Logistics Department, to **facilitate the technological adoption and digital transformation** of companies with an international vocation, with the first session taking place at the Dry Port of Madrid.

Elisa Carbonell (ICEX's Business Internationalization Manager), **Gerardo Landaluce** (Port of Algeciras Bay Authority Chairman), **Jose Ignacio Landaluce** (Mayor of Algeciras), and **Javier Sanchez** (Andalusian Chambers of Commerce Chairman) were in charge of opening the event.

During his speech, Gerardo Landaluce centred on highlighting the need for the existence of competitive, resilient and sustainable port areas: logistics hubs

where partnerships, technology, innovation, and real-time data sharing with port agents provide added-value services to port-logistics processes, and eventually provide tools that the Port Community and their neighbouring economies can employ.



Next, it was the turn of **Rocio Ros** (Maersk's Head of Spain, Portugal & North Africa Customs Delivery), whose key-note speech explained the **digitalisation and decarbonization progress made by the shipping-logistics** group: from comprehensive end-to-end logistics chain management solutions to the announcement of the "Morocco Bridge Solution" - a new shuttle service between the North of Morocco and Algeciras - whose aim is to reduce transport emissions by taking advantage of the rail-port potential at the Port of Algeciras.

Following the speeches, two round tables took place, where attendees discussed **technological applications in port-logistics processes**: firstly, from



the shippers' perspective and secondly, from the point of view of logistics operators and shipping lines. Both round tables featured distinguished speakers from COVAP, Indorama Venture PCL, Cunext Copper, Atarfill, Marcotran, TTI Algeciras, Total Logistics Services and Balearia. All participants agreed that the **commitment to digitization and applied innovation has been able to provide a differential value proposition towards their competitiveness.**

The day closed with a final round table, moderated by **Jesús Medina** (APBA's Head of Technological Development), and featuring **Oscar Pernia**, (NextPort.AI Founder and Technical Manager), **José Manuel Avelino** (Vestigia CEO), and **Miguel Silva-Constela** (CEO and Co-Founder of AllRead Machine Learning Technologies). The speakers addressed their own innovative solutions for the port-logistics sector; their understanding of the entrepreneurial landscape; the world of start-ups; and other key issues, such as: the need to connect value chain decision-mapping; how to understand business and harness the power of data; system interoperability; and the importance of fostering digital talent.



■ The Port of Algeciras presents Artificial Intelligence cases at the 1st Andalusian AI Congress Held in Granada.

On November 22nd and 23rd, The Algeciras Bay Port Authority (APBA) took part in the 1st Andalusian Artificial Intelligence Congress, organized by the Andalusian Government together with the Andalusian Digital Agency (ADA), and held at Granada Congress Hall.

Antonio Sanz (Counsellor for the Presidency, Interior, Social Dialogue & Administrative Simplification Department) opened an event that brought together more than **170 national and international AI experts** for two days, under the tagline "**Transforming the Way**". The congress addressed trends in disruptive technology development and looked ahead to the key



factors that would guide its evolution in the coming years. Attended by an audience of more than **2,000 individuals and 65 organizations** (universities, and companies such as Google, Microsoft, Telefonica, IBM, VMware, T-Systems Iberia and Fujitsu, among others), the initiative served to promote collaborative networks among institutions, financial bodies, research centres, companies, universities and other innovation system players.

During his speech at the opening ceremony, Antonio Sanz highlighted the 46 practical cases of AI application that have already been developed in Andalusia, stressing the importance of the **Port of Algeciras** as a benchmark institution. He underlined his commitment to "...Andalusia [continuing] to position itself as a pioneering, benchmark region in AI application".

On the second day, it was the turn of **Jesús Medina** (APBA's Head of Technological Development), who



presented the Port of Algeciras's digital transformation and innovation strategy, together with several of the artificial intelligence projects that have already been carried out, such as: the smart, real-time vehicle and container license plate reading and tracking system by using Deep Learning; the Cross-the-Straits Process Simulation by using Machine Learning; and the Vision Row Project for the smart detection of HGV queue and estimated port-access waiting time by using AI vision.

The event also featured a huge 2,400-square-metre exhibition area, where leading companies from the sector led a full agenda with talks, debates, demonstrations and workshops. Know-how and experience could be shared with leading AI professionals with the ultimate goal of designing a path together towards the future... a future that is already here.



09



Collaboration
with start-ups





■ The second round of Puertos 4.0 Funding ends with the selection of 10 APBA-backed proposals.

On the 2nd October, the Spanish Ports Department's Inter-Port Compensation Fund Distribution Committee approved a provisional resolution for pre-commercial procurement, pursuant to the 2nd Round of Puertos 4.0 Funding.

On this occasion, the Department granted the above category of projects an €11.1-million budget that has enabled **thirty initiatives** be subsidised from a total of 116 submitted.

Among the initiatives given funding, there are **six backed by The Algeciras Bay Port Authority (APBA)** – 20% of the total number of subsidised projects – that have been added to the four previous projects that had already been selected in the “ideas and commercial projects” category in the same round.

The projects chosen for pre-commercial procurement are as follows:

- **Docking Assistant (Company: Ghenova):** The company proposes a smart-docking tool based on berthing assistance for RoPax ferries via LiDAR technology
- **SiMU-PORT (Company: ISOIN):** the company proposes a digital platform focused on optimising RoPax passenger and vehicle port-logistics traffic operations via AI and hybridisation simulation.
- **Carbon Wave Gauge (Companies: Adecua y VTI):** the project's aim is to develop a pioneering portable carbon probe to measure tides and waves (among other parameters) in real time, and much more accurately than current available systems
- **NextPort Digital Twin (Company: NextPort.AI, de Moffat&Nichol):** this initiative is based on creating a digital twin with predictive and prescriptive capabilities for the orchestration of port operations.
- **MarineHound Autonomous Sulphur Sniffer System (Company: Marine Hound):** This initiative centres on developing a ground-breaking, self-

contained gas-analyser located on a buoy that will be able to control ships' emissions and determine whether they are using legal, low-sulphur bunkers.

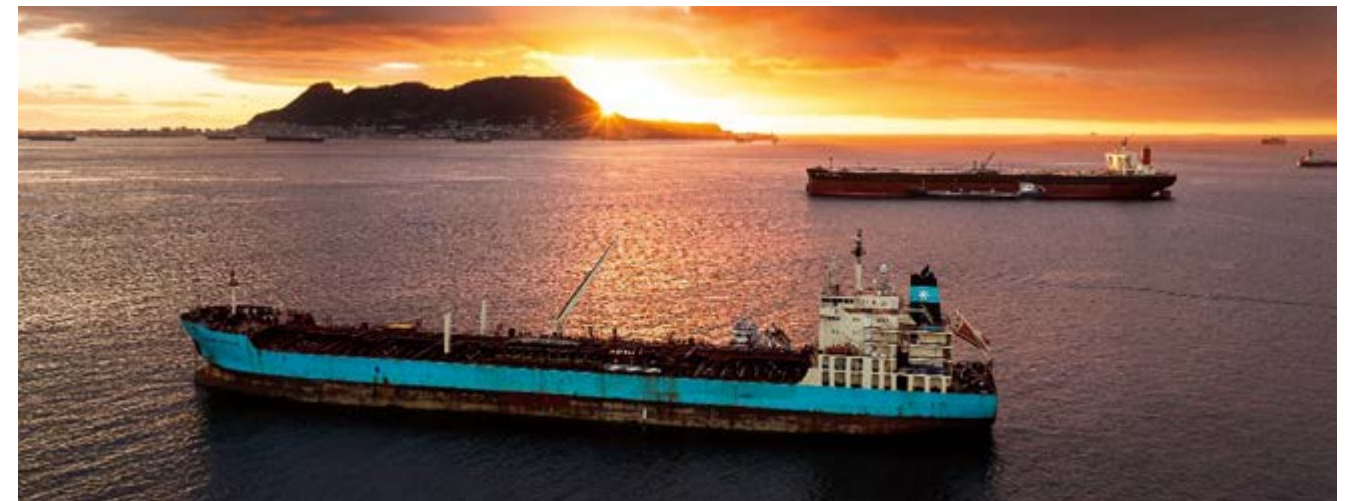
- **SubDrill JC (Empresa: GEM):** the project is to design and develop a sensor meter for a Vibrocorer system, dedicated to submarine subsoil inspection.

In all, APBA received a total of **34 proposals** for consideration. On analysis, it was decided to back **25 proposals (two ideas, 17 pre-commercial procurement projects and six commercial projects)**. It is important to point out both the commitment of the port authority to promote the adoption of disruptive innovative technological projects in its port-logistics ecosystem – APBA committed to brokering nineteen of the projects; and also the promising potential and character of every proposal backed by APBA, given

that 40% of the ideas APBA backed were chosen for funding.

All the innovation proposals have developed ideas and projects by means of emerging technologies, with notable projects based on: **Advanced Analytics** and **Artificial Intelligence** (41%); **Drones** (20%); **Blockchain** (12%); and **Sensorisation, IoT and Next Generation Communications** (12%). The origin of the proposals was mainly Spanish (94%), with a slight local trend from Algeciras (6%); with the remaining 6% originating from outside Spain.

Last but not least, it is notable that the Distribution Committee itself approved a **new budget** totalling €18 million during its last session, which will help launch new rounds of Puertos 4.0 Funding for next year.

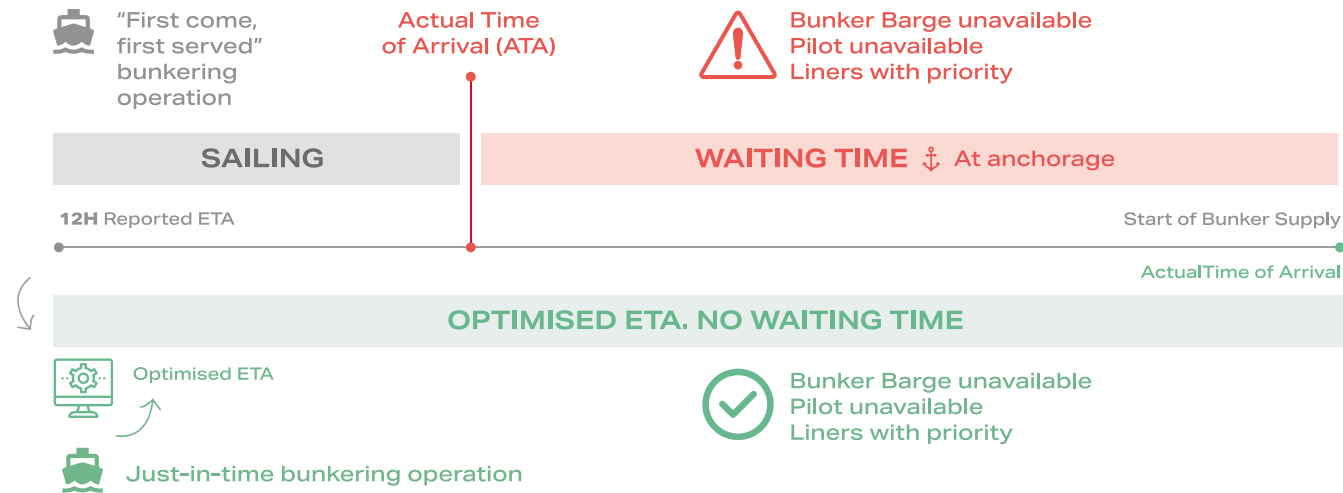


■ Just-in-Time Bunkering Operations project.

Currently, port-based bunkering operations are not exempt from congestion issues, sometimes causing this key ship-refuelling service to be delayed. At the same time, there is a lack of real-time visibility, coordination and operational awareness. This gives rise to idling and consuming unnecessary fuel, both by the ships awaiting the service and the bunker barges that provide the service. As a result, it has a knock-on effect

of creating greater Greenhouse Gas Emissions (GGEs) in and around port facilities, apart from additional cost overruns and greater operating risks.

This is the scenario that the Port of Algeciras Bay (APBA) has explored, with a Proof-of-Concept (PoC), which we have called “**J-i-T Bunkering Operations**”: our plan is to develop a digital tool to completely revamp refuelling operations and encourage Just-in-Time-type ship arrivals. The project was carried out together with



Navozyme, a digital tool specialist scale-up that has employed deep-tech, and especially AI and Blockchain innovation, in the maritime sector before.

The PoC's specific scope involved developing a **prototype digital tool** to plan and support decision-making, based on an **optimisation model** that uses **AI and Machine Learning predictive analytics** to be able to enhance bunkering operations in Port of Algeciras anchorage zones.

The optimisation model we have developed specifically helps obtain the following:

- 1. Prediction** of the **earliest possible availability** for bunker barges to attend the next operation, depending on prior refuelling requirements
- 2. Prediction** of probable **ETAs** of incoming ship calls
- 3. Estimates** of the earliest possible time to **complete bunkering operations** at anchor
4. Generation of an **optimum service window** – based on a combination of the above estimates – to include a Recommended Time of Arrival (RTA) at anchor, or commencement of Road-Tanker to Ship (RTS) service operations.

The **final aim** is to **minimise idling and waiting times** of ships as they approach the port, and to assign

them: on the one hand, an available bunker barge; and – on the other – an **optimum window for operations**. With ships arriving at their designated anchorage at optimum speed, they will be guaranteed both a **specific anchorage position** and an **available bunkering service**. By optimising both the ships' sailing speed towards port and the bunker providers' commute times, it should reduce idling and waiting times for both of them, and thus reduce emissions.

The prospect of a **decision-making support tool** (gleaned from a validated prototype) would be of tremendous use to the operational management of bunkering at anchor; it would also increase the global efficiency of the process, mainly due to better scheduling and coordination among the agents involved.

This tool could be **applicable to the remainder of ship services** (chandling, provisioning, etc.) that is provided by the Port of Algeciras in order to upgrade these port operations, too, and thereby increase our value proposition.



■ SafetyTech Accelerator, Awake.AI and APBA partner up to promote maritime sector innovation.

A recent study recently stated that more than a third of the time spent by containerships at port is employed in arrival and departure manoeuvres, mooring, unmooring and idling while waiting for port services. It is only the remaining time that is given to the actual loading and unloading of cargo onboard the ship. The main factors that influence the ship's on-time arrival at port are usually berth and service availability, and sea conditions, among others.

The **efficiency of port calls** therefore depends on Port Authorities, terminals, shipping lines, and – above all – whether all the agents involved have been **briefed** and are able to **receive up-to-date information**, especially during the hours prior to a ship commencing arrival or departure manoeuvres. **Better transparency, more efficient data exchange** among the agents who work together and **smart tools** that back up the different processes are required.

On the basis of this information, the Port of Algeciras Authority (APBA) is currently partnering **Awake.AI** – a Finnish start-up specialising in maritime business AI tools; and **SafetyTech Accelerator** – the Lloyd's Register innovation-promoting, maritime sector tech accelerator – to develop a Proof-of-Concept (PoC) called

"ETA Prediction & Emissions API". The project's aim is to analyse how **accurate and reliable ETA predictions** could encourage **Just-in-Time arrivals to optimise port call scheduling and improve overall operational efficiency**. This would be carried out through AI algorithms and AIS data, as soon as ships announce their approach to the Port of Algeciras. Awake.AI's tool offers greater visibility and predictability to scheduled port calls, providing an ETA and streamlining data exchange, which should **support decision-making** and give rise to a **higher level of port call optimisation**.

It should also be noted that Awake.AI took part in Waypoint – Safetytech Accelerator's maritime acceleration programme. This fourth round of Waypoint is focused on solving the challenges of high-seas operations, specifically: to minimise human error; support safer navigation; reduce response times; and prevent accidents on the high seas.



■ The APBA collaborates in the development of the Smart Mobility Analyticis (SMA) project.

 The Algeciras Bay Port Authority (APBA) is currently taking part in the **Smart Mobility Analyticis (SMA)** project, geared towards developing an AI, camera-based system that will be capable of analysing passenger and vehicle flows by applying advanced neural networked algorithms. The end-product would be a **comprehensive mobility management system** that could extract objective data, e.g., passenger and vehicle **waiting times** and the **usage made of the different zones in a passenger terminal**.

The aim of the pilot scheme itself is to **digitalise the operational processes** at a port passenger terminal (ferry terminal, cruise ship terminal, etc.) via the employment of **artificial vision**. This will subsequently be developed into a decision-making support tool: on the one hand, to temporarily resize port areas to reduce congestion, and passenger and vehicle waiting times through the port; and, on the other, to provide better



customer care to passengers, vehicles, and public and private transport companies. The tool should even be able to share real-time information with these port users.

The project is funded by **Fondo Puertos 4.0** under the Commercial Project category, and is being carried out by Delonia Software, an engineering company providing multi-disciplinary, digital transformation and tool development services – based on Big Data and AI – for the banking, telecommunications, engineering and health sectors, among others.

The scope of the project in the case of the Port of Algeciras ponders the **testing of operations management functionalities for passenger vehicle traffic on La Galera Quay**. It includes: the detection of the degree of embarkment and disembarkment traffic-handling area occupancy; counting the arrival and departure vehicle flows to and from these areas; and the detection of each area's operational status.

APBA especially hopes to glean the following from the project: (1) **evaluation of the technical viability** of



implementing an AI vision-based system to manage vehicles during Operation Cross-the-Straits at the Port of Algeciras; (2) the evaluation of tools that **provide real-time data on traffic flows** during said Operation, both to **support operational decision-making**, and to

resize port areas; and (3) the undertaking of **replicability validation research on Delonia's tool** in alternative operating environments as far as the developed use case, the deployment method, and analysable parameters are concerned.

Finally, it should be mentioned that the Port of Barcelona Authority also participates in the project by providing an environment where use cases can be developed: specifically, in this case, in the analysis of operations at the Port of Barcelona's Cruise Ship Terminal



Image&Video Processing



Advanced Analytics, IA&ML



Maritime Instrumentation



IoT&5G&NextGen Communications



Logistics & Mobility



Cybersecurity



Future Transportation



3D Impression



Drones - AUV



VR & AR



Location Intelligence & Geo-Mapping



Blockchain



Energy Efficiency & Sustainability



RADAR START-UPS 2023



10

Press Release





Article 1



Maritime Lagoon: New Innovation & Port-City Synergy District for Algeciras.

Written by Gerardo Landaluce Calleja and published in PORTUS-RETE magazine, the article describes the wide-reaching Maritime Lagoon project. With a multi-purpose building complex, the project will establish a true innovation district in Algeciras: a benchmark for digitalisation, research and knowledge transfer in the fields of port logistics and maritime transport on an international level. The article picks up on the project's background and future goals, as well as the services that are soon to be set up at the Port Digital Innovation Centre and at the University of Cadiz's UCA-SEA Innovation Centre.

The culture that sprouted from port cities was a source that found numerous ways to express itself: music, visual arts, technology and other areas of human creativeness. But it also needed to find itself through architecture and urban development.

In Europe, almost 40% of its population lives in mid-sized cities, just like Algeciras. However, the great social, cultural, environmental, economic and technological changes that take place usually do so in the larger cities and their wider metropolitan areas.

It is for that reason that the middling cities – above all port cities – should be endowed with features of interest that serve to attract companies and workers with talent. At the same time, they should still retain their own culture and their heritage as a hallmark. These cities have to be able to draw young people in to offset a population that will naturally age and dwindle.

Port-city integration is where projects, such as the Llano Amarillo initiative on the Northern seaboard of the port-city boundary, acquire vital significance. This is an opportunity to reawaken: a revival based on a knowledge-driven economy, innovation, culture, the landscape, the seascape and a better quality of life. It is here, in the quality of life, that architecture and urban planning comes into its own. Mid-sized cities with a high standard of living can lure the digital talent of youth to a city that grants them personal growth and professional prospects.

The Maritime Lagoon in Algeciras is not just a project that seeks a greater level of port-city synergy in reclaiming an urban port area; it also seeks to become a hub of progress for the region that surrounds it – economically, socially and professionally – on foundations steeped in innovation, new technologies and research.



Article 2

Practical Digital Twin and AI Application at the Port of Algeciras - A Pilot Scheme to Optimise Ferry Operations.

*Published in Port Technology e-Journal PTI-135 North America and co-authored by **Jesús Medina Blanco, Agustin Martinez, Jose Garcia and Mario Lucio**, The Algeciras Bay Port Authority (APBA) and NextPort.AI gave an in-depth explanation of the results of a pilot scheme carried out in the summer of 2023. This, the busiest period of ferry operations in Europe, was backed up by machine-learning algorithms and simulators that provided new decision-making paradigms.*

The operational management of Operation Cross-the-Strait (OPE, in Spanish; Marhaba, in Moroccan) poses a huge challenge for The Algeciras Bay Port Authority every year. For one, the exact number of passengers and vehicles is never very clear, and it is quite normal for shipping lines to reschedule ferry rosters in collaboration with the needs of the Port of Algeciras and Tarifa Authorities and the Border Police Agencies.

The pilot scheme process of analysis helps us understand Operation Cross-the-Strait operations in great detail. For example, berthing times can be unreliable, and a berthing clash can lead to a domino effect on subsequent maritime operations; this then becomes an even greater challenge for operational management: taking on-the-spot decisions, with only a limited level of quality information. Another example is the difficulty in predicting exactly which vehicle-handling areas should be filled to enable the transit of vehicles to and from ferries through our ports, and how full these areas actually are. Similarly, it can be



difficult to measure the performance and evolution of Operation Cross-the-Strait, because we have to compare and contrast information from different sources.

To tackle these problems, we deployed the following component tools that arose from the NextPort Minimum Viable Product (MVP) during a pilot scheme that we set up between June and September last. These included: (1) visual monitoring of operations via the application that provides alarms and alternative solutions for anticipated contingencies; (2) deep machine learning (ML) to predict conflicts and propose alternative solutions, as well as assessing hypothetical scenarios for those propositions; (3) an integrated user experience that can prompt decision-making via available data, pre-empt conflicts, and propose solutions that also link up with land operations; and (4) metrics and indicators that are shown on a control panel via data analysis.

The main aim of the pilot scheme was to validate the abovementioned tools as part of a larger Digital Twin project applicable to ferry operations. Validation was carried out by several Port Authority and Port Police departments.

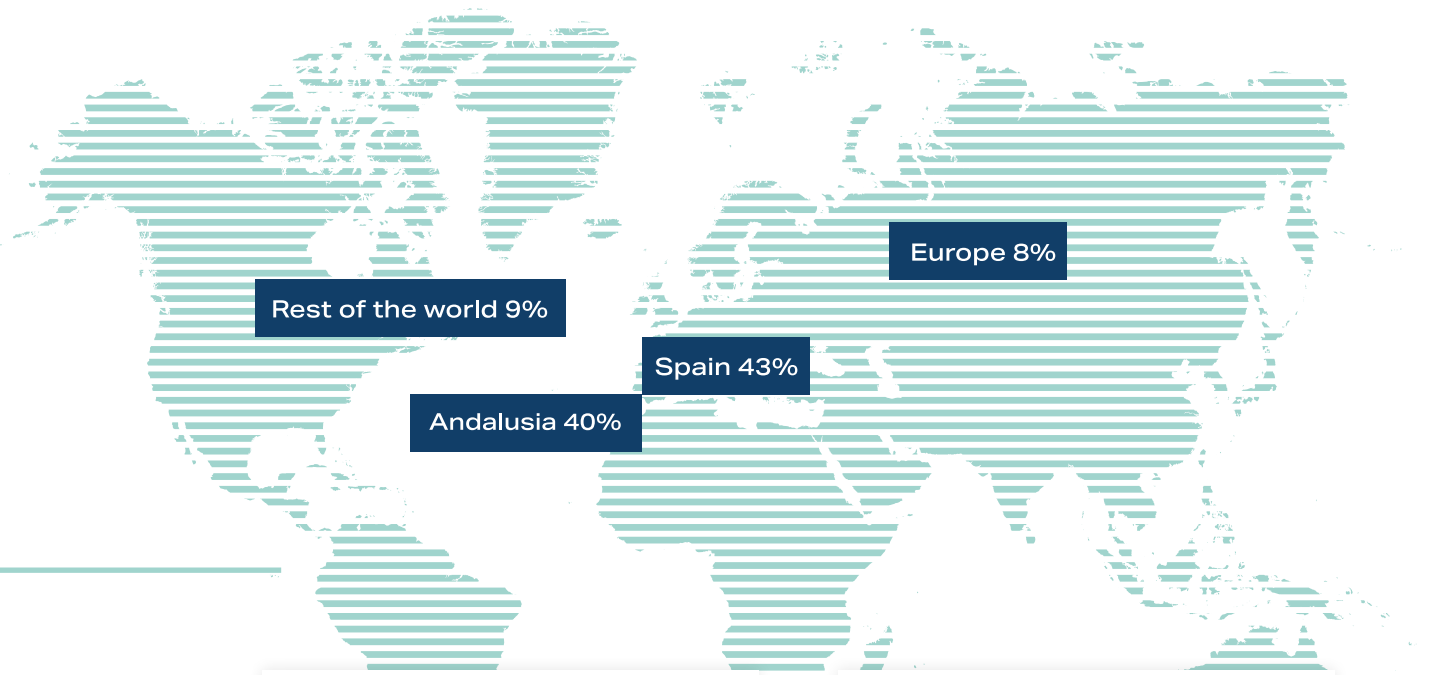
The keys of the tool's functionalities, the innovative nature of the project and its results, are presented in a concise, detailed form in this article.

NEWS PRESS APPEARANCES

1 7 16 24 28 36 43

2017 2018 2019 2020 2021 2022 2023

ORIGIN OF PUBLICATIONS



MAIN RELEASES OF 2023

"The Port of Algeciras continues to lead innovation"

Media: El Estrecho Digital.

APBA launches a new app for passengers at the Ports of Algeciras and Tarifa.

Media: Diario del Puerto.

Thirty-six companies sit on the Port of Algeciras Innovation Committee.

Media: Portal Portuario.

The Port of Algeciras presents cases of Artificial Intelligence use at the 1st Andalusian AI congress held in Granada.

Media: Infopuertos.

The Port of Algeciras – Home of the first smart port-logistics hub.

Media: Cadena de Suministro.

Innovative monitoring technology for Port of Algeciras access and tracking (El Estrecho Digital).

Media: El Estrecho Digital.

Prodevelop presents Posidonia Port CDM findings at Port of Algeciras.

Media: Port Technology.

APM y Sopra Steria to offer internships for the Port of Algeciras Digital Academy.

Media: El Canal Marítimo y Logístico.



©APBA, 2024
All rights reserved

DESIGN AND LAYOUT
Apolo, Propulsora de marcas

PHOTOGRAPHY
Carlos Duclos©
Javier Galo Monge©
Pexels©
Unplash©
APBA©
TTIA©
DFDS-FRS Ferry©
Apolo, Propulsora de marcas©

ACKNOWLEDGMENTS
Carlos Moreira
Anjaney Borwankar
María del Mar Cerbán

And all those who make
innovation possible in the
Port of Algeciras, thank you
very much!

