# Innovation Report

## ///2021

R D & i

The reality of a new port

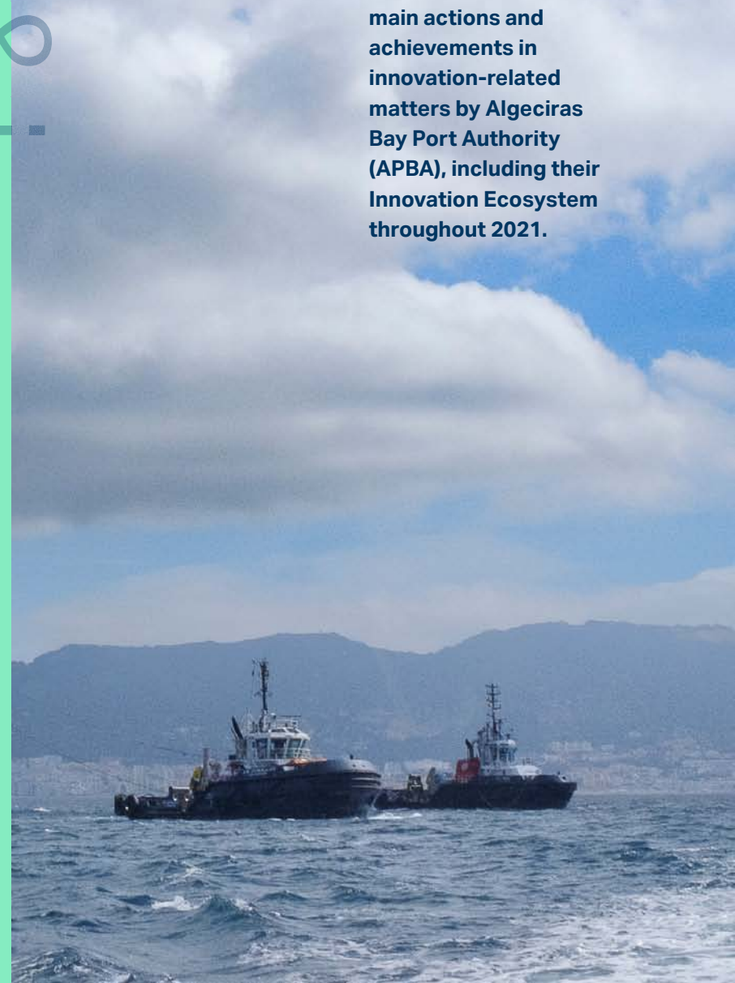
Travesía de la innovación

Travesía de la innovación + Algeciras Port

# Welcome to our Innovation Report 2021

R&D&I

**A summary of the main actions and achievements in innovation-related matters by Algeciras Bay Port Authority (APBA), including their Innovation Ecosystem throughout 2021.**





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

Innovation Report 2021

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# 01 ///

# Foreword by the Chairman and Director

The year 2021 has been marked by a return to normality and the recovery of the path of growth and prosperity that has accompanied the Port of Algeciras throughout the last decade.

This is evidenced by the fact that the Port of Algeciras has overcome the invisible barrier of 100 million tonnes for the sixth year running, representing 20% of total goods across the entire Spanish port system. This milestone is all the more important, if possible, when we take into account the global imbalances in the logistics and supply chains suffered throughout 2021 and in which the Port of Algeciras has demonstrated its operability, efficiency and resilience.

However, in order to face up the international competition in the West Med and take advantage of the opportunity represented by the Strait of Gibraltar as a bridge between Europe and Africa, the Port Authority has approved a new innovation strategy in 2021 which will keep it at the cutting edge of transformation, exploring new markets, business models and technologies. In fact, for APBA, innovation is a strategic priority and something that has been deeply rooted in its culture and processes for many years.

The new innovation strategy, marked out until 2025, seeks to transform the Port of Algeciras into a world leader in innovation and technology, with a focus on competitiveness and logistics orchestration, sustainability and climate neutrality and, thirdly, on talent management and the development of digital skills. All this is accompanied by the Port Authority's firm commitment to the value of data for decision making (data-driven organisation), and its role evolution as a business facilitator, acting as an operational orchestrator. Moreover, we channel innovation through an open model that seeks to grasp any high-impact innovative initiatives in order to turn our concept of the latest-generation port into a reality.

> **The new innovation strategy, marked out until 2025, seeks to transform the Port of Algeciras into a world leader in innovation and technology**

Meanwhile, and also in 2021, one fundamental role has been played by the implemented sustainable development model, which is in the framework of the Port of Algeciras' Green Strategy, as well as every project, initiative and action we have been developing for years with the objective of promoting the improvement


of the three pillars (environmental, social and economic) of the port's sustainability and its surroundings, including all the organizations that make up the Portuary Comunity. With this Strategy we have aligned our business with the commitments of the United Nations Agenda 2030, the Worldwide Network of Port Cities (AIVP) Agenda 2030, the environmental priorities established by the European Sea Ports Organisation (ESPO) and the European Green Deal's lines of action.

The main initiatives carried out in terms of innovation during 2021 are described in this report, bringing together a wide range of projects – balanced between disruptive, strategic and incremental projects – among which we highlight the Port of Algeciras' new Port Community System, the PortCDM collaborative platforms put into production last year, an advanced prediction system for the behaviour of moored or anchored ships under the effects of the physical environment and various experimental pilots with disruptive technologies such as 5G, IoT or Artificial Antelligence. What's more, the *Travesía de la innovación* programme continues its work, allowing us to achieve our established innovation goals, while the first edition of the digital skills-training programme Digital Trekking has already been organised, in partnership with the Cepsa Foundation.

Likewise, we are continuing to make advances in our exciting project for the Lago Marítimo building complex, which will be our flagship Hub in terms of innovation and digital transformation, allowing us to increase the impact of our activity in the region. This space aims to serve as a meeting point between people, technology and companies, their challenges and their opportunities.

We would like to close this introduction by thanking all the employees of the Port Authority and the companies making up the Algeciras Port Community, as well as all our customers and partners, for making our Journey to Innovation possible and supporting us as we continue to progress.

We have some exciting initiatives on the table to consolidate Algeciras' position as an international logistics Hub leading the way in port-logistics innovation and as an economic driving force for Andalusia.

**Gerardo Landaluce** ////
Chairman of the Port Authority

**José Luis Hormaechea** ////
General Manager of the Port Authority

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# 02///

# Our innovation process and outcomes


## /// APBA renews its innovation strategy looking towards 2025.

During the year 2021, the Algeciras Port Authority carried out an internal reflection and retrospection exercise to renew its Innovation Strategy and align it with the company's challenges and strategic goals, focusing its efforts on the competitiveness and sustainability of the Algeciras Bay Port.

The purpose of this Innovation Strategy is to focus our innovation efforts in order to generate greater added value and cover those specific and more strategic goals. In concrete terms, in order to identify and characterise the focuses and aims of innovation, a retrospective analysis of the previous innovation strategy was carried out, followed by an internal and external analysis of the main changing forces for the ports of the future and, in particular, of the Port of Algeciras.

The conclusion of this retrospective analysis found a satisfactory degree of compliance with the goals established in the Innovation Strategy (2017-2020), representing a significant collective effort. However, it was found that the focus of innovation related to environmental sustainability and the resilience of logistics Hubs required greater action and, as such, the decision was made to reinforce this in the new strategic plan. Likewise, the simplification of the focuses and goals of innovation was proposed, in order to concentrate efforts and improve their communication.

On the other hand, from the internal and external analysis carried out, it was determined that the future competitiveness of the Port of Algeciras – as an international logistics Hub within a strategic location – would come from being operationally excellent both within the port and to and from its value chains.

In this context, and bearing in mind the evolution and transformation of the different economic and industrial sectors served, the future of the Port depends on digital transformation and innovation, which should tend towards auto-orchestration and the optimisation of port-logistics processes (data-driven innovation).

Likewise, as a logistics Hub and key actor in maritime and road transport, the Port must actively contribute to the decarbonisation of the port activity, as well as the various modes of transport involved, promoting the concept of synchromodality and offering an infrastructure capable of supplying the demand for alternative fuels

and meeting the goals set by the SDGs for 2030 and 2050. Furthermore, according to Law 7/2021 on climate change and energy transition, ports under state jurisdiction must achieve zero direct emissions by 2050.

Given the context described above, the mission/vision of the 2025 Innovation Strategy established is as follows: To transform the Algeciras Bay Port into a world leader in innovation and technology: To implement the concept of a Next Generation Algeciras Port: Intelligent (data-driven and innovative), Synchromodal (operational excellence and logistics integration) and Green (sustainability and climate neutrality).

Going into further detail, the focuses and goals of innovation on which the Innovation Strategy is based are:

### F1. Competitiveness and logistics orchestration

1. To improve the competitiveness of port-logistics operations and increase operational efficiency.
2. To improve the integration and physical and digital connectivity of the Port of Algeciras with regional and global logistics chains.
3. To improve the sustainability of port-logistics operations and contribute to the decarbonisation of maritime transport.
4. To increase the quality of the Port's service (Completeness, efficiency and connectivity).

### F2. Sustainability and climate neutrality

1. To decarbonise the port activity and mitigate emissions of polluting gases (greenhouse gases and aerosols) to reduce climate change and improve air quality.
2. To increase the environmental quality of port activity within the urban fabric.
3. To improve the Port's energy efficiency.
4. To encourage circular and regenerative port-logistics activity.
5. To preserve the marine ecosystem and biodiversity with a sustainable infrastructure compatible with port activity.

### F3. Innovation and talent

1. To drive innovation and the generation of new business models with the Port.
2. To develop a world-leading technology, innovation and port-logistics training Hub.
3. To consolidate the Port of Algeciras brand as an innovative and technologically advanced port.
4. To promote the creation of talent and drive its attraction and retention within the Port.

It should be noted that the innovation focus concerning sustainability and climate neutrality brings together the main elements of APBA's recent Green Strategy and, in particular, those in which innovation may act as a catalyst through which to achieve the objectives set therein.

After defining and characterising the strategic focuses and goals, a package of 20 strategic indicators was defined, with their corresponding current measurements and targets Which will facilitate the monitoring and compliance.

Finally, a summary infographic of the APBA 2025 Innovation Strategy is presented, detailing its values and facilitators, alongside the main technological and innovation projects.

## Innovation Strategy 2021-2025


### /// APBA awarded the 12th edition of the ESPO Award for 2020.

In August, the Port of Algeciras welcomed the Secretary General of the European Sea Ports Organisation (ESPO), Isabelle Ryckbost, who delivered the painting by Dutch artist Sasja Hagens to the Chairman of APBA, intended for the winner of the 12th edition of the ESPO Award in

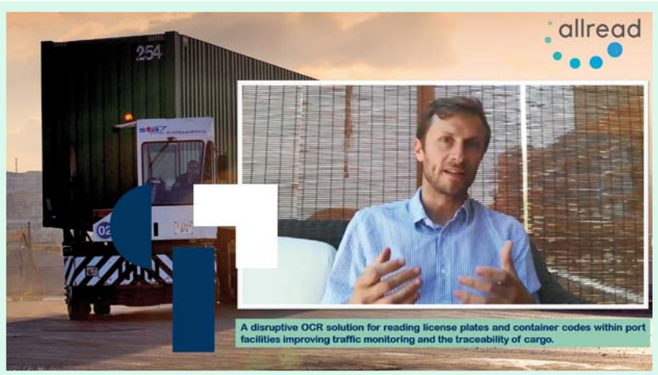
2020, a ceremony which was held on-line in November 2020 as a result of health restrictions.

> This prize recognised APBA's work in promoting the integration of innovative companies and local entrepreneurs within the port area.

This prize, which was announced by the European Commissioner for Transport, Adina Valean, recognised APBA's work in promoting the integration of innovative companies and local entrepreneurs within the port area.

Ryckbost, who also visited the container terminals of TTI Algeciras and APM Terminals Algeciras, held a working meeting with the Chairman and General Director of APBA, Gerardo Landaluce and José Luis Hormaechea, respectively, as well as with the chairmen of the port-business associations, Comport, Ateia and Apemar, among others.

Furthermore, the award ceremony featured virtual testimonies from some of the start-ups who have collaborated with APBA over the last few months, such as Allread, what3words or PortXchange, for example.






## /// APBA renews its commitment to innovation.

The Algeciras Port Authority (APBA) has renewed for another year its RD&i management system certification, and it officially proves that APBA continues to meet the requirements from the UNE 166002:2014 standard regarding research, development and innovation (RD&i) within the scope of logistic and port operations.

This renewal reinforces APBA's commitment with RD&i, as well as the quality standards reached over the last years when it comes to coordinating and systematising the innovation processes. Through these processes we endeavour to achieve excellence and hence to strengthen the sense of satisfaction in our customers and users. In addition, this renewed certification acknowledges that we continue to commit to an experienced, competitive and high-quality RD&i Management System, whose effectiveness is unbiased, that guarantees good practices, and that promotes an ongoing improvement and high-quality innovation-related actions and projects.

## /// The Port of Algeciras relocates its Testing and Integration Centre (CPI) and refurbishes it to become a sandbox for digital solutions in the port-logistics sector.

APBA, seeking to consolidate the Port of Algeciras as a leading international ecosystem for technology and innovation applied to the port-logistics sector, has carried out the relocation, renovation and updating of its Testing and Integration Centre (CPI).

This is a space which has been technologically prepared for the performance of validation tests and the integration of new software developments with the organisation's existing systems, within a pre-production environment, before being implemented in the port's daily operations. This includes access to the data provided by APBA's digital systems.

The various digital platforms available in the centre include the Port Management System (PMS), the Port Photo-Capture System (SCI) or the Comprehensive Management System for Facilities and Infrastructures in Virtual Environments (SG3iEV).

The CPI falls under the concept of the Port Living Lab proposed by the Port Authority, offering Port installations as a real testbed and environment of experimentation in which start-ups and companies, together with potential users, can co-create and validate products and services adapted to the real needs of the business. Start-ups, industrial partners, research institutes and local universities can access this testbed to develop and test their solutions.

This renovated space, together with other facilities currently under development, will allow for the combination of cross-cutting organisational innovation initiatives with the ecosystem of entrepreneurs and start-ups, and will help to create a world-leading port-logistics innovation ecosystem allowing us to consolidate a new production model based on innovation and knowledge. The Hub will be located in the multifunctional-buildings complex that forms part of the Algeciras Lago Marítimo project. ■

> **The CPI falls under the concept of the Port Living Lab proposed by the Port Authority, offering Port installations as a real testbed and environment of experimentation**


# 03///

# Listening to innovation experts


**José Llorca**
Head of the State Ports Innovation Department

José Llorca is the Head of the State Ports Innovation Department. Academically, he is a Civil Engineer from the Polytechnic University of Catalonia and a civil servant in the Ministry of Defence's Senior Technical Staff. Throughout his professional career, he has held various roles within the Ministries of Defence and Development. In the latter, he served in the General Directorate for Ports and Coasts, the General Directorate for Ports and in the State Ports body. He has also participated in the European Union Port Working Group, as well as the Dredging Experts Group for the International Maritime Organization's (IMO) London Dumping Convention. He also served as secretary of the Spanish Ports and Coasts Association between 1990 and 2000, and was a member of the World Association for Waterborne Transport Infrastructure's Finance Committee (AIPCN-PIANC). Between 2000 and 2004, he was Chairman of the State Ports body and of the public company PORTEL. Subsequently, between 2012 and 2018, he returned to hold the same position in the state agency. Currently, as Head of the State Ports Innovation Department, he is responsible for the «Ports 4.0» Fund.

## /// Innovation in the Spanish port sector and the Ports 4.0 Fund.

**?< The Ports 4.0 project has already attracted its first ideas and projects (61 candidates elected between 474 received), with the aim of promoting talent and entrepreneurship and thereby improving competitiveness in the port-logistics sector. How would you evaluate this first edition and what tangible results are expected in the short to medium term? >**

The evaluation of the first call of the 'Ports 4.0' fund has been really positive. Both the number of candidates presented in both modalities – coming from 14 different countries across six continents, with support provided to these candidates from 28 countries – as well as the quality and cross-cutting nature thereof, has demonstrated that the strategy that led Spanish ports to create the

fund has been completely successful in bringing innovative ecosystems closer to the port sector and raising awareness within the port-logistics community regarding the necessary transition to the new economy in order to maintain and increase its levels of competitiveness. The results of this first call, with more than 60 projects underway, in addition to 90 new projects from the second call currently in progress, consolidates the initiative and strategy on which it is based and is today considered an example of how open-innovation processes driven by the public sector can promote the transformation of an economic sector as relevant as that of logistics.

**?< Among the many candidates received, which were the three main innovations presented likely to change the course of a port-logistics sector that has been booming over the last five years? >**

This is an impossible question, precisely because of the expansive range of the ideas and projects presented that prevents any ranking thereof. Candidates have been presented that improve logistics efficiency, sustainability, the application of renewable energies, safety and protection, and the sector's digitalisation processes, both in terms of software and hardware. They all facilitate a change of course within a sector with various overlapping scopes. We have seen how the concept of Port 4.0 is much more than the mere digitalisation or introduction of enabling technologies for the new economy, and that disruptive technology must be introduced in various links of the value chain, including new hardware or decarbonisation projects.

**?< The second call of the Ports 4.0 fund is already underway and candidates for commercial ideas and projects have been received. What initial conclusions can we extract from this second edition, compared to the first? How will the following editions be planned, are any changes expected? >**

The second call has closed in the Commercial ideas and projects modality, with the pre-commercial projects category coming to a close next. The first conclusion is a reduction of the number of candidates presented in comparison with the first edition. However, this does not indicate that the initiative has run out of steam; in fact, it is quite the opposite. The process behind the awarding of grants in the first call was very serious, transparent and cautious, with hardly any arguments and with very high cut-off marks, which has led us to increase the amount allocated for the new call to prevent very interesting ideas or projects being left out due to a lack of funds. As such, there has been an awareness that the candidates must be very well grounded, with all the required documentation very carefully and comprehensively filled out, in line with the requirements of the regulatory bases in order to ensure a real chance of being awarded these grants. In turn, the Port Authorities are being much more demanding when it comes to providing support or facilitation agreements to really interesting and disruptive projects and ideas, in order to maximise the results obtained through their innovative ecosystems, and are even intervening to a greater extent in the construction of proposals. As such, I believe that these aspects may have discouraged the presentation of candidates that did not yet fulfil these conditions for each of the modalities. These high standards consolidate the prestige achieved by the programme.

**the concept of Port 4.0 is much more than the mere digitalisation or introduction of enabling technologies for the new economy, and that disruptive technology must be introduced in various links of the value chain, including new hardware or decarbonisation projects.**

**?< Until now, we have seen that each Port Authority has acted independently when it comes to supporting and collaborating in certain projects, but how have you found the collaboration between Port Authorities in co-developing a given innovative project with global application within the sector alongside a start-up? Are initiatives emerging between different ports to find synergies? >**

Basically yes. In general, Port Authorities have acted independently when it comes to supporting or acting as facilitators of ideas and projects, in many cases closely guarding their strategies in order to maintain high levels of competitiveness for their port community. Barring a few exceptions, coinciding with those Ports having already developed PortLabs or Innovation Hubs, it has been the entrepreneurs, start-ups or technology companies who have approached the ports to request support or facilitation. As such, there have been no collaboration initiatives between Port Authorities, except where candidates have requested help from several Port Authorities to reinforce their proposal or where it has been deemed necessary, according to the different characteristics of a port, to test a concept or the performance of prototypes in various examples. With the exception of the latter, in the technological maturation phases of an idea or project, I do not consider this collaboration essential. Synergies are associated so that all ports, both the public part and the entire port community, can get to know the innovative ideas and projects, their state of technological maturation and the options they offer to improve the competitiveness of a port once they reach market. The most important thing about this information is that it facilitates knowledge of what is being developed or is already on the market, avoiding duplicates in the processes of product or equipment acquisition, in the management of processes, and in the contractual costs associated with the development of products that may be proposed as innovators. To achieve these goals, we are planning specific presentation days to introduce the winning ideas and projects of the Ports 4.0 Fund calls and the results obtained through these grants to Port Authorities and their port communities.

**?< We are seeing that practically all ports want to become places for testing and serve as demonstration sites (Living Labs), but are all ports truly prepared for this, both physically and digitally – or even technically? Are they agile enough to support and accompany start-ups through the different phases of growth? >**

I think it would be very useful for all ports to develop PortLabs or innovation Hubs that promote an interrelation with their local innovation ecosystems. Each port has different characteristics, particularly with regard to their port community, which may result in a certain specialisation in the support of disruptive projects, as well as different equipment needs. The strategy in this field does not need to be unique, and should adapt to the characteristics of both the port and its port community, and the local entrepreneurial ecosystem. Many ports have implemented models with different focuses and partners that will allow them to evaluate the results of each.

**?< How can Port Authorities support themselves with experts and specialists to address the technical and technological needs that start-ups and entrepreneurs offer and thereby respond to business challenges? Do you believe that there has been a paradigm shift for Port Authorities and their Port Communities with regard to start-ups and technology companies? >**

I believe that there should be a change in the relationship model between Port Authorities and their port communities with innovative ecosystems, understanding that it is not possible to transition to the application of enabling technologies for the new economy without open-innovation models. The old models for the incorporating innovation within productive processes from internal departments are not only ineffective, but impossible at this time. Many corporations belonging to different eco-

nomic sectors have arrived at the same conclusions. I firmly believe that the Ports 4.0 Fund and the generation of PortLabs or innovation Hubs in each port is supporting this paradigm shift enormously.

**?< Are there any barriers that make it difficult for Port Authorities to definitively opt for digital innovation? Is the legislation being adapted to facilitate this scenario? >**

I want to make a distinction between the digitalisation of processes with innovative technology and the participation or driving of technological-maturation processes in disruptive ideas or projects. The introduction of innovative technology in Port Authorities or in the port community must be done through contractual procedures, including innovative public purchasing or other possibilities offered by contractual legislation. Open-innovation procedures, which may end with the acquisition of the product or the use of the prototype whose technical maturation has been supported, through facilitation-grant processes, are not covered by existing legislation. The General Grants Law does not permit compensation for the grant received or any returns for the authority offering said grant. Without a doubt, these aspects must be regulated in order to break down any barriers that make it difficult or impossible for public companies or other public-sector entities to promote innovation processes from their very early maturation phases. I am confident that a future Start-Ups Law, focused on promoting innovative entrepreneurship, will alleviate many of these barriers.

**?< To finish, and thinking about the next five years, how do you see the Spanish port sector in terms of innovation, entrepreneurship and value? What type of innovation or new business model do you expect to have been implemented and consolidated in our sector? >**

I believe that many things will change in the next few years in our ports, with the introduction of enabling technologies of the new economy. There will be a growing digitalisation that tends towards the automation of processes based on collaborative models, sensorisation and data analytics, with the application of Artificial Intelligence and Deep-Learning techniques. Of course, this will involve greater robotisation of operations and improvements in the compatibility of port activity and its services with the progressive advances of autonomous vehicles – both road and maritime. It's important to remember that new developments in the field of maritime-transport and port-activity decarbonisation, and in the generation of green energy that promotes self-consumption, will become a reality. Finally, all this goes hand in hand with a transformation of the port community, associated with accelerated disintermediation processes.

> **There will be a growing digitalisation that tends towards the automation of processes based on collaborative models, sensorisation and data analytics, with the application of Artificial Intelligence and Deep-Learning techniques**



**Ander Pomposo**
Senior Director of Innovation at IDOM

Ander holds a bachelor's degree in Business Administration and Management and a Master's in Management Development from the Deusto Business School. He has more than 18 years of professional experience, working for the last eight years as consultant to innovation projects and facilitator of co-creation processes for the generation, validation and performance of new products, services and processes responding to clients' needs. He is an expert in innovation, lean and agile methodologies (Design Thinking, Lean Startup, Open Innovation, Scrum, Technology Road Map, etc.) used in innovation processes; Service Design; Business Design; open innovation and intra-entrepreneurship within companies; processes of acceleration and scaling of start-ups; and in the development of a culture of innovation. He has studied innovation methodologies, Service Design and Business Design at THNK (The Netherlands) as well as facilitation at Kaos Pilot (Denmark), and is a Scrum Alliance Certified Scrum Master.

## /// Innovation and entrepreneurship Hubs.

**?< Innovation models have changed and there is now little point in having a single innovation department within companies, as it is impossible to have specialists that manage the entire modern technological stack. In this context, and firstly, what does open innovation consist of? >**

Without a doubt, innovation models have developed greatly in the last few years. From innovation areas tied to the technology department to independent areas and even independent spaces within companies' business units. Initially, innovation was driven by the organisations themselves, but technological disruption and the slow pace of its implementation often hindered its success. Many companies are not capable of taking advantage of the opportunities that technology can offer, whether because the necessary knowledge is not available within organisations, or because they are not capable of attracting talent and quickly integrating it in the organisation and launching it to market. In this context, many companies have opted to combine their innovation with an open-innovation model, creating links with start-up ecosystems.

**?< How can companies and organisations take advantage of open innovation? What is the path to achieving this? >**

Open innovation allows companies to access technology and talent in a quick and agile way. In many cases, these are highly disruptive technologies that the company would take years to integrate internally. What's more, the majority of start-ups that take part in open-innovation processes present business models that have already been validated and accepted on the market. This agility when it comes to seeking solutions and introducing them on the market is a value for companies today looking to position themselves and become more competitive through technology.

To achieve success in an open-innovation process, companies must deepen their knowledge and ensure a detailed understanding of both their challenges and the main benefits of collaboration with a start-up. Based on the identification of the challenge, it is essential that companies are supported by powerful ecosystems, whether national or international, that grant access to start-ups interested in collaboration. Finally, it is fundamental that a relationship of trust and, of course, mutual benefit is established between both parties.

**?< Why do many companies struggle so much to innovate? Is a change of mentality required in the management of companies? >**

There are several factors that make innovation difficult for companies, but I would highlight the following: working in silos makes communication and collaboration between people and teams difficult, rigid structures prevent quick decision making, and there is a lack of time in which to explore new opportunities, a lack of creativity and entrepreneurial initiative as well as a fear of experimentation.

Although it is essential to maintain a series of stable practices that facilitate greater reliability and efficiency in companies (strategic orientation, accountability, etc.), it is also necessary that a series of more flexible practices is introduced (experimentation, creativity, open innovation, etc.) which facilitates greater speed and capacity to respond and adapt to new environments of continual change. In this sense, the models of open-innovation provide these flexible practices increasingly demanded in today's environments of change and disruption.

**?< Within the field of innovation, there has been a lot of talk about the concept of the 'innovation Hub' recently. How would you define an innovation Hub? >**

An innovation Hub is a space to put experimentation into practice, a place in which to advance in a more agile way towards innovation in new products, services and business models and towards the introduction of new disruptive technologies within organisations.

**?< On what pillars are these innovation Hubs based? >**

Firstly, on technology. This must be a space with talent and knowledge in the main technologies today and a good observatory of international trends. Secondly, it must be a well-connected space with an international ecosystem of start-ups that facilitates rapid and effective scouting of companies that best suit the needs of the business. Thirdly, a good process that promotes innovation and relationships between start-ups and other areas of the company – a process based on experimentation and agility. And, finally, a close and continuing relationship between company business units that allows for greater awareness of activities, identifying company challenges and involving the main sponsors throughout the process.

**?< APBA has spent several years working to consolidate the Port of Algeciras as an open-innovation Hub and to create an innovative ecosystem around the port-logistics business. Do you believe that this is the right decision? What could the effects be for the Port? >**

Like any organisation of APBA's size and relevance, creating an ecosystem of innovation around its main business will allow it to stay at the cutting edge of the main technologies and take advantage of the differentiating value that these technologies can offer to its clients. This Hub will be an international model for technological innovation in the port-logistics business and a key tool for competitiveness in the face of other ports, both national and international.

**?< In this regard, the new Lago Marítimo project driven by APBA in partnership with the Regional Council of Andalusia and the UCA includes a building intended to promote entrepreneurship, learning, creativity and collaborative work, etc. Is it important to have physical infrastructures that support the consolidation of these innovation Hubs? What benefits do they bring? >**

Physical spaces are highly relevant in the innovation ecosystems of organisations like APBA. Not just any space will do, and as such its uses and design must be well designed in advance in order to offer the services that these ecosystems need and demand: spaces for learning, networking, creativity or the testing of new products and services. Although in recent years we have discovered the benefits that remote work can offer, physical spaces are without a doubt the ideal spaces for building trust and collaboration between the different stakeholders. In this regard, the Lago Marítimo project must serve as a meeting space and space of business generation for companies, entrepreneurs, start-ups and driving institutions in the port-logistics field.

> **The ability to access one of the largest European ports, with real challenges and spaces to test their solutions is a truly unique opportunity for many companies and start-ups, both national and international.**

**?< Is it necessary to work hand in hand with other public and private partners to implement these types of initiatives? What types of collaboration are being used for this, both nationally and internationally? >**

Faced with lineal and traditional innovation, open innovation is booming, encouraged by Public Administrations as an instrument that channels and brings together the region's innovation skills from large companies, academia, public institutions, society, start-ups and entrepreneurs. Likewise, in recent years, R&D Hubs have been growing based on collaboration agreements between private companies and the public sector. These are very specialised technological and strategic Hubs for the development of new products, services and business models in growing sectors with a huge impact for the region.

**?< Malaga, after the arrival of various tech multinationals, is reaffirming its status as a southern Europe technological Hub. Do you believe that the emergence of other innovation Hubs in nearby cities may impact the consolidation of this Hub that APBA hopes to achieve? How? >**

Many international corporations have implemented R&D Hubs specialised in the application of disruptive technologies such as Artificial Intelligence, Big Data or the IoT. These R&D Hubs are generators of new business opportunities and employment in the regions in which they are based.

Malaga is an example of this trend, making it an inspiration not just on a national level, but across Europe. One of the main advantages for Malaga, but also for all other Andalusian territories and companies, will be the attraction of technological talent, which is so demanded and necessary today. This attraction of technological talent will place Malaga and its entire ecosystem as one of the most attractive technological Hubs in Europe. And the Port of Algeciras will undoubtedly benefit from this talent and knowledge.

**?< Faced with the growing range of innovation spaces, entrepreneurial communities and incubation/acceleration programmes, and even start-up 'factories', what suggestions or recommendations would you give to a public administration like APBA to offer differentiating value to entrepreneurs, start-ups and technology companies in order to consolidate itself within the future digital-innovation Hub of the Port of Algeciras? >**

It is essential to begin with concrete and well-defined challenges that allow entrepreneurs and start-ups to present concrete and well-defined solutions in terms of both scope and budget. Furthermore, continuous support to the start-up is crucial, as it offers periodic feedback in order to adapt the solution to the business' real needs. As we mentioned earlier, there must be a good process that facilitates communication between both parties in order to observe progress towards the solution's implementation.

I also believe that it is essential to offer start-ups challenges and experimentation spaces that give rise to solutions that may be subsequently scalable and replicable in other environments, both nationally and internationally. There are few organisations that can offer the opportunities that the Port of Algeciras can offer to many entrepreneurs and start-ups with regard to the port-logistics business. Without a doubt, the Port of Algeciras can be an international role model for many start-ups in this environment.

**?< Finally, when it comes to creating this ecosystem and attracting talent, what do you believe that entrepreneurs and start-ups value more when it comes to taking an active part in these initiatives? >**

The opportunity to test, develop and improve their solutions within a real environment in the port-logistics field, which may subsequently be replicated and scaled. The ability to access one of the largest European ports, with real challenges and spaces to test their solutions is a truly unique opportunity for many companies and start-ups, both national and international. Furthermore, offering an environment with growing talent attraction and technological knowledge places the Port of Algeciras in an enviable position with regard to its competitors.

**Antonio Jara**
CEO at Hop Ubiquitous

Antonio J. Jara is CEO and founder of the start-up HOP UBIQUITOUS (HOPU), Vice-Chair of the IEEE Communications Society Technical Committee on the Internet of Things and member of the FIWARE Foundation's Board of Directors. With more than 15 years of experience in the field of IoT, he has worked and collaborated in multiple national and European projects, such as the University of Applied Sciences and Arts of Western Switzerland (HES-SO). He has published over 150 articles and communications in conferences around the world, more than 40 Thomson Reuters JCR-indexed articles and more than 10 contributions to keynotes, tutorials or invited talks. Currently, he is also working in the fields of Big Data and Knowledge Engineering for Smart Cities.

## /// IoT and support to start-ups.

**?< Firstly, could you tell us a little more about your start-up? How and when was HOPU born? >**

HOPU was born in 2014 in Ceutí (Murcia), as a resource to accompany cities in the process of digital transformation to become Smart Cities, offering tools to improve urban-health indices. Our commitment to people is our central mission, developing solutions that bring about technological advances in the field of daily use, improving the quality of life of citizens.

**?< HOPU is mainly focused on the research and development of IoT solutions, one of the most talked-about emerging technologies today. How do you define the IoT or Internet of Things? What types of solutions do you create at HOPU with this technology? >**

The fundamental aim of solutions based on the Internet of Things (IoT) is the exchange of data, through the interconnectivity of different hardware devices and software programmes, in order to improve the quality of life of people by offering better public services. These offer an overall view of what is happening, for example, in a city, in order to anticipate any incidents. In short, it's about efficiently planning and taking decisions based on data and evidence.

More specifically, we at HOPU generate urban innovations through decision-support tools and genuine IoT devices to monitor impact, sustainability, the environment, noise, weather and, with a high degree of detail, air quality. We mix data and technology to offer people a truly powerful urban-innovation tool. Our aim is to support the creation of Smart Cities both today and tomorrow, in which citizens and visitors truly feel that they are in an 'intelligent' city.

The main problem we seek to address is supporting urban technicians and planners in their decision-making process, guaranteeing that decisions take into account suitable indicators for sustainability, climate change and air quality, and always focused on people.

> **The Port of Algeciras will position itself at the forefront within Europe, becoming the most modern port in the south of Europe when it comes to digitalisation and sustainability**

Our solution consists in offering, on the one hand, hardware – involving in-house manufactured IoT Smart Spot sensors for the monitoring of air quality – and, on the other hand, software with the SaaS platform for following up on actions, indicators and decision making. Unlike other companies in the sector, we at HOPU can offer just one part – for cities that already have devices or platforms – or a comprehensive solution to those cities in the earliest stages of their digital transformation, supporting them from data collection through the sustainable urban-design process.

**?< As well as IoT, do you incorporate other innovative technologies in your solutions, such as Artificial Intelligence or the blockchain? Could you give us any examples? >**

HOPU is not just a company dedicated to air quality and the IoT, it is also a company based on research and the development of all those services and technologies that may directly impact the quality of the services it offers its clients. It is for this reason that HOPU is venturing into innovative and disruptive research proposals, such as a Data Spaces federation service that guarantees the quality and transparency of data through blockchain technologies for all users, or a security service which makes it possible to restrict users' access to data according to their geographic location, also based on decentralised technologies such as blockchains.

**?< Do you believe that companies or organisations can lose their competitive advantage if they do not incorporate these new disruptive technologies? What advice would you give from your experience with these technologies? >**

It is no longer a question of losing competitiveness, but remaining in the margins and isolated in an analogue world, faced with a society based on technological innovations. To give an example, tourist destinations no longer exclusively seek to attract visitors with marketing campaigns, but to understand the impact of tourism in the city, how it affects the management of water and energy resources, how to improve public services like transport and, crucially, how this impact affects the local population.

The first step for those organisations, companies and cities that have not started their digital transformation will be to turn to specialist companies, like HOPU, in order to analyse their starting point and plan the actions to be carried out in a Master Plan, based on clear and strategic objectives.

**?< One of the fields in which IoT is most applied is in environmental sustainability. How is IoT currently used to offer a positive contribution to the environment? >**

At HOPU, we offer urban innovation through key techniques such as Artificial Intelligence, the IoT and data quality. We involve citizens and managers in decision making

in order to guarantee that data is understandable to all, intuitive and useable. HOPU supports urban development and digital transformation through tools based on data with visualisation tools and IoT devices to supervise the impact, sustainability and environment of urban environments. We mix data, technology and people, offering a powerful urban-innovation tool – creating smart and sustainable cities, in which people can feel the difference.

**?< How do you believe that ports can apply this technology to achieve their 'green' goals and mitigate climate change? To what extent are ports adopting this technology? >**

The Port of Algeciras will position itself at the forefront within Europe, becoming the most modern port in the south of Europe when it comes to digitalisation and sustainability, thanks to the FIWARE Challenge 2020, in which we will create an advanced environmental and sustainability-management platform. More than 120 sensors in 17 different locations will allow the real-time monitoring of air-quality values such as gases ($NO_2$, CO, $CO_2$, $O_3$, $SO_2$, $H_2S$), volatile organic compounds (VOC), PM1, PM2.5 and PM10 particles, noise levels, meteorological values such as temperature, humidity, solar radiation, precipitation, and wind speed and direction. What's more, through the installation of a water probe, we can also monitor parameters such as temperature, turbidity, pH levels, dissolved oxygen and sea conductivity in the port environment. All this data, alongside others from external devices, will be brought together in a single platform which will analyse the forecast of episodes and incidents through AI algorithms in order to anticipate these in future.

The determination of the Algeciras Bay Port Authority in making a firm commitment to compliance with the Sustainable Development Goals in terms of combatting climate change should be, without a doubt, an exemplar for all other ports, who we at HOPU encourage to closely follow the results of this project.

**?< Let's now talk about support for start-ups, recently, the Council of Ministers approved the new Start-Ups Law project. What do you think about this? What do you think are the most relevant aspects? Do you believe that this initiative will manage to attract more investment, entrepreneurship and talent? >**

The public administration owes a great deal to Spanish start-ups. We have been a driving force behind innovation and progress in this country and we have been forgotten when it comes to the support received by large corporations. The European Union, on the other hand, has always focused on the entrepreneurial spirit of young people, with a wide programme of innovation and investment projects.

Fiscal improvements are, of course, beneficial, but what we at HOPU hope is that the regulations will come with an ambitious plan to ensure that Spanish talent does not need to emigrate in order to find success. Projects such as Wayra (Telefónica) and Lanzadera (Mercadona) – both programmes in which HOPU has participated – represent examples to follow in which money is invested in Spanish start-ups to help them progress and build a future.

> **APBA's participation in the FIWARE Challenge to drive the digitalisation of the Ports of Algeciras and Tarifa is a clear example, in which they have put their support behind a project based on R&D with small businesses instead of launching a complicated tender that would have left them out**

On the other hand, and in this case, there is the potential to attract the best from Europe to Spain through FIWARE iHubs in particular: digital-incubator and accelerators based on the local adoption of European technologies. Without a doubt, one of the greatest benefits for us has been the chance to join the Andalusia FIWARE Zone and actively take part in the FIWARE ecosystem, through participation in the FIWARE Challenge 2020.

**?< According to your experience, do you believe that institutions give enough support to newly created companies? What more can Public Administrations do to support entrepreneurship? In your opinion, how would you evaluate the support received by APBA? >**

I believe that the need to create the Start-Ups Law reflects the scarce support that small businesses have received. We need the administration to take part in aspects such as business training, simplifying bureaucratic formalities, creating networking spaces to cut the costs of launching start-ups, Spanish Official Credit Institution loans and internalisation plans, to name a few examples.

APBA's participation in the FIWARE Challenge to drive the digitalisation of the Ports of Algeciras and Tarifa is a clear example, in which they have put their support behind a project based on R&D with small businesses instead of launching a complicated tender that would have left them out. What's more, the synergy created with the Port Authority during our joint project has been absolute, applied from the very outset and actively contributing in each phase.

**?< To close, in this new scenario caused by COVID-19, how do you see the post-pandemic technological panorama? What contributions can IoT offer in this new panorama? >**

All the solutions implemented to fight COVID-19 have been created based on IoT solutions – absolutely all of them. Sharing information, working together across Europe or having level access to data are just a few of the features of IoT technology.

At the start of the pandemic, we at HOPU decided that we needed to contribute to society in order to stop the virus. From the very start, we allied with an Italian company, Engineering, in order to create two solutions – together with EIT Digital – which would stop the spread of the virus (TOKEN) and create safe hotel and leisure spaces (Go.Safe). Currently, we are developing the HORECOV project alongside the Polytechnic University of Cartagena (UPCT), the Technological Centre for Energy and the Environment (CETENMA) and the Hotel Alfonso XIII of Cartagena, in which we are building a system based on Artificial Intelligence for the prediction, prevention and monitoring of viral or bacterial agents (such as COVID-19) in any business sector.

As you can see, IoT solutions are present in various aspects of our daily lives, improving the urban health of cities and citizens' quality of life, based on innovation and technology.

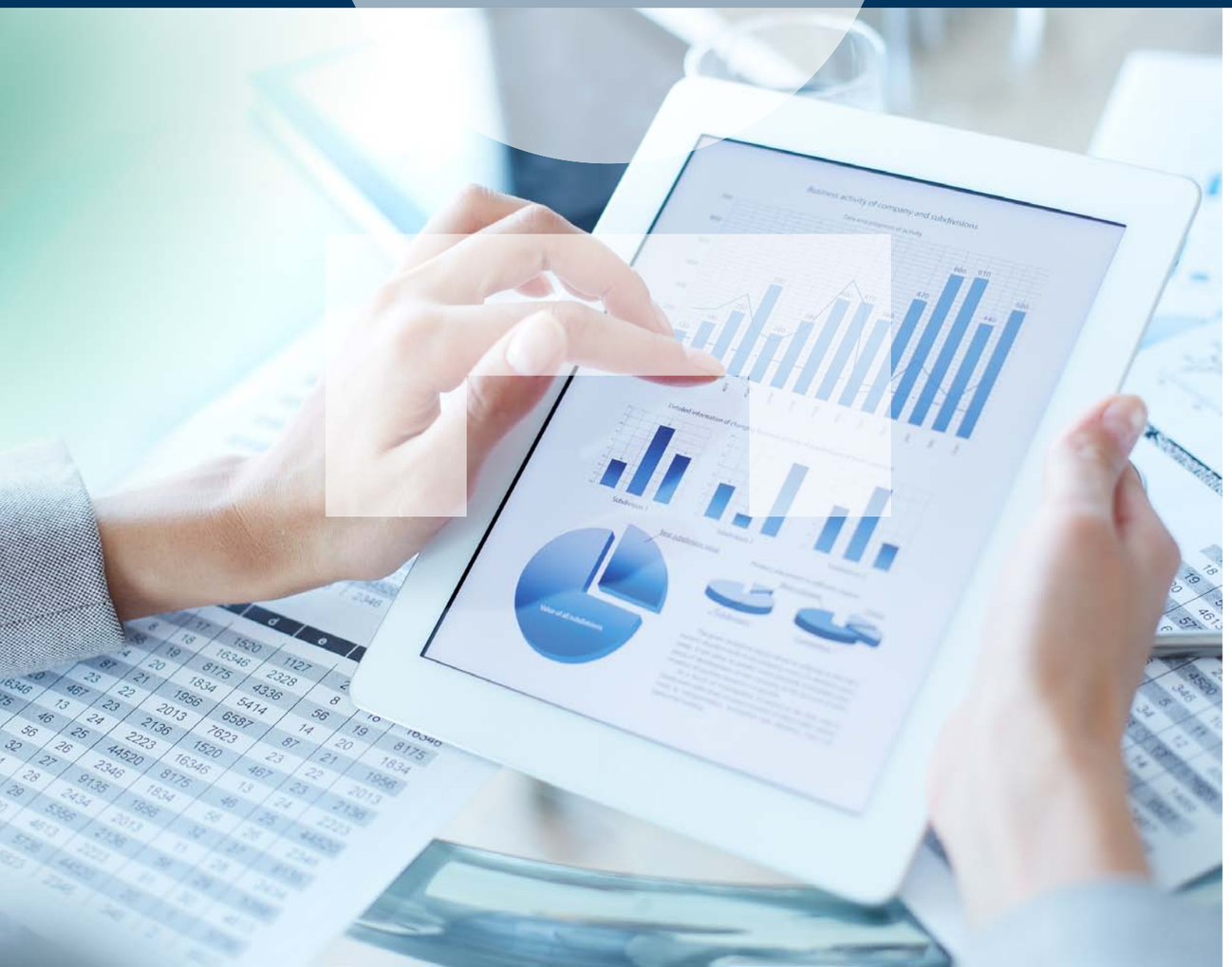
**?< Finally, what is the most important lesson you have learnt in your career as an entrepreneur? What advice would you give to someone who is planning to launch their own business in a market like port logistics? >**

The most important lesson I have learnt in my career is that the biggest differences will be found in methodology and attitudes towards things. These two aspects define the potential of a company or group of workers. In my experience working for large corporations such as United Technologies (OTIS) in Ireland, I understood the importance of processes and organisations. On the other hand, in South Korea, in the National Mathematics Institute, I learnt the importance and value of transparent communication and empathy within a work environment. In this case, curiously enough, I learnt this because I had experienced the absence of these aspects within the workplace and therefore understood that it is very difficult to create a team if there is no transparency and empathy between its other members.

We should be capable of understanding the vision of all participants, thereby understanding their needs and concerns in order to predict and manage the different challenges faced within a company. This vision has only grown stronger as I continued to develop professionally, alongside other adventures across the world. Being in constant movement, until COVID-19 has allowed me to see that everything comes down to people and that we must put our support behind local talent and teamwork.

# 04///

# Figures and milestones



/// List of indicators and values for **2021**

**Generation and selection of ideas >**

- **19** ideas received
- **90%** external proposals
- **16** selected for phase 2
- **30%** have made it into the RD&i Portfolio of Projects
- **228** ideas accumulated since 2017

**RD&i projects >**

- **3** projects launched
- **3** projects completed

## Innovator ranking ideas

| | |
|---|---|
| Daniel Andrades | 11 |
| Francisco de los Santos | 10 |
| Paco Saucedo | 5 |
| Jesús Medina | 5 |
| Jesús Matute | 5 |
| Ignacio Serra | 5 |
| Maria Román | 4 |
| Carlos Alberto Sánchez | 4 |
| Francisco Pardo | 4 |
| Enrique Martín | 4 |
| Daniel Hernández | 4 |
| Jorge Lopera | 3 |

## Support tools >

## Innovation portal

**368** users registered on the portal

**528** subscribers to the newsletter

**+22,000** new users

**+117,000** visits

## Open innovation - Ports 4.0 >

### 1st call

**48** proposals supported (6 ideas and 42 projects)

**6** initiatives awarded grants (2 ideas, 3 precommercial projects and 1 commercial project)

**4** projects launched

### 2nd call

**25** proposals supported in the second call for commercial ideas and projects, specifically 2 ideas and 23 projects (6 commercial project and 17 precommercial projects)

**Main focuses** Competitiveness and Logistics Orchestration (70%), Sustainability and Climate Neutrality (30%)

## Culture of innovation >

**17** updating and training sessions in fields such as AI, IoT or Digital Twins

**2** culture-of-innovation workshops in agile methodologies such as Design Spring

**4** workshops

**We're launching** the third edition of the Innovation Awards

**We're collaborating** in the first edition of the Digital Trekking Programme intended to increase the digital maturity of professionals and organisations in Campo de Gibraltar

**We're taking part** in the organisation of the first Digital Transformation Day: IoT

**We've released** We've released the 11th edition of the quarterly Technology Prospective newsletter

## Social impact >

**15** participations in events and conferences

More than 1,500 attendees

**7.09** Perception of APBA as an innovative company

**28** press appearances

76 topics addressed

RD&i

# 05///

## RD&i Projects

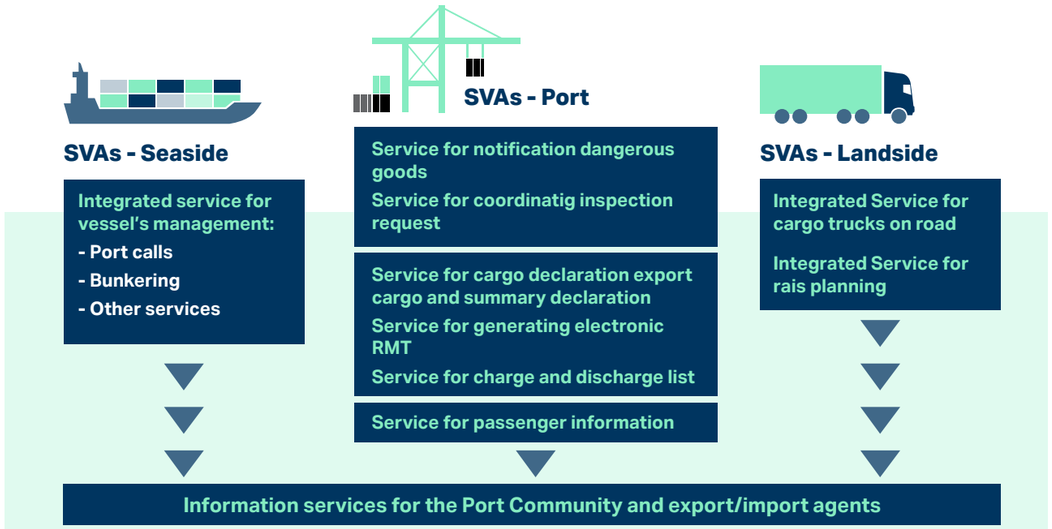
### /// APBA makes progress in the evolution of its Port Community System (Teleport 2.0).

With the ultimate aim of implementing the concept of the Latest-generation Port and consolidating Algeciras as a Hub for innovation and operational and technological progress, specialised in port logistics, APBA has launched a programme of projects focused on bringing about the evolution of its current Port Community System (PCS), Teleport, to become a next-generation cloud platform. The programme of projects, named Teleport 2.0, is structured into three main blocks: the technological platform, the software development of Added-Value Services (AVS) and the system's operation, as well as a fourth additional block intended for the programme's project-management office.

Teleport is the Port of Algeciras Bay's Port Community System and, as such, has been providing its services for more than 10 years, acting as a local one-stop shop for port-logistics processes. The new version, in which the institution will be investing a total of 10 million euros, is based on a change of focus towards Added-Value Services for the exchange of information between different actors within the Port-Logistics Community. This strategic reorientation has enjoyed the active participation of the Port-Logistics Community, through more than a hundred working meetings held with different stakeholders, aiming to meet their needs with regard to bringing the technology up to date. This investment forms part of the Port Authority's two overarching strategic goals: competitiveness and sustainability, aiming to improve the Port of Algeciras' competitive position by increasing efficiency, reliability, traceability and transparency of these port-logistics collaborative processes.

With regard to the execution of the three main blocks defined, the company BeLike is currently developing the new technological platform (Block I). What's more, the adjudication of the Framework Agreement for Development, Implementation and Evolution of Value-Added Services has been carried out for this new version of the Port PCS (Block II).

Specifically, the companies that have been awarded this framework agreement are as follows: Babel, the Tempo-



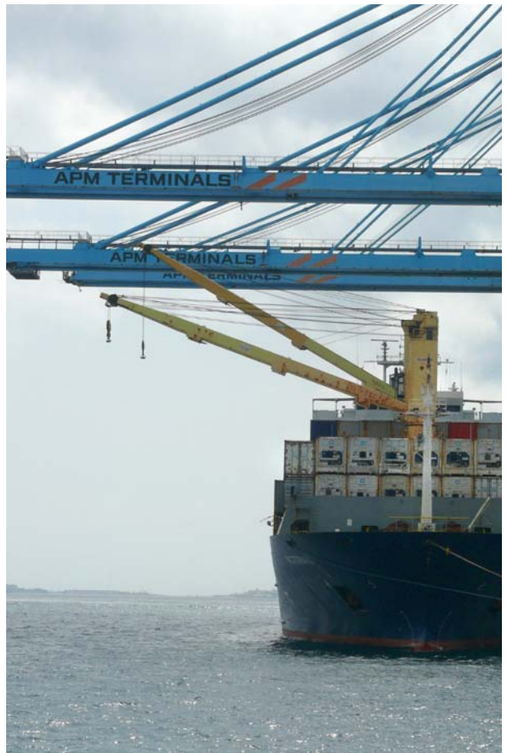

rary Joint Venture formed of Sopra Steria and ADDocean Technologies, Emergya Ingeniería and Prodevelop. Under this type of contract, APBA will, in turn, be awarding the PCS' various Value-Added Services to each of these companies through contracts based on said agreement. As such, the companies will develop the software of each of the 10 modules that make up the PCS, regarding road transport, summary declarations and statements, inspection requests, ship management and rail management, among others.

Finally, with regard to the programme's project-management office (PMO), IDOM's company will be responsible for supervising, coordinating, checking, monitoring and supporting the transition of the various projects included in the Teleport 2.0 programme. ■

## /// The Port of Algeciras will increase the safety and efficiency of port operations thanks to an Advanced Prediction System.

At the start of the year, APBA awarded the Temporary Joint Venture formed of Oritia & Boreas SL, Ayesa Advanced Technologies SA and the Polytechnic University of Madrid the contract to develop the Ship & Infrastructure Operations Advanced Forecasting System, known as PROAS: Port Risk Optimized Advanced System. The amount of this award exceeds 1.4 million euros.

The aim of the project is to develop a predictive safety and efficiency tool for port operations based on forecasting of the physical environment and the planning of ship calls and scheduled operations. More specifically, the agents of the physical environment (wind, swell, currents, etc.) are directly related to the safety and efficiency of port operations. As such, the awardees will develop a predictive model from the perspective of probabilistic techniques and Artificial Intelligence. For this, they will draw on APBA's own sources of information, such as the Autonomous Measurement, Prediction and Alert System (SAMPA) or information regarding port operations provided by the Port Management System (PMS), as well as the data obtained in field campaigns aiming to characterise the physical environment and the behaviour of ships during operations.




This Advanced Forecasting System will facilitate the decision-making of the main agents participating in loading/unloading operations, as well as technical-nautical services and ship services. In addition to anticipating possible risk situations, PROAS was born with the aim of optimising the passage of ships using the Strait of Gibraltar maritime route and, in particular, for those that call in Algeciras, an enclave with direct connections to more than 200 ports in the world.

The processing of this contract is a novel initiative within the Spanish port system, as it is the first to have been carried out through the Public Innovation Purchasing (CPI) Competitive Dialogue procedure. This is an administrative action that seeks to encourage innovation from the public sector, through the acquisition of innovative solutions or solutions in their development phase.

> As such, the awardees will develop a predictive model from the perspective of probabilistic techniques and Artificial Intelligence

Due to the aforementioned innovative nature of this project, it will be developed in two phases with the aim of reducing risk, narrowing the scope and ensuring the creation of value for the business. This year, Phase 1 work was launched, including a Design Thinking day in which the Port Community (technical-nautical services, terminal operators, APBA, etc.) were brought together to identify the key indicators for business, risk management and user experience. ■

## /// The Port of Algeciras among the success stories of the Andalusia 5G Pilot.

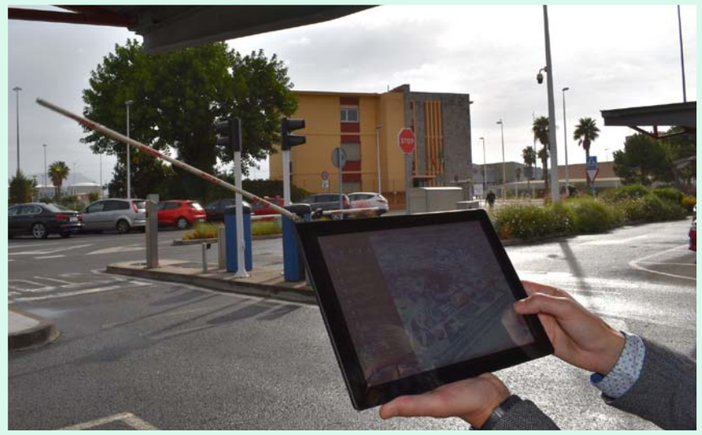
As part of the Andalusia 5G Pilot programme driven by the Ministry for Economic Affairs and Digital Transformation, through Red.es, and developed by the Temporary Joint Venture headed up by Vodafone España and Huawei Technologies España, two case studies were carried out in the Port of Algeciras. These were focused on testing the new technological capacities of infrastructures, using 5G technology, and assessing how innovative applications can be supported, within the fields of port protection, operations and infrastructure management.

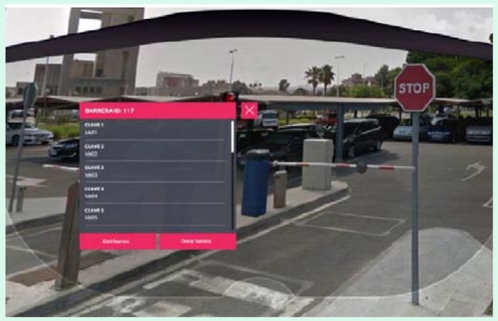

For this, a special deployment of the 5G network was carried out, covering all port facilities and areas, and which, ultimately, has demonstrated that 5G technology can contribute to streamlining and optimising port operability.

On the one hand, within the first case study, known as '5G Port', with the participation of Virtualware, APBA demonstrated that this new technology could help to modernise and improve the port's existing information, protection and safety systems, gaining ubiquity, agility and wealth.

More specifically, the pilot project developed has largely been focused on offering improvements to APBA's own digital platforms, such as the Port Photo-Capture System (SCI) or the Comprehensive Management System for Installations and Infrastructures in Virtual Environments (SG3iEV), facilitating, among other aspects, their availability within the field of mobility, the integration of high-quality video cameras for real-time transmission, the use of Augmented Reality to offer geolocated, real-time asset information on the ground (Situational Awareness), or the performance of synchronised maintenance tasks through bi-directional video and audio streaming, offering the possibility for a specialist to provide instructions and orders in graphic format (displayed on the operator's AR glasses) from the control-centre operator's desk, and, at the same time, view augmented information in the local environment.

On the other hand, with the second case study, entitled 'Real-time recognition system for safety environments', APBA, with the collaboration of Cellnex, has demonstrated that 5G technology can contribute to improving waiting times and the safety of thousands of vehicles, both private and commercial, travelling in its facilities, particularly during Strait-Crossing Operations when, at their peak, up to 600 vehicles may be managed per hour.

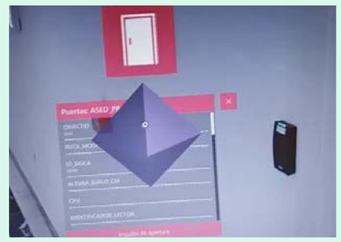






For this, the cameras installed at the port's entrances and throughout the access routes to boarding areas will collect images of vehicles in real time. These images will be locally processed in the port itself thanks to Edge Computing systems, in order to identify the vehicles accessing the port, find the associated ferry ticket and safely guide the driver to their final destination. Thanks to this local information processing, external data traffic will be reduced and the privacy of all those who access the port protected.

For this safety application, specific Artificial Intelligence algorithms have been developed that allow cameras to read registration plates without having to stop vehicles, and which are even capable of recognising Arabic characters. The local processing of information, together with double verification, ensures a high rate of certainty, while 5G communications available throughout the port enclosure guarantee minimal delays in the presentation of information on guidance panels.



Finally, the Port Authority and the managers of security bodies also been equipped with augmented-reality glasses that provide real-time information about the arriving vehicles, their destination or the availability of tickets, as well as facilitating the definition of warnings and alerts. Again, Edge Computing plays a fundamental role in the processing of information and its delivery to the augmented-reality device with almost no delay.

In conclusion, through the performance of both case studies, it has been demonstrated that technologies such as 5G, Edge Computing or Artificial Intelligence, already paving the way for the digitalisation of infrastructures, can positively contribute to optimising the safety and efficiency of operations within the Port of Algeciras.

R D & i

# 06///

# Innovation activities

## /// The Port of Algeciras participates as a strategic member of the European AspBAN project.

The AspBAN (Atlantic Small Ports Blue Acceleration Network) was selected by the European Commission in March to implement a platform of acceleration services for Atlantic ports within the EU.

In particular, the mission of the AspBAN European project is to support Atlantic ports in acting as ecosystems to drive innovation and the generation of start-ups in the Blue Economy, thereby diversifying their business models and income sources.

The project, with an estimated duration of two years, involves 13 partners from Portugal, Spain, France, Ireland, the Netherlands, Norway and the United States, including the Galician company Kaleido Tech and other prestigious businesses such as Beta-i (project coordinator), PortXL, NOAH, GCE, Ocean Technology, Fórum OCEANO or the Canary Islands Maritime Cluster, among others.

More specifically, Kaleido Tech is heading up work package 3, with the general aim of establishing a network to promote innovation between Atlantic ports and lay the groundwork for the identification of shared challenges within a network of more than 123 strategic partners, including the Algeciras Bay Port Authority. Being a strategic partner in this project offers the port a unique opportunity to take advantage of a set of innovative ideas and solutions for sustainable growth.

> The scope of the project includes the development of 30 innovative solutions in the pilot phase in 30 Atlantic ports

The scope of the project includes the development of 30 innovative solutions in the pilot phase in 30 Atlantic ports, attracting 6 million euros of direct private investment and mobilising another 4,500 million euros from potential private investors, while achieving a reduction of at least 100,000 tonnes of $CO_2$ emissions in the operations of these 30 ports.

## /// APBA collaborates in the organisation of the first edition of the Digital Trekking Programme aimed at the business fabric of Campo de Gibraltar.

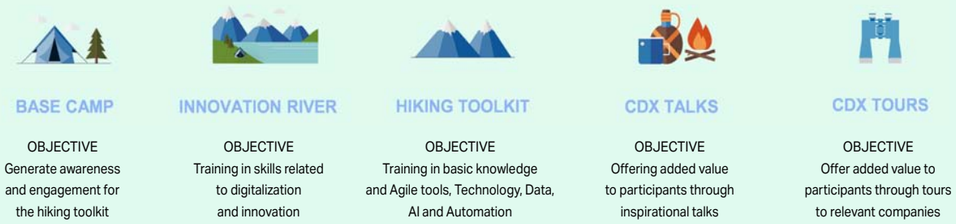

APBA has participated in the organisation of the first edition of the DIGITAL TREKKING PROGRAMME, a digital-training programme funded by the Cepsa Foundation and through which, over the course of three months, a hundred workers from Campo de Gibraltar were trained in new technologies and ways of working related to digital transformation and innovation.

As part of the actions promoted and coordinated by the 'Bay of Algeciras Logistics-Innovation and Industry 4.0 Hub' and with the collaboration of institutions and companies from Campo de Gibraltar - Cepsa, the Andalusia Innovation and Development Agency (IDEA), the Algeciras Bay Port Authority, the University of Cádiz, the Campo de Gibraltar Large-Industries Association and the Campo de Gibraltar Chamber of Commerce - this initiative has been developed with the aim of increasing the digital maturity of professionals and organisations, through practical training in specific skills and knowledge regarding digitalisation, agile methodologies, data analytics, Artificial Intelligence, robotisation of processes and innovation.

The programme, which will benefit more than 30 companies in Campo de Gibraltar, was launched in September 2021 with an event held in the Millán Picazo Auditorium. In this inaugural session, the regional delegate for Employment, Training, Self-Employment, Economic Transformation, Industry, Knowledge and Universities of the Regional Government of Cádiz, Alberto Cremades; the Chairman of the Algeciras Bay Port Authority (APBA), Gerardo Landaluce; the Manager of the Cepsa Digital Transformation Department, Joaquín Abril-Martorell; and the Manager of the Cepsa Foundation in Campo de Gibraltar, Estrella Blanco.

On behalf of APBA, Gerardo Landaluce noted that digitalisation and innovation, together with sustainability, "are fundamental pillars of APBA's business strategy, with this work being recognised by the European Sea Ports Organisation (ESPO), which has awarded our collaboration with start-ups". In this regard, he highlighted that "we are now very excited about this Digital Trekking programme, which represents another step forward in continuing to train our companies, ensure our competitiveness and continue creating wealth for our region".


This first edition, lasting 80 hours and delivered online, was focused on the first phase of a more comprehensive itinerary, designed to deepen knowledge and specialise in some of the topics related to digital transformation. This initial phase consisted of five overarching blocks:





The complete programme will be composed of three main phases: a general phase on basic concepts (Hiking Toolkit) and two specialisation phases (Climbing Programme and Zenith Master).

Finally, it should be noted that a total of 21 Port Authority employees took part in this first phase, over a total of 1,680 hours of training and with a completion rate of 57% for APBA.


## /// APBA continues to drive its employees' training in agile methodologies.

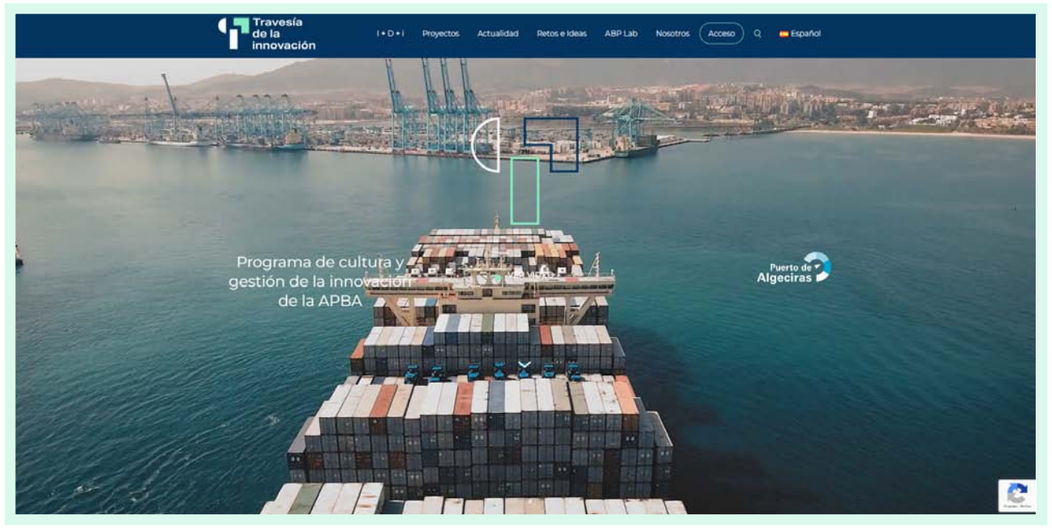
During the month of September 2021, a three-day bootcamp was held focused on training a group of APBA employees in the Design Sprint agile methodology, developed by Google Ventures and made popular by Jake Knapp, intended to design a new product/service, resolve issues and/or validate solutions in a short period of time.

The aim of this initiative, developed by the Port Authority through its Innovation Office, was two-fold: to deepen knowledge of the concepts and benefits offered by the Design Sprint methodology and learn to apply said methodology with a specific case study. For this, the 'learning by doing' methodology was applied, putting into practice the different concepts learnt during the three days spent designing and creating a 'clickable' prototype of a mobile app intended to provide useful information to Port of Algeciras Bay passengers.

APBA has also benefitted from the technical collaboration of a team of developers and experts in UX/UI from BABEL, to develop a prototype, and IDOM, for the coordination and development of the workshop, as part of its Innovation Office.

After the end of the bootcamp, APBA took the baton, with Babel's collaboration, to develop a first version of the mobile app for passengers, so that this could be validated by the business managers and, should satisfactory results be obtained, published on the Google and Apple app stores.

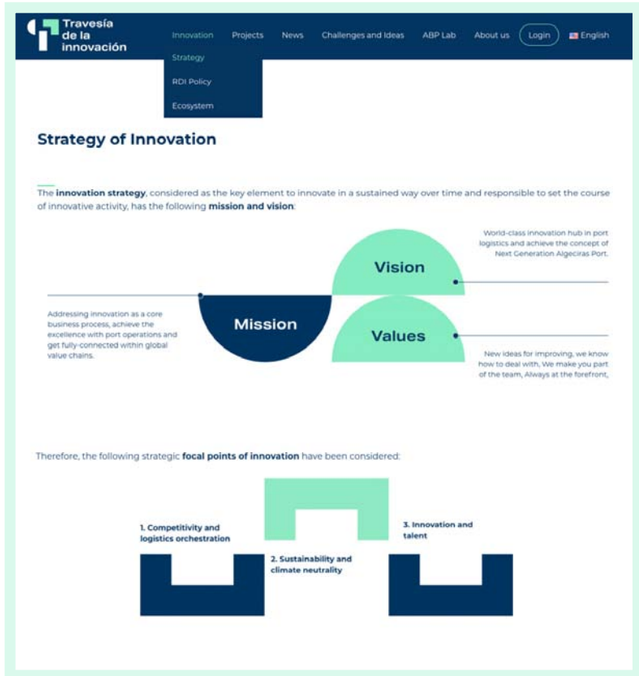
This new tool will allow APBA to add to its communication channels and provide real-time, relevant information about the Port of Algeciras, which will be useful not just for passengers - as the main users thereof - but also for heavy-goods drivers and even the employees of the organisation itself, in order to help them improve the planning of their journeys and streamline their passage through port facilities.




## /// APBA renews its innovation portal adapted to the new visual and verbal identity of its Journey to Innovation programme.

APBA has renovated its innovation web portal (innovacion.apba.es), improving its usability and adapting it to the new visual and verbal identity accompanying the 'Journey to Innovation' brand. This new image inspires innovation and communication, based on simple and modern shapes and with a value proposition summarised in the following slogan: "The reality of a new port".

Access through this QR to the Innovation Portal




> three strategic focuses of innovation defined: Competitiveness and Logistics Orchestration, Sustainability and Climate Neutrality and Innovation and Talent

Taking advantage of these works carried out, APBA has updated the section dedicated to the organisation's innovation strategy with the aim of communicating its mission and vision, as well as the three strategic focuses of innovation defined: Competitiveness and Logistics Orchestration, Sustainability and Climate Neutrality and Innovation and Talent.

# 07 ///

## Our innovation awards

### /// Guillermo Ripalda wins the second 'Algeciras BrainPort' Port Innovation Award for the best Final Bachelor's and Master's Project.

Guillermo Ripalda Andrades, student at the Higher Polytechnic School of Algeciras of the University of Cádiz received the second Algeciras Brainport Port Innovation Award for Best Final Master's Project in March 2021, during a ceremony held in the conference hall of the Algeciras Technological Campus' RD&i Building and streamed online for remote attendees.

This international competition, sponsored by the Algeciras Bay Port Authority (APBA) and the Algeciras Technological Campus Foundation (FCTA), seeks to encourage and incentivise applied research and innovation related to port-logistics and maritime activity developed around the Port of Algeciras Bay and to continue recognising the talent of university students and young researchers.

The award ceremony featured the virtual presence of the Chairwoman of the Foundation and Director General for Research and Knowledge Transfer of the Regional Government of Andalusia, Teresa Serrano, and was attended by the Government Subdelegate of the Regional Government of Andalusia in Campo de Gibraltar, Eva Pajares Ruiz, the General Director of APBA, José Luis Hormaechea, the Vice-Rector of the Algeciras Bay Campus, María del Mar Cerbán, the Deputy Mayor and University Delegate of the Algeciras City Council, Sergio Pelayo, and the Head of the APBA Technological-Development Department, Francisco de los Santos, as well as the Director of the FCTA, Rosa Rodríguez, who presented the ceremony.

Teresa Serrano, in her first public act in this role, wished to highlight the importance of initiatives like this to promote the transfer of knowledge and the innovation of young talents in order to achieve a solid economy.

To this, she added that the Foundation she chairs is a "very important instrument for dialogue between the university and the business fabric".

Sergio Pelayo emphasised the synergies achieved between local organisms and actors, as well as the importance of the Port of Algeciras, which is "an asset for all and we must care for it".

José Luis Hormaechea underlined that "we are looking for innovative ideas and talented people capable of generating these ideas and many more in the Journey to Innovation", the name given to APBA's innovation-culture and management programme whose aim is to implement an innovative culture within APBA and its Port Community.

The Vice-Rector of the Algeciras Bay Campus stated that relationships between the university and APBA began more than 20 years ago and that they have always worked hand in hand. As evidence of this, he highlighted the Master's in Port and Logistics Management and the project for the construction of the UCA's Innovation Centre in the Llano Amarillo, among others.

Finally, the Government Subdelegate noted the importance of this award "through which we seek to retain talent in the local area and province" and signalled that "for the Regional Government of Andalusia, it is a source of pride to have this port in constant evolution and innovation".

After an introduction from the institutions, Ignacio Serra took the stage, as the winner of the first edition of this competition in 2018 with his project to improve the efficiency of container terminals and their automation. During his testimony, he expressed that, thanks to this award, "doors have been opened for me in the working world and I have been able to continue working in this sector".

Before the award's delivery, the finalist projects were introduced, presented by the candidates themselves, with a total of four proposals based on some of the established port-innovation focuses and objectives. Alongside Guillermo Ripalda, the finalists were Arnaldo Bueso and Ignacio González, both from UCA's Port and Logistics Management Master's programme, and Cristina Herranz from the Polytechnic University of Valencia.

The projects were assessed by a jury composed of members from the field of port-logistics innovation, representatives from academia and experts in the evaluation of entrepreneurial initiatives. For this, the jury considered criteria such as the projects' technical and technological viability, their degree of impact and maturity, and their innovative nature and strategic fit.

Finally, APBA and the Technological Campus Foundation awarded Ripalda's work to update the instructions that govern ro-ro- traffic in the Príncipe Felipe Quay of Algeciras through discrete-events simulation.

The award consisted of a six-month paid scholarship at APBA, which began at the end of September and allowed the winner to continue developing their project; as well as a grant of €1,200 from the Technological Campus Foundation, thanks to funding from the Regional Government of Andalusia's Council for Economic Transformation, Industry, Knowledge and Universities.

## /// APBA launches the third edition of the Journey to Innovation Ideas Contest, intended to encourage innovation based on the use and exploitation of data: Data-Driven Innovation Challenge.

APBA the third edition of the 'Journey to Innovation' ideas contest in September 2021, with the aim of continuing to promote, encourage and incentivise innovation and (intra)entrepreneurship within APBA and its Port Community.

This was a new edition of the open contest directed at all APBA employees, as well as students, researchers, entrepreneurs, users/customers and companies (start-ups, SMEs and large companies) capable of contributing to solving the 'Data-Driven Innovation' challenge with ideas, solutions or even case studies with a direct impact on improving competitiveness and sustainability.

In particular, the challenge was focused on identifying new ways of creating value for the users/customers of the port, as well as for the goods themselves and their environment, through the use and exploitation of data in various formats and sources. For this, judges will assess ideas related to the identification of case studies in which data may offer differential value, solutions to collect valuable data and improve decision making, algorithms to resolve business challenges, new data-analysis and visualisation tools, predictive/prescriptive applications and applications that improve the transparency and visibility of the passage of goods through the port, among others.

The official deadline for the presentation of proposals ended in December, with a total of 14 ideas received, after which all ideas submitted will be evaluated and the best internal idea, best external idea and most popular idea will be selected.


## /// The Port of Algeciras and the Technological Campus Foundation hold the third edition of the 'Algeciras BrainPort' Port-Innovation Awards.

APBA and the Algeciras Technological Campus Foundation (FCTA) held the third edition of the 'Algeciras Brain Port' port-innovation awards in October, an initiative aimed at recognising the talent and contribution to the Port of innovative initiatives, created by university students or researchers, dealing with various aspects related to the port-logistics business.

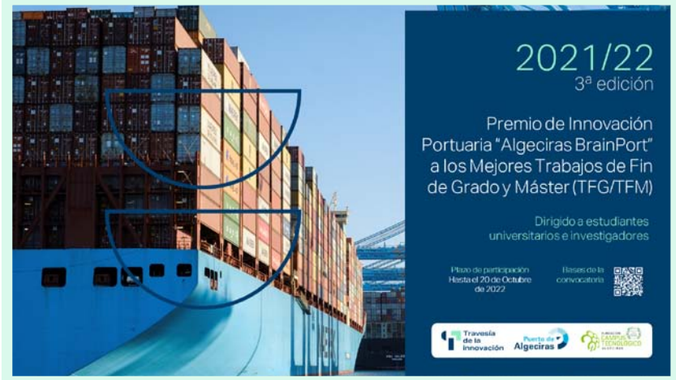
Just like the previous edition, the award is broken down into two categories. On the one hand, the best Final Master's Project will be recognised, with an award valued at €1,200 and a paid six-month fellowship at APBA. And, on the other hand, the best Final Bachelor's Project, with a full scholarship to study one of the official Master's degrees offered at the University of Cádiz: Port and Logistics Management, Civil Engineering or Renewable Energies and Energy Efficiency.

The assessment criteria include the extent to which these projects align with the works carried out as part of the innovation strategy and with the current challenges faced by the Port of Algeciras Bay, the impact on competitive advantage, the innovative proposal's degree of novelty, its technical and/or technological viability and, finally, the quality of the works presented.

The projects will be assessed by a Jury made up of seven prestigious members from the field of port-logistics innovation, both professional and academic, who will select a single winning proposal per category, to be announced and delivered in a public ceremony.

The participation and presentation requirements for the projects can be found in the rules published on the APBA Innovation web portal (https://innovacion.apba.es/premios-innovacion/), with submissions closing on 20 October 2022 (inclusive).

Access through this QR to the Port-Innovation Awards



# 08///

# Main conferences and events

## /// The Port of Algeciras presents its Innovation and Digital Transformation plan at the EXPO TIC Cádiz event.

APBA, represented by Cristina Recio, Sales and Marketing Manager, and Jesús Medina, Head of the Innovation and Digital Solutions Business Unit, participated in the 2021 edition of the Expo Tic Cádiz event, held virtually in March.

Expo TIC Cádiz – the international business summit in which the most important companies of the technological sector come together to promote the Spanish IT sector in Mexico – is supported by its institutional partners ICEX, Extenda, Promtel México, the Mexican State Secretary for Communications and Transport, the OnTech Cluster and APBA.

During the third day of the event, which included workshops, demonstrations, conferences, a business space and an exhibition zone, among others, APBA took the opportunity to present the Port of Algeciras' capacity and potential, as well as its Innovation and Digital Transformation Plan.

Cristina Recio launched the presentation by highlighting the importance of the Port's geostrategic location, with more than 200 direct connections to ports in 72 countries and the continual investment made into port infrastructure to meet the technical needs of new megaships of more than 24,000 TEUs, factors that have made it possible for PBA to maintain its position as the leading port in the Mediterranean and the fourth-busiest European port in terms of total traffic. In this regard, she noted the increase of import and export traffic and, in particular, the transport of refrigerated goods, which has increased by 222% in the last 10 years.

Jesús Medina also commented on the evolution of the Port Authority's role, which has changed in recent years from that of a manager or regulator of port infrastructure and services, to become an orchestrator of the port ecosystem, facilitating decision making and creating value for all stakeholders.

In this regard, Medina explained how APBA is working to achieve these goals, on the one hand, through the development and implementation of a digital operations-orchestration platform which allows it to coordinate

all agents involved in the value chain and, on the other, through the consolidation and systematisation of innovation as a key business process. On this matter, he highlighted the organisation's Innovation-Management System certification according to the UNE 166002 standard, the dissemination and communication activities carried out both internally and externally and the launch of innovation awards and collaboration with start-ups, offering the port up as a full-scale laboratory for testing solutions in a real operational environment (Algeciras Port Living Lab), among others.


Before closing, Medina wished to remind attendees of the recent award received from the European Sea Ports Organisation, the ESPO Award 2020 – an award through which this European institution has recognised the role of APBA in promoting the integration of innovative companies and local entrepreneurs within the port sector.

Over the three days of the event, various activities and presentations were carried out, such as the 'IT in Mexico: market situation and Trade Office support' speech offered by EXTENDA – the Andalusian External-Promotion Agency of the Spanish Government in Spain's Economic and Trade Office – or the virtual 'Andalusian IT Sector' talk from OnTech Innovation, the cluster of Andalusian Digital-Economy companies.

## /// The Port of Algeciras participates in the Smart Digital Ports of the Future 2021 virtual event.

The Port of Algeciras was once again offered the opportunity to take part in the spring edition of the Smart Digital Ports of the Future event, organised by Port Technology International and which, on this occasion, was held virtually between 29 March and 1 April.

The event, which involved the participation of more than 60 speakers from the main international ports, alongside leading companies in the global supply chain, focused on analysing, debating and sharing the best practices and latest advances in automation, sustainability and connectivity.

Representing APBA, Paco de los Santos, Head of the Technological-Development Department, took part in one of the debate panels included on the fourth and final day. The panel, entitled 'New Business Models for Technology Projects in Ports & Terminals of the Future', brought together Wabtec Corporation, the Port of Quebec, Port XL, ILWU Canada, PortXchange, TiL Group and the Algeciras Bay Port Authority, with the aim of debating new business models for technological projects in the ports and terminals of the future.

During the debate, the need for the terminal and port sector to attract and develop new business models was discussed, particularly those aimed at promoting collaboration and inclusion and therefore exploiting the potential advantages of automation and digitalisation. Likewise, it was argued that, no matter how exciting the implementation of new technologies may be, projects must be approached with people and human resources in mind. As such, it is essential that workers are trained in order to make full use of these new technologies, as the collaboration of all interested parties is key to success in the implementation of new technologies.

> **no matter how exciting the implementation of new technologies may be, projects must be approached with people and human resources in mind**

Over the four days of the event, multiple topics of interest were discussed, such as the use of autonomous vehicles, the application of Artificial Intelligence and blockchain technology within the port environment, the exchange of data and standardisation, the use of digitalisation to improve the sustainability of ports and the improvement of automation through the use of 5G, among others.

One session of particular note focused on the use of data to improve decision making. This served to analyse how ports may interpret large quantities of information generated from port operations in order to help optimise their processes and get the most out of the decisions made. So called emerging technologies have been around long enough in many ports to allow data analysists to identify trends within individual data sets, thus facilitating a better understanding of what is happening at each point of port operations.

The event was attended by more than 600 attendees from 70 countries, and offered the opportunity to establish contacts with the main sector stakeholders virtually.



## /// APBA shares its progress with the PORTCDM concept via a webinar organised by the Inter-American Committee on Ports (CIP) and the Maritime Policy Bureau (MPB).


At the end of March 2021, APBA took part in the 'Port Modernisation: Digital Operational Management and Cyber-Security' webinar organised by the Inter-American Committee on Ports (CIP) and the Maritime Policy Bureau (MPB), around the central issue of the use of digital tools to improve digital operational management and the implications of cybersecurity in the face of port modernisation.

Representatives from Prodevelop, HudsonAnalytix and APBA shared successful practices in terms of innovations in technological tools to improve decision making, operational indicators and increasing port competitiveness, as well as analysis of the role of cybersecurity and

the responsibility that comes with the process of port digitalisation.

On behalf of APBA, Jesús Medina, Head of the Innovation and Digital Solutions Business Unit, presented the progress made in the implementation of the Pit Stop philosophy developed by the Port of Algeciras Bay, whose main objective is to optimise port operations by reducing waiting times associated with ship calls in the port. This innovative concept, developed by APBA and its partners, such as the Prodevelop company, is based on the use of collaborative-data platforms, inspired by the Port CDM (Port Collaborative Decision Making) paradigm and employs international standards. The event, moderated by Jorge Durán, Head of the CIP Secretariat, featured the participation of various experts from the port-logistics


and maritime sector, such as Helmut Bellingrodt, International Business Development Director at Prodevelop, Ángel Martínez, R&D Project Manager at Prodevelop, and Andrew Baskin, Vice-Chair of Policy and Global Sales at Hudson Analytix, who spoke on a topic with great relevance in the sector today: cybersecurity.

Universities, Juan Espaldas, Mayor of Seville, and Francisco Rodríguez Rubio, Director of the Seville Higher School of Engineering, together with the Chairman of COITAOC, David Cruz-Guzmán, #SmartCity24Hours21 consolidated and positioned itself as a necessary event intended to drive the transformation of administrations, entities, companies and society itself to 'smart' models which facilitate the creation of better and more modern infrastructures for citizens, aiming to increase quality of life, strengthen the economy, promote sustainability, improve mobility and ensure inclusivity, among other goals.

The event was once against supported by various entities and companies. Berger Levrault, the Council for Economic Transformation, Industry, Knowledge and Universities of the Regional Government of Andalusia and *ABC de Sevilla* as sponsors, alongside its partners Wellness Telecom, Sando, Smart City Cluster, Unicaja, AMETIC and the University of Seville Higher School of Engineering.

## /// APBA shares its experience with 5G technology in the second edition of the #SmartCity24Hours event.

The Algeciras Bay Port Authority took part in the second edition of the #SmartCity24Hours event - 'Urban Ecosystem of Applied Innovation' - organised by the Official College of Telecommunications Engineers of Western Andalusia and Ceuta (COITAOC) and held in April, in the Auditorium of the Seville Higher School of Engineering.

The event, which was streamed live and watched by more than 200 people, presented the advances currently underway in many public sectors and services to bring cities closer to the Smart City concept and which places Andalusia as a well-positioned community on the path to becoming a Smart Region. In this regard, the latest trends were shared related to the implementation of technology aimed at the modernisation of public services, Digital Health experiences and models, the transformation of the educational system, the use of 5G technology in economic activity or the application of Smart City solutions within a local and municipal scope, among others.

> **The Algeciras Port Digital Transformation is a programme in which 5G served as a key integrating technology**

The event's second round table revolved around the first steps in the use of 5G technology within economic activity and allowed for the presentation of three success stories from different productive sectors. Manuel Ortigosa, Technical Advisor of the General Directorate for Digital Economy and Innovation in the Council for Economic Transformation, Industry, Knowledge and Universities, was in charge of hosting and moderating each intervention, starting with a presentation of the Algeciras Port Digital Transformation programme by Juan Padilla, Director of the Vodafone 5G Smart Center in Andalusia, and Francisco de los Santos, Head of the APBA Technological-Development Department. This was a programme in which 5G served as a key integrating technology.

Inaugurated by Loreto del Valle Cebada, General Director for Digital Economy and Innovation in the Council for Economic Transformation, Industry, Knowledge and

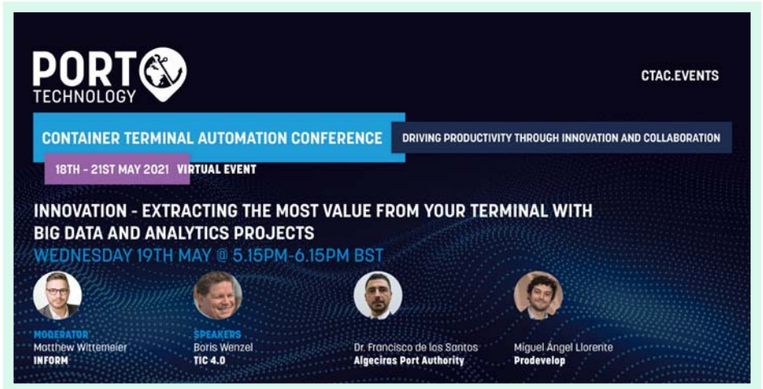

## /// The Port of Algeciras presents a new edition of the Container Terminal Automation Conference.

From 18 to 21 May, a new edition of the Container Terminal Automation Conference was held virtually, a conference which, under the title 'Driving Productivity through Innovation and Collaboration', served as a meeting point to discover, participate and listen to the best experts in the automation of terminals from the main global technology providers.

With more than 50 speakers and over 20 sessions, the event welcomed several debates on the current state of the sector and sought to explore those emerging technologies revolutionising the journey towards the automation of container terminals, such as Artificial Intelligence, 5G or the Internet of Things.

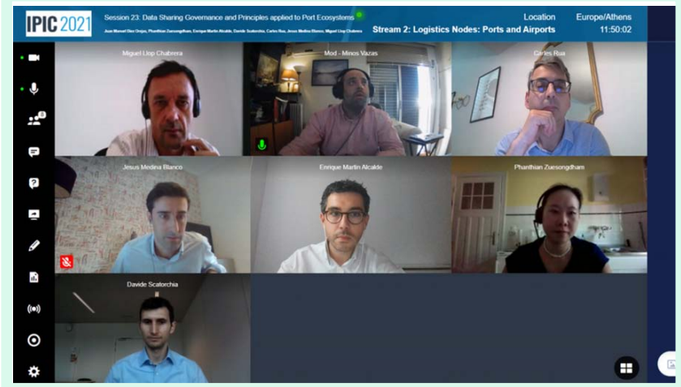
More specifically, APBA, through Francisco de los Santos, Head of the Technological-Development Department, participated in the final session of the second day, focusing on how to get the greatest value from a terminal through big data and data analytics. Under the title 'Innovation and Collaboration for Operational Excellence in the Port of Algeciras', De los Santos presented the main challenges faced by the port, as well as the innovation and Digital Transformation strategy followed by the organisation in order to implement a digital port-orchestration platform and achieve its goal of becoming a Next-Generation Port.

With the aim of providing attendees with a comprehensive immersion experience, despite the event being held online, the organisation used the Swapcard virtual tool to allow users to get to know the various professionals before the event, as well as chatting and exchanging contact details during the conferences.




## /// The Port of Algeciras participates in the International Physical Internet Conference IPIC2021.



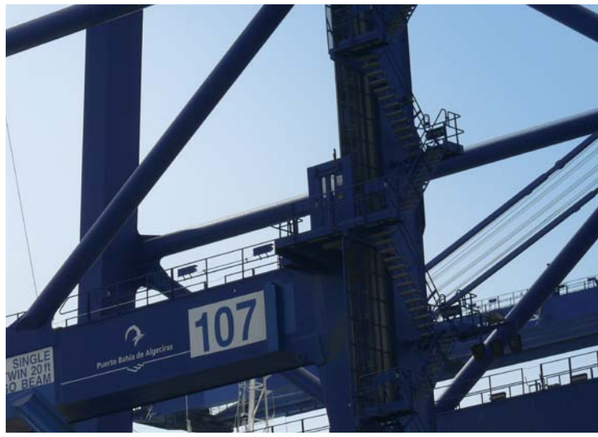



APBA, represented by Jesús Medina, Head of the Innovation and Digital Solutions Business Unit, and Enrique Martín, Director of the APBA Innovation office, took part in the eighth edition of the international IPIC2021 conference (International Physical Internet Conference) held online in June and co-organised by the European ALICE platform. IPIC aims to provide an open forum for researchers, industry representatives and representatives from the administration to explore, discuss and introduce concepts, methodologies, recent projects, technological advances and start-up initiatives for the present and future implementation of the Physical Internet (PI).

The virtual event, focused on the era of hyper-connectivity and sustainability in logistics chains, featured the participation of more than 180 speakers distributed over three areas of knowledge (Shippers & Retail, Logistics Nodes and Digitalisation & Data Sharing) and more than 30 sessions.

Specifically, the Port of Algeciras took part in the S23 (Data Sharing Governance and Principles Applied to Port Ecosystems), which focused on how ports and airports are becoming physical-internet Hubs and how they are implementing solutions to improve operational efficiency through data sharing. Here, APBA presented its vision of how the role of the Port Authority must evolve to transform the Port of Algeciras into a digitally interconnected Hub within the global logistics network.

This session included the participation of representatives from the Ports of Barcelona, Hamburg and Valencia, as well as AirCargo Belgium. The main topics of discussion included the present and future of standards, governance systems and interconnectivity between the multiple digital platforms that make up the logistics panorama today.



## /// The Port of Algeciras presents its advances in the fields of IoT and 5G at the first Digital Transformation Conference aimed at the business fabric of Campo de Gibraltar.

At the end of June, the Algeciras Bay Port Authority (APBA) took part in the first Digital Transformation Conference: IoT, organised as part of the Algeciras Bay Logistics Innovation and Industry 4.0 Hub and held in the events hall of the Algeciras Higher School of Engineering.

The event, focused on bringing digital transformation closer to the business fabric of Campo de Gibraltar and the province of Cádiz in order to improve its productivity and competitiveness, featured the participation of Cepsa, the University of Cádiz, the Association of Large Industries, the Campo de Gibraltar Chamber of Commerce, the Andalusia Innovation and Development Agency (IDEA) and APBA.

The Mayor of the city, José Ignacio Landaluce, offered the inaugural welcome, together with the Vice-Rector of the Algeciras Bay Campus, María del Mar Cerbán, the Secretary General of Business, Innovation and Entrepreneurship of the Council for Economic Transformation, Industry, Knowledge and Universities of the Regional Government of Andalusia, Pablo Cortés, the Manager of Digital Transformation at Cepsa, Joaquín Abril-Martorell, and the head of the APBA Technical-Development Department, Francisco Javier de los Santos.


In this first edition, which could be attended both in person, in accordance with COVID-19 restrictions, and virtually, revolved around IoT technology. Specifically, APBA presented two of its initiatives. On the one hand, Francisco M. Bernal, Communications and Systems Manager, presented the Advanced Environmental and Sustainability Management Platform, a project derived from the Fiware Zone IoT Challenge and which aims to use IoT technology to provide updated, quality information that supports the decision-making process and facilitates monitoring of the evolution and impact of preventive and correctional measures carried out in the port with regard

> **to promote alliances and synergies between all attendees, so that they may go on to work together in the identification of opportunities and new business models through the application of the latest technologies**

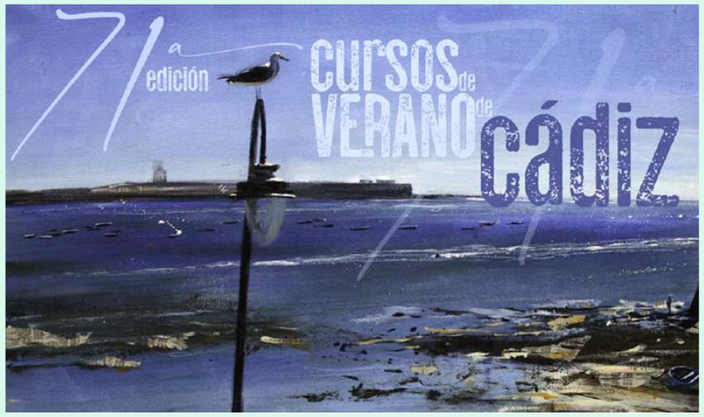
to the environment. On the other hand, Daniel Hernández, member of the Innovation Office, introduced two case studies currently being developed with Vodafone and Huawei as part of the Andalusia 5G Pilot and focused on the modernisation and optimisation of operational management and safety and protection systems through 5G technology.

Other speeches presented by professionals from CEPSA and the UCA tackled modern issues such as smart electrical networks, the predictive maintenance of industrial infrastructures, advanced analytic platforms or the use of 5G technology to drive digital initiatives, among others. Furthermore, the day ended with a round table held around the topic of digital transformation in the industry, with the participation of Cepsa Manager of Digital Transformation, Joaquín Abril-Martorell, Carlos Rioja del Rio, UCA Vice-Rector of Digitalisation and Infrastructures and Jesús Medina, Head of the APBA Innovation and Digital Solutions Business Unit.

The aim of these sessions was to promote alliances and synergies between all attendees, so that they may go on to work together in the identification of opportunities and new business models through the application of the latest technologies and share the experiences and learnings generated through these Digital Transformation processes.


## /// APBA presents its digital and innovation strategy in the 71st edition of the UCA Summer Courses.

In July, the Head of the APBA Innovation and Digital Solutions Business Unit, Jesús Medina, took part in the Innovazul seminar on innovation and blue growth, organised as part of the 71st edition of the UCA Summer Courses in Cádiz.




The seminar, coordinated by Professor María Jesús Mosquera Díaz, Vice-Rector of Political Science and Technology, and Fernando Merello, Research-Results Transfer Office technician at UCA, served as the prelude to the International InnovAzul Conference 2022 which aimed to involve relevant actors from the Blue Economy in southern Europe and thereby contribute to the resolution of challenges and opportunities in both traditional and emerging sectors related to the Blue Economy.

Over the course of three days, professionals and experts tackled issues as diverse as renewable energies, maritime safety, ports and logistics, fishing and aquaculture, tourism and culture at sea and marine bioproducts, among others.

Specifically, Jesús Medina, with his speech entitled 'Artificial Intelligence for the Optimisation of Port-Logistics Operations' analysed the challenges of the port-logistics sector and explained how APBA is currently developing the Port's Digital Transformation and how innovation is being consolidated as a systematic process, integrated within the business. He also went on to present two projects recently developed in which Artificial Intelligence was applied in the Port of Algeciras.

The aims of this initiative, with more than one hundred registered participants and which could be followed both in person and online, can be summarised as: contributing to increasing and strengthening interconnection between Blue Economy innovation-system agents, promoting the circulation of knowledge and innovation as an engine for social change and the modernisation of Cádiz, Andalusia and Spain, and involving Cádiz society, and young people in particular, so that they may take advantage of the opportunities offered by the Blue Economy.


## /// The Port of Algeciras presents its advances in Artificial Intelligence in the second webinar hosted by the ALICE Artificial Intelligence for Logistics Applications group.

The Algeciras Bay Port Authority, through its Technical Innovation Office, took part in the webinar 'Artificial Intelligence in Ports and Freight Transport Applications' organised by the European association ALICE, and more specifically by the ALICE Artificial Intelligence for Logistics Applications group, under the Systems & Technologies for Interconnected Logistics department.

After the success of the working group's first event, held in May, a second webinar was organised with the aim of allowing a few participating entities to share the main projects and areas of application in which they have been working, the problems tackled and how Artificial Intelligence can help them achieve their goals.

Various experts from the logistics sector took part during the event, after an introduction from Andreas Nettsträter, (ALICE TG3 Vice-Chair & Fraunhofer IML) and Fernando Liesa (ALICE), such as Joan Meseguer (Valenciaport Foundation), who explained an example application within a neural network for the management of empty containers in a depot, or Enrique Onieva (Deusto) who shared the general vision of the LOGISTAR project. Said project aims to plan and optimise transport operations in the supply chain, taking advantage of horizontal collaboration and the use of real-time data.

On behalf of APBA, Enrique Martín, Director of the Innovation office, spoke about the use of AI techniques to support decision making related to planning and port operations in the Port of Algeciras.

More specifically, Martin introduced three pilot projects developed in the Port Authority alongside companies like AIRead, IDOM and AWS with the aim of demonstrating the viability and potential offered by Artificial Intelligence to resolve important operational challenges such as (1) improving continuous-flow traceability in port facilities, (2) the optimisation and improvement of the management of operations taking place in the lorry and vehicle terminal storage area and, finally (3) how Data Science techniques can offer added value when mana-

ging moorings and delays during high-traffic operational situations, such as special Strait-Crossing Operations.

The aim of the Systems & Technologies for Interconnected Logistics department is to define the action and research lines that must be tackled in order to ensure that global supply chains are reconfigurable in real time via technologies available and affordable for all companies and participants.


## /// APBA participates in the Smart Ports Conference 2021 organised by Executive Forum.

The Port of Algeciras, represented by Jesús Medina, Head of the Technological-Development Department, actively participated in the Smart Ports 2021 symposium, held virtually in October and which brought together both institutional representatives from Ports and Port Authorities and technological companies involved in the development of innovative projects within the port-logistics sector.

After the event's inauguration by Pilar Parra Serrano, Corporate Director of State Ports, the conference was divided into two blocks of speeches, presenting successful examples and innovative projects.

During the second part, APBA had the opportunity to introduce the pillars of its strategy to transform the Port of Algeciras into a next-generation smart port, largely based on the implementation of a digital operational-orchestration platform and the consolidation of innovation as a key business process.

Finally, APBA also took part in a round table with Txaber Goiri, Head of Competitiveness and Innovation of the Bilbao Port Authority, and the technological company Wonderware.

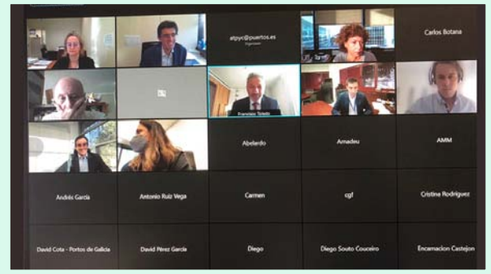



## /// The Port of Algeciras presents the PortCDM concept and introduces the platforms that have made it a reality within its port ecosystem at the second ATPYC Innovation and Technology in Port-Management Conference.

The Algeciras Bay Port Authority actively participated in the second Innovation and Technology in Port Management Conference organised by the Technical Association of Ports and Coasts (ATPYC), held at the end of October 2021 in virtual format.

The event, which was opened by Francisco Toledo, former Chairman of State Ports and Honorary Chairman of the ATPYC, and Manuel Arana, Chairman of the ATPYC, focused on the main trends and action lines regarding innovation in the port sector, as well as revealing some inspiring success stories. The session was moderated by Macario Fernández from the McValnera company.

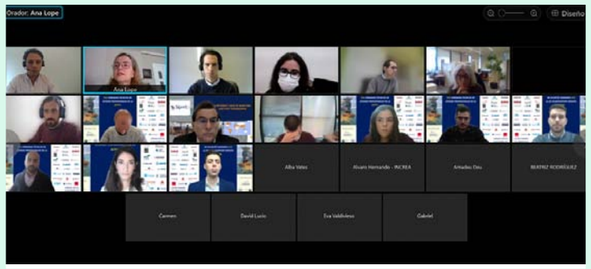
This second edition featured the participation of the ALICE association, the Next Port AI start-up, State Ports and the Port Authorities of Algeciras, Barcelona and Vigo. Topics of great interest were analysed, such as sustainability, port synchro-modality and the concept of 'Physical Internet', Artificial Intelligence in ports and terminals, innovation and entrepreneurship ecosystems in ports and advances in the Met-Ocean field and their application to ports and coasts.




APBA, through Jesús Medina, Head of the Technological-Development Department, presented the Port CDM (Port Collaborative Decision Making), JiT (Just-in-Time) Arrivals and Pit Stop concepts and explained how these are being tackled in the Port of Algeciras through the use of collaborative platforms. Specifically, he spoke about the possibilities offered by the PortXchange and Posidonia PortCDM tools now in production and whose main goal is the optimisation of port operations through the reduction of waiting times related with ship calls in the port.

Lastly, mention should be made of the speech by José Llorca, Innovation Manager for State Ports, in which he introduced the main commercial ideas and projects awarded in the first call of Ports 4.0, the fund launched by State Ports which aims to attract, support and facilitate the application of talent and entrepreneurship in the Spanish port-logistics sector and actively promote disruptive or incremental innovation as an element of competitiveness.

## /// The Port of Algeciras presents its progress with the Ship & Infrastructure Operations Advanced Forecasting System (PROAS) in the seventh Young Professionals Conferences organised by ATPYC.



In mid-November 2021, APBA took part in the seventh Young Professionals Conferences organised by the Technical Association of Ports and Coasts (ATPYC).

The event, with this edition held online, presented a high-level scientific and technical programme and was focused on bringing the Port Community closer to various innovative initiatives developed by members of the ATPYC. For this, along with the participation of the APBA Technological-Development Department, the event featured the presence of other reputable organisations and companies such as Siport21, IH Cantabria, Mapei, Arcelor Mittal, Typsa and McValnera.

Juan González, member of the APBA Advanced Digital-Services Centre spoke about the PROAS project (Port Risk Optimized Advanced System), a project currently underway within APBA and which is focused on the development of a Ship & Infrastructure Operations Advanced Forecasting System. The main aim of the system is to develop a predictive tool for levels of safety and efficiency in port operations based on specific information for each mooring (forecasting of the physical environment and the planning of ship calls and scheduled operations).

More specifically, the project is divided into two phases and is currently halfway through its first stage, which is expected to end in the first half of 2022. This first phase, lasting nine months, is characterised by a phase of exploration, concept testing and detailed design of the future tool. During the speech, he highlighted the participation of various agents from the Port Community in the project, who have actively taken part in the joint Design Thinking days included in the design stage. Next, in the second phase, which will last 21 months, measurements campaigns will be carried out, followed by analysis and application of predictive models and the development of the tool itself.

Throughout the other speeches presented by professionals from the ATPYC, current issues within the port sector were tackled, such as the forecasted impact of climate change on the Spanish coast, the characterisation and management of coastal and port risks and the development of spill-alert systems, among others.


## /// APBA participates in the 'Digitalisation and Innovation in the Port-Logistics Ecosystem' informative breakfast organised by Diario del Puerto.

In November, the Algeciras Bay Port Authority (APBA) took part in the informative breakfast organised by Diario del Puerto, entitled 'Digitalisation and Innovation in the Port-Logistics Ecosystem'.


The event, held in webinar format and welcoming over 200 people, was moderated by Miguel Jiménez, Director of Diario del Puerto, and featured the presence of Pilar Parra Serrano, Corporate Director of State Ports, Jose Oliver, Director of Infoport and Jesús Medina, Head of the APBA Technological-Development Department.

In his appearance, Medina noted that it is not enough to be an innovator or have the latest-generation technology, we must also integrate this innovation and these technological solutions within the daily needs of the port-logistics sector. Furthermore, he emphasised that innovation and digital transformation are not always easy to achieve, but that we must be prepared to face up to the risks they represent and accept failure when it occurs.

Pilar Parra explained the Administration's capacity to drive digitalisation throughout the logistics chain, affirming that digitalisation and innovation are essential in order to remain at the cutting edge on an international level and maintain competitiveness.

In short, the three speakers agreed that the port and logistics sector is fully immersed in a process of technological change, in which innovation has become an instrument and a mean through which to achieve the goals established and boost the sector's competitiveness. For this, various aspects that must be worked on were analysed, joining forces to achieve optimal and efficient digitalisation. The most important of these factors are cultural change in companies and organisations, the integration of workers within this digitalisation and the standardisation of the port sector.


> it is not enough to be an innovator or have the latest generation technology, we must also integrate this innovation and these technological solutions within the daily needs of the port-logistics sector

R D & i

# 09///

# Collaboration with start-ups


## /// Six proposals supported by APBA are selected in the first call of the Ports 4.0 Fund.

Six of the initiatives supported by the Algeciras Bay Port Authority (APBA) have been selected by the Compensation-Fund Allocation Committee to receive a grant in the first call of the Ports 4.0 Fund created by the State Ports Public Body (OPPE) for digitalisation projects.

For this first edition, APBA supported a total of 48 initiatives, of which ultimately six proposals have obtained financing from the Fund – with two ideas and four projects funded, one belonging to the commercial category and three from the pre-commercial category.

In the ideas category, of the six proposals offered a letter of support from APBA, the following two proposals were selected, one of which belonging to the intra-entrepreneurship category:

- **All4Maritime**
  **(Proposer: Jesús Medina, APBA - Intra-entrepreneurship category)**

  This proposal is defined as an Advanced Digital Consignee. In summary, this is an automation platform for the administration processes carried out by consignees, offering added-value services.

- **World Friendly Port**
  **(Proposer: N.Bordas and A.Navarro, Port de Tarragona)**

  Proposal focused on the definition of a new WFriendly/ index designed to objectively evaluate the situation of each port in comparison to others, through the identification of the key elements of the Sustainable Development Goals and a measurement of their compliance in ports.

On the other hand, in the category for commercial-phase projects, of the seven initiatives supported by APBA, one of them, which the Port Authority backed as a facilitating agent, has been selected to receive funding:

- **Posidonia Port CDM. Next-Generation Port Collaborative Decision Making (Proposer: Prodevelop)**

  Development of a tool, based on the CDM (Collaborative Decision Making) concept, which facilitates the exchange of real-time information regarding ship calls and operations in the port among the different agents of the Port Community (Terminals, Port Authority, shipping companies, etc.), allowing all agents involved to work with the same information and making collaborative and data-driven decision making possible.

Finally, for the pre-commercial phase projects, the 19 lucky proposals receiving grants from the Fund included three of the 35 proposals supported by APBA. What's more, all of these proposals received backing as a facilitating agent by the Port Authority, allowing them to develop their pilot projects in the Port of Algeciras. These are:

- **Port OCR disruption (Proposer: AllRead MLT)**

  Development of an advanced solution for the automatic monitoring and traceability of goods by rail using computer vision and Artificial Intelligence.

- **VIPE. Monitoring of maritime vulnerability from space (Proposer: Detektia)**

  Application of DInSAR satellite technology to analyse ground and infrastructure movement with millimetric precision and without the need for ground-based instrumentation.

- **SATMAR. Global service for digital maritime communications via satellite (Proposer: Alen Space)**

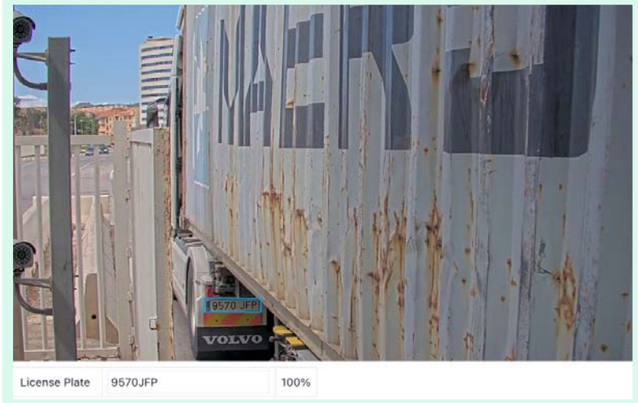
  Proposal based on the development and deployment of microsatellites for the use of VDE-SAT technology as an improved alternative to the AIS system.

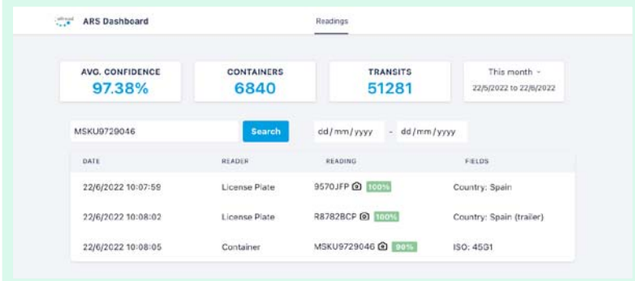

## /// The Port of Algeciras validates the AllRead technology and takes a step towards its implementation in the port environment .

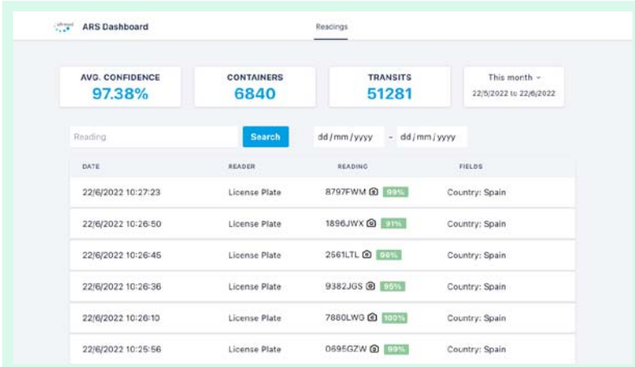
After a successful concept test carried out last year with the Barcelona start-up AllRead MLT, APBA has decided to go beyond the minimum viable product (MVP) initially developed to put the company's ARS software (Automatic Reading Software) into production, with the aim of extending the traceability of goods from the Port's South Entrance.

In concrete terms, two new control points have been installed in the heavy-traffic entry and exit lanes in order to process the images captured by the existing cameras and obtain the registration numbers of containers, platforms, trailers and semi-trailers, tractor units and all types of light vehicles, both from Europe and Morocco, in a structured way. Furthermore, the necessary integration works to make the information captured by the new system available in Teleport, the Port Community System, have also been developed.

The AllRead solution that was implemented, which has delivered highly satisfactory indicators in the first months of operation, is based on Artificial Intelligence – more specifically, on computer vision. Its innovative and patented vision is based on the use of neuronal networks and deep learning, which allows the system to learn from its mistakes in a similar way to the human brain and come to rational deductions when reading a code or particular digit.

# Radar START-UPS 2021

## Image&Video Processing

allread · detektia · ANYLINE · DEEP EYES · wooptix · vicomtech · vision-box · cogniac · BALIDEA · MAVISOFT

## Cybersecurity

Enthec.

## VR & AR

PixelsHub

## IoT&5G&NextGen Communications

Secmotic · Rombit · urban clouds · PURPLE BLOB. · INALIA INNOVATING DIFFERENTLY · ALén space · KIWANDA · WiTraC · sigfox · Sync · hop · AISTECH Access Intelligent Space Technologies

## Advanced Analytics, IA&ML

CONTIAMO · PIPERLAB · SINAY MARITIME DATA SOLUTION · FILAMENTW · ELEMENT AI · SEAPort Solutions · SIMPLUS make smarter decisions · GIGASPACES innovate with confidence · Kyanite 360 · SOFTCRITS Software for Critical Systems · bluepulse · BLUE CARGO · LUCA AI Powered Decisions · BuntPlanet · NORLEAN · SIGMA ARTIFICIAL INTELLIGENCE · goclever

## Logistics & Mobility

iomob · SMARTESCROW · routescanner · BIZCARGO · Portxchange · i4sea · Cargologik · BUSUP · LOGINNO · awake.ai · CONROO

## Blockchain

customs · VESTIGIA · éKratos · NAVOZYME · chainGO · JELURIDA

## Location Intelligence & Geo-Mapping

WHAT3WORDS · CARTO · MarineTraffic · nexusgeographics MAPPING YOUR WORLD · RAD technologies

## Drones

RIGITECH · SOLUTIONS · aerdron · SKYPORT · AEROTOOLS UNMANNED AERIAL TECHNOLOGY · ICTYS tech

## Future Transportation

ZELEROS · navlandis · CONNECTAINER

## Maritime Instrumentation

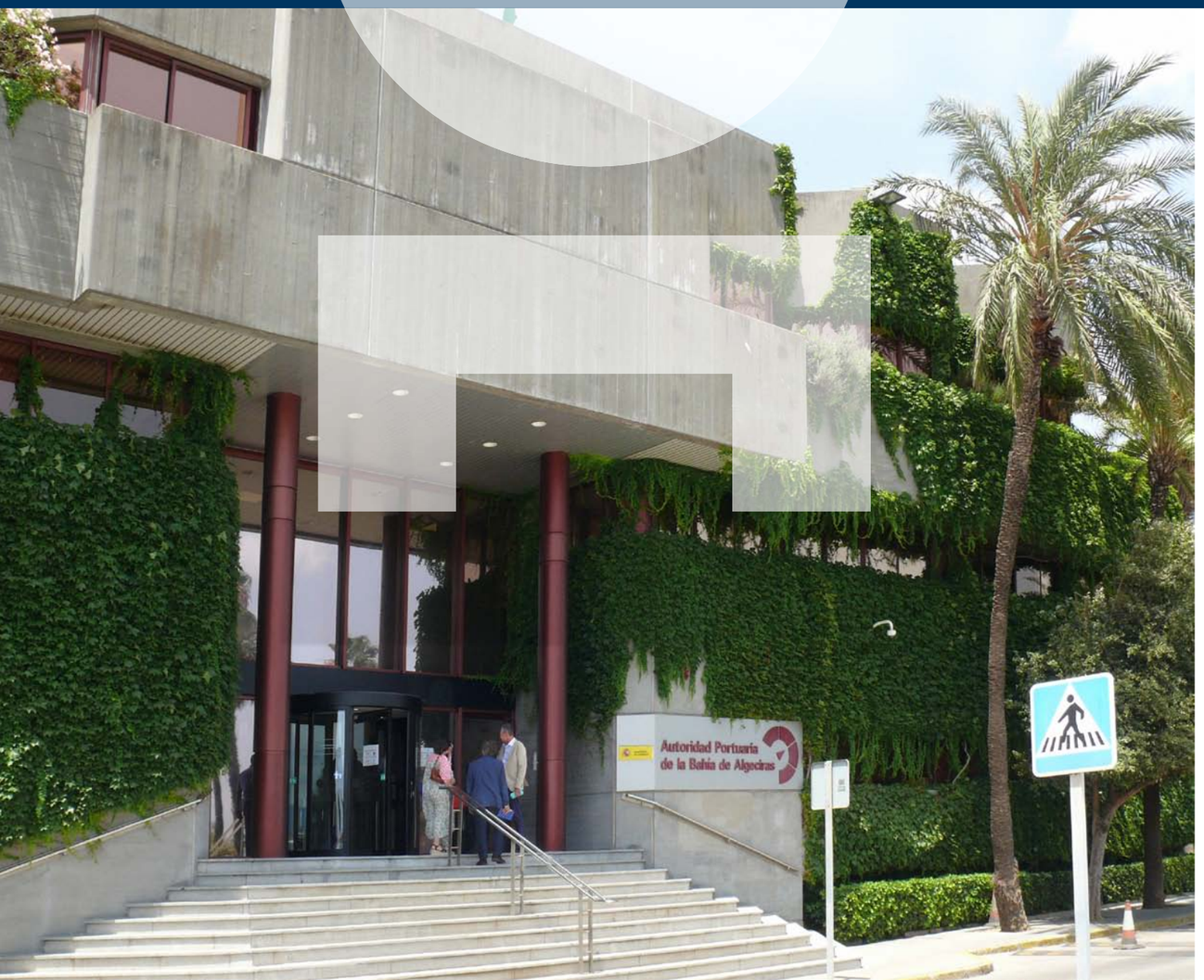
igeotest GEOSCIENCE · ADECUA · L. STRAATMAN BV

## Energy Efficiency & Sustainability

bound4blue · SOLUM · ECONCRETE · Eco Wave Power · fundeen · ona SAFE & CLEAN

# 10///

## Press release




### /// 1

Article **“From digital transformation to open innovation at Port of Algeciras Bay”**. Published in PORTUS Magazine, Port-City Relationship and Urban Waterfront Redevelopment, by Francisco Javier de los Santos Ramos, Jesús Medina Blanco and Enrique Martín Alcalde, in which the key elements of the Port of Algeciras Bay intended to face up to the complex and competitive market within the context of the Strait of Gibraltar and the West-Med were explained. To do so, the ‘Algeciras Next Generation Port’ strategy was presented, through its key initiatives, as well as the ‘Algeciras Digital Innovation Labs’ and ‘Lago Marítimo’ projects, with the aim of achieving an ecosystem of open-innovation and attracting talent.

Access through this QR to the full original article

### /// From digital transformation to open innovation in the Port of Algeciras Bay.

Ports, considered strategic and essential logistics Hubs for international value chains, are currently subject to a series of external forces of changes in terms of geopolitics, economics, society, the environment and technology, to which they must respond with a clear objective: to continue creating value and remain competitive within a context marked by the globalisation and ‘logistification’ of business models, with high levels of competition. Furthermore, a large portion of society has established the concepts of instantaneity, adaption to constant change, improvisation and real-time decision making as ‘The New Normal’ (Hinssen, 2011), in which environmental sustainability plays a fundamental role.

As such, under the leadership of Port Authorities, a far-reaching process of strategic and operational change is underway to transform and prepare ports to continue serving the logistic chains of the future – more autonomous, resilient and physically and digitally hyperconnected (PwC, 2020) – and, on the other hand, to become drivers and facilitators of the economic and sustainable development of port communities and their interface with the urban fabric of the cities of the future.

In this context, the Algeciras Bay Port Authority (APBA) has been at the forefront of an exemplary process of change which has positioned it as one of the leading ports in terms of technology and innovation on an international level, awarded in 2020 by the European Sea Ports Organisation (ESPO) for its role in promoting the social integration of innovative companies and local entrepreneurs within the port field.

This article presents the keys to said Digital Transformation and innovation process and the next steps to achieve the concept of the next-generation port in a concise and detailed manner.


/// 2

Article **"Optimisation of container ship calls through the digitalisation of processes and active collaboration between port agents"**. Published in Bit Magazine, by Ángel Martínez Cavero, Telecommunications Engineer, Product Manager at Posidonia Port CDM and head of the Maritime Operations team at Prodevelop; María José Villalobos, Degree in Communication, Analyst specialized in the development and implementation of solutions in the port sector; y Jesús Medina Blanco, Telecommunications Engineer, Chief Information and Innovation Officer at APBA.

Access through this QR to the full original article

## /// Optimisation of container-ship calls through the digitalisation of processes and active collaboration between port agents.

*Maritime shipping of goods is a complex business process in which coordination between various participating actors is essential. The synchronisation of maritime traffic, joint decision making, a comprehensive (and unbiased) vision of the process thanks to the exchange of standard information between the IT systems of different entities and better use of time are just some of the issues that must be addressed. In this article, we describe the process that has successfully facilitated the development of a collaborative solution guaranteeing operational excellence in the Algeciras Bay Port Authority (APBA), one of the leading ports in Europe.*

Port communities are complex ecosystems in which a significant number of actors interact in a coordinated way to offer high-added-value logistics services under dynamic planning and tight cost control. Of all forms of maritime shipping, that carried out by container ships is of particular relevance. This traffic has demonstrated a growing trend, which has in turn resulted in the simultaneous creation of new models of container ships of a greater size and capacity. Though the port sector has undoubtedly played a fundamental role during the recent COVID-19 health crisis, ensuring continual and uninterrupted delivery of basic and essential products, events such as that recently experienced in the Suez Canal demonstrate the fragility and complexity of a system where any unexpected occurrences can have a significant global economic impact within the current distribution model.

It is also important to mention that there is a strong commitment from formal institutions and competent bodies in the field to reduce $CO_2$ emissions from ships (of all types). The IMO (International Maritime Organisation) is currently driving a global decarbonisation strategy to reduce levels of CII (Carbon Intensity Indicator). Shipping companies, as owners of fleets of ships, have highlighted three strategies: (1) use of the most environmentally friendly fuels, (2) use of alternative, high-energy-efficiency propulsion systems and (3) smart and real-time ship-speed adaptation during journeys in line with actual operational contexts.

> **Data sensitivity, privacy and confidentiality in communications are essential for the business**

## /// 3

Article **“Algeciras award-winning innovation model”.** Published in web portal Piernext, innovation by *Port de Barcelona*, by Francisco de los Santos Ramos and Jesús Medina Blanco.

Francisco de los Santos, Head of the Technological Development Area at APBA. His main responsibility is to lead the digital transformation of Algeciras Port and consolidate Innovation as a core business process. He holds an MSc in Civil Engineering, an Executive Master in Telecom Management and IT, a Ph.D. in Port Engineering, and an Executive MBA from IESE Business School.

Jesús Medina, Head of the Innovation and Digital Solutions Business Unit. His main mission is to ensure the correct relationship and integration between the Technological Development Area and the rest of the Business Units of the Port Authority, identifying, channeling and aligning the business needs with the IT and innovation strategy. He is a Telecommunications Engineer from the University of Seville, Prince2 Practitioner and ITIL Intermediate.

Access through this QR to the full original article

## /// Algeciras award-winning innovation model.

*The Port of Algeciras program ‘Journey of Innovation-Travesía de la Innovación’ has been recognized by the European Sea Ports Organization (ESPO) with its 2020 Award for its ability to attract innovation and local talent. Francisco Javier de los Santos Ramos, Head of the Technological Development Area, and Jesús Medina Blanco, Head of the Innovation and Digital Solutions Business Unit, explain in detail this management model and why the key lies in its integral and transversal development.*

The twenty-second edition of the ESPO Award recognized the work of the Algeciras Bay Port Authority (APBA) in integrating innovation as part of the integral management of the organization as established in the ‘Journey of Innovation-Travesía de la Innovación’ program. This is the second accolade that the APBA received in 2020, since in April it became the first Spanish port to receive a UNE 166002 certification that distinguishes its management in Research, Development and innovation (RD&i).

“In a very embryonic first phase we established the innovation framework that we currently have, based on the integration between innovation and business and throughout the life of the company, not only for a certain period of time,” says Jesús Medina Blanco, Head of Information Systems at the APBA, who explains that the ‘Journey of Innovation-Travesía de la Innovación’ was launched in 2016 with the aim of creating “a culture of systematic innovation in the port, reinforcing our brand and defining better our innovation management systems.”

This systematic, continuous and integrated program in all the business units aims to implement the concept of the Last Generation Port in Algeciras and to consolidate an Innovation Hub specialized in Port Logistics by 2030.

# ///Main releases of 2021

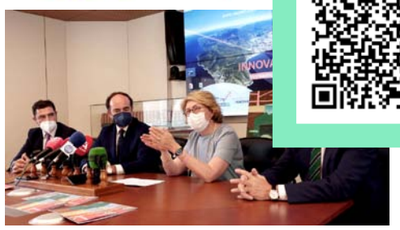
SPANISHPORTS


The Port of Algeciras renews its UNE 166002 Certification for its RD&i Management System (Spanish Ports)

ABCdesevilla

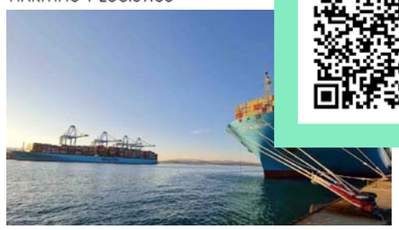
The *Lago Marítimo*, the ambitious project that will transform Algeciras (ABC de Sevilla)

El Estrecho Digital.



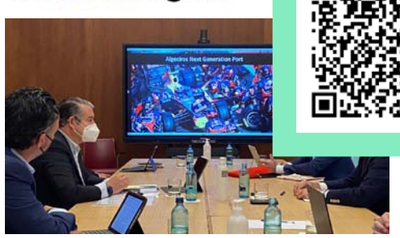
The Secretary General of ESPO highlights the value of the Port of Algeciras (Estrecho Digital)

el canal MARÍTIMO Y LOGÍSTICO



The Port of Algeciras develops its technological platform with Teleport 2.0 (El Canal Marítimo y Logístico)

El Estrecho Digital.

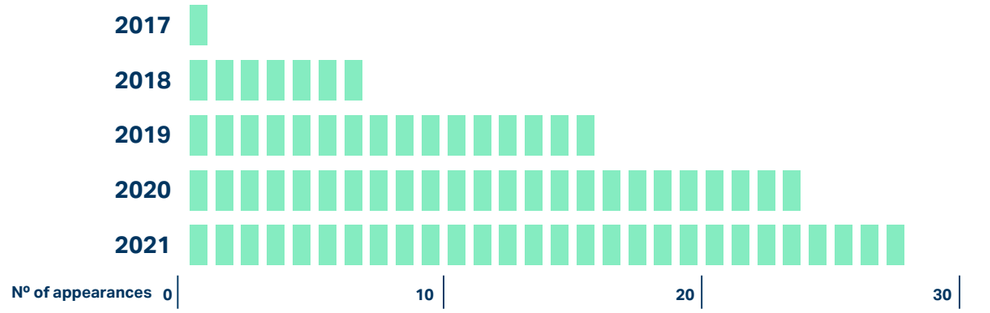


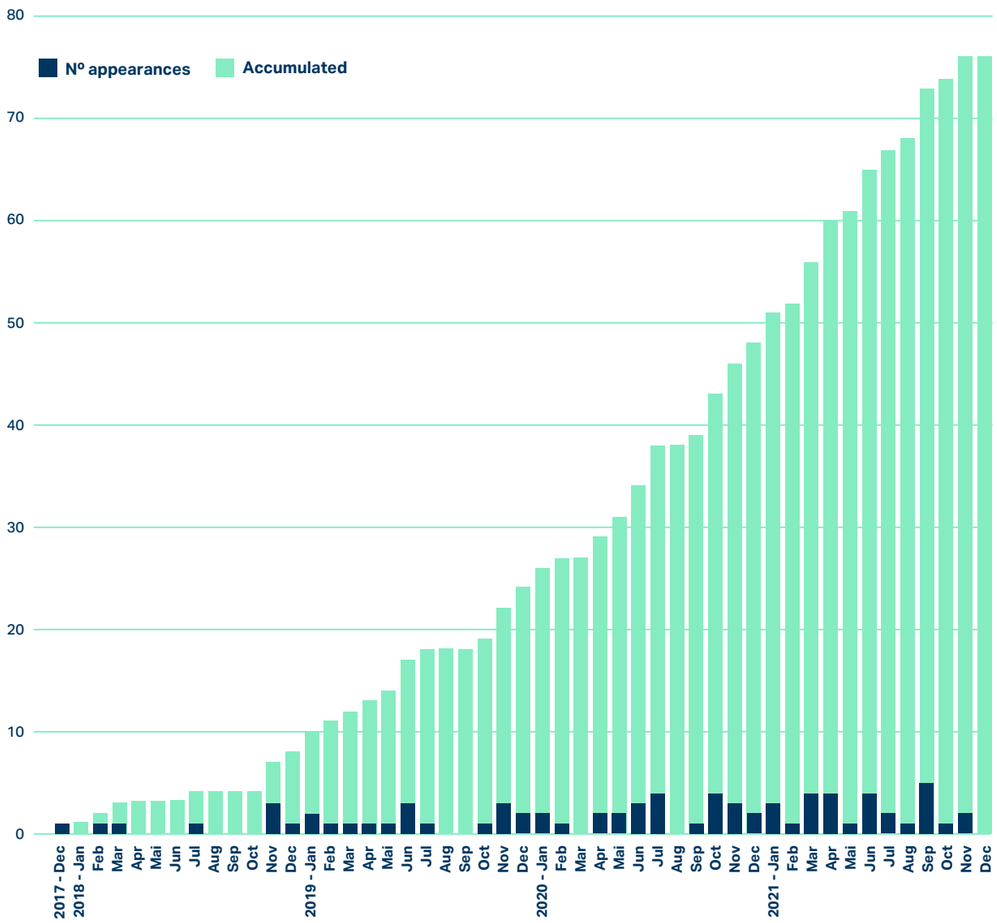
The Port of Algeciras consolidates itself as a 'Next-Generation Port' (Estrecho Digital)

Diario del Puerto

The Port of Algeciras of the 21st century: innovative, sustainable and responsible in its local area (Diario del Puerto)

# ///Press appearances



Travesía de la innovación