

ALGECIRAS PORTCDM PLATFORM

- Digitalization Theme -



La realidad
de un nuevo
puerto.



Travesía
de la
Innovación

Short description:

The Port of Algeciras, one of the main global maritime hubs, faces critical challenges arising from the growing demand for maritime trade, such as port competitiveness, resilience of supply chains and decarbonization of the industry. To address these challenges, the Port Authority of Algeciras Bay (APBA) has developed the innovative **Collaborative Decision-Making Platform (PortCDM)**.

This digital solution, based on **operational standards and advanced technologies**, revolutionizes coordination among port stakeholders by providing a single point of real-time data exchange. The platform improves operational forecasting, reduces waiting times and optimizes resource allocation, **promoting Just-in-Time operations** that minimize operational, environmental and economic impacts.

PortCDM uses reliable real-time data, interoperability and analytics to create a cross-cutting dashboard that visualizes the planning and execution of end-to-end operational processes. This “**single point of truth**” ensures unified action toward a common goal: **optimizing port call processes**. By adopting this collaborative platform, we are shaping the future of the maritime industry.

With a focus on operational excellence and sustainability, the platform has achieved outstanding results during 2022-2025, such as a **26% reduction in vessel waiting times**, a **50% reduction in idle time upon departure from berth**, and a **significant decrease in emissions** (25,761 tons of CO₂). In addition, it has generated **estimated savings** of approximately **€15.7 million**, benefiting both the operators and the local Port Community.

This successful project, conceived as a replicable model, has an ambitious expansion plan towards **operational synchronization between ports**, setting a global standard for operational efficiency, decarbonization and service quality in the maritime-port sector.

Vision and leadership deployed by the port's management:

Our innovation proposes an approach that extends the rules of the game, applying the proven concept of collaborative decision-making in the airport sector to the maritime domain. By establishing transparent and efficient data exchange and facilitating end-to-end visibility, our platform breaks down traditional barriers and connects decision domains, revolutionizing operational efficiency and advancing ambitious decarbonization goals.

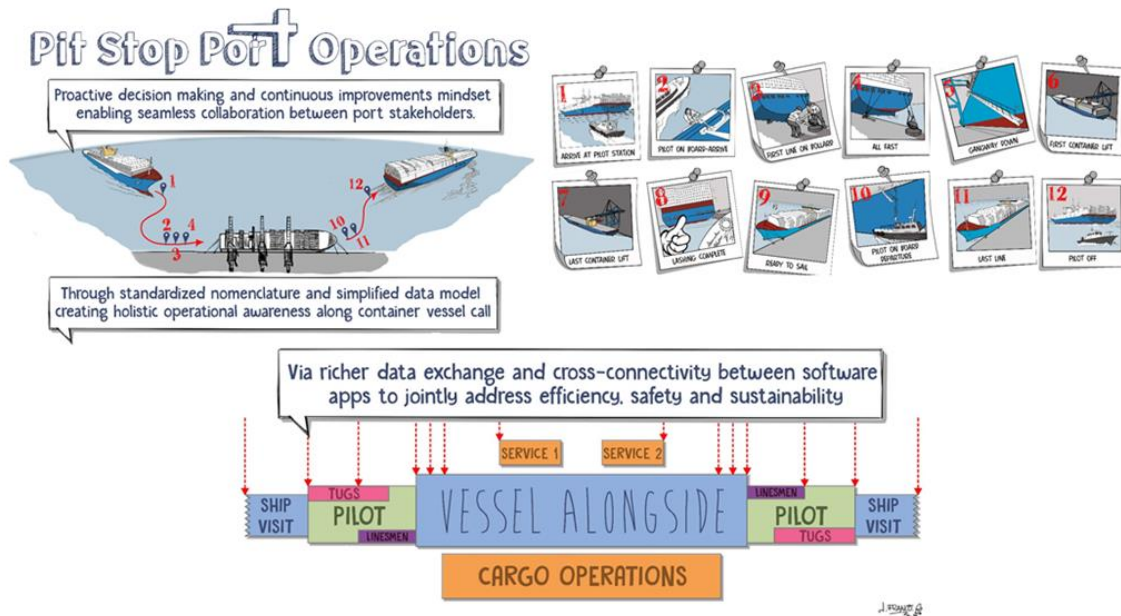
What really sets us apart is our pioneering collaborative data-sharing model, which not only allows us to predict upcoming events in the call process, but also anticipates potential incidents, bottlenecks and disruptions. As a result, it adjusts vessel arrivals, streamlines berth management, resource allocation and, ultimately, offers an unprecedented digital orchestration tool.

Likewise, this collaborative decision-making platform is unique in its conception. We do not want to forget our pioneer users, many of whom were part of the pilot project, “Pit-Stop Port Operations Algeciras”, embryo of the current platform. An innovative proof of concept, conducted in 2018, where participating stakeholders explored the concepts of collaborative decision making and achieved a global milestone in the industry, setting the course towards today's triumphs.



Navigating a sea of collaboration, this initiative brought together a vibrant set of maritime trade stakeholders: the Port Authority, two major container terminals (APMT and TTIA), visionary shipping companies (such as MSC or Maersk), tenacious shipping agent representatives and local ship service providers. Not to mention the vital inclusion of two innovative maritime technology companies as our solution providers.

This is not just a list of participants; it was a coalition dedicated to revolutionizing the maritime industry. Beyond simply integrating data, these players embraced our vision: a synchronization that transcends individual efficiencies to enhance the collective value proposition of the Algeciras Bay Port Community. And to the facts we refer.



Impact on the sector to which it relates:

The implementation of the PortCDM platform marks a milestone in the maritime-port sector by redefining the way key players collaborate and manage operations in real time. Digitization and the use of advanced technologies, such as predictive analytics tools and interoperability systems, have proven to be instrumental in addressing the congestion, inefficiency and sustainability challenges facing the industry. According to benchmarking studies by consulting firms such as Deloitte and DNV, digitization can increase the operational efficiency of ports by up to 30%, which translates into shorter waiting times, resource optimization and a significant reduction in operating costs.



This solution not only improves the competitiveness of ports by offering a more efficient and sustainable model, but also reinforces their role as strategic nodes in global logistics chains. In this context, PortCDM-type tools are essential to ensure the resilience and flexibility of supply chains. In addition, KPMG reports highlight that the integration of digital platforms can foster transparency and predictability, key factors in attracting investment and strengthening the confidence of logistics operators and shippers.

From a global perspective, the digitization of the port sector also has a transformative impact on sustainability. DHL studies highlight that optimizing logistics processes through digital technologies can reduce CO2 emissions associated with shipping by up to 15%, aligning with international decarbonization targets. By integrating these capabilities, our solution not only benefits immediate port stakeholders, but also contributes to the industry's move towards a more efficient, competitive and environmentally friendly model.

Finally, this tool acts as an enabler of new services and business models based on the adoption of innovation and technology. By providing an open and collaborative digital ecosystem, we drive the creation of new solutions, services and advanced business models in maritime transport and port management, consolidating ports as engines of transformation and growth in the global economy.

Industry challenge or problem to which it presents a solution:

It is estimated that 90% of world trade is transported by sea. This implies that the optimization of maritime/port operational processes has a great impact, both on the business (cost reduction) and on society as a whole (reduction of pollution generated by vessels).

On the other hand, for example, according to studies carried out by the company Maersk Line, 38% of the time spent in port by container vessels corresponds to entry/exit manoeuvres, berthing/unberthing and waiting for port services, the remaining 62% being dedicated to loading/unloading operations themselves. It is assessed that the waiting times that usually occur at entry/exit, with the need for anchoring on some occasions, and from the time the ship docks until it starts operating can be considerably reduced through greater transparency, more efficient data exchange between all the actors involved and intelligent solutions that support the different processes.



That is why the APBA came up with this revolutionary collaborative digital platform, designed to optimize container traffic at the Port of Algeciras' international hub.

An initiative that aims to pave the way towards seamless Just-in-Time operations, leveraging industry-based operational standards to synchronize digital management tools, fostering accurate and real-time data exchanges between key players in the port scale process.

Tangible benefit to the industry:

Our solution exceeded expectations in 2022, the first full year since its implementation, reducing the number of vessels waiting on arrival at the port by 13.5% and decreasing downtime at departure by an average of 40 minutes per call. Based on the latest analysis collected during the period 2022-2025 and the container terminal (APMT Algeciras) where this platform is applied, the results could not be more successful. The PortCDM platform has transformed the operational efficiency of the Port of Algeciras, achieving a historic reduction in vessel waiting times. Thanks to its implementation, a historic minimum has been reached in the average stay of container ships, consolidating the port as a benchmark for agility and reliability in global maritime trade. Thanks to the collaboration between APM Terminals Algeciras, the Global Operations Centre (HOC) and the APBA, in less than a year, the average idle time of ships in the port has been reduced from 2.8 hours to 82 minutes. Likewise, it has been possible to consolidate the optimization of vessel port call processes in a global manner, obtaining a 26% reduction in the waiting time of ships upon arrival at the port (2,709 total hours), a 34% reduction in berthing time (13,464 total hours), a 34% reduction in idle time upon arrival at the berth (1,350 total hours), and finally a 50% reduction in idle time upon departure (3,422 total hours).



The impact of these improvements is not limited to a simple time reduction. This progress has generated tangible benefits in terms of asset turnover, allowing customers to optimize their logistics operations and reduce associated costs. Furthermore, these advances strengthen the competitive position of the Port of Algeciras in the international context, consolidating it as a key logistics centre in global maritime trade. Without going any further, this fact led to the Port of Algeciras being designated, among the 8 selected globally, as a hub port of the Gemini

alliance (Maersk - Hapag Lloyd), in a demanding commitment to reliability and reduction of stopover times.

The new management model established in Algeciras represents an example of best practices that could be replicated in other ports with similar challenges. This development not only benefits customers operating in the port, but also has positive implications in terms of sustainability, by reducing waiting and idle times and optimizing the use of available resources.

Tangible improvements that impact both port stakeholders and society, and whose benefits allow us to generate unparalleled savings to our Port-Logistic Community of approximately 15.7 million euros, considering fuel consumption, depreciation of assets such as vessel, or the social impact of environmental pollution, among others.



And that is only the beginning. The replicability of this operating model to other types of port traffic managed in the Port of Algeciras, such as anchorage calls, liquid and solid bulk traffic or ship supply operations, raises to another dimension the potential benefits of our logistics-port ecosystem, in particular, and of the maritime industry, in general.

Job creation:

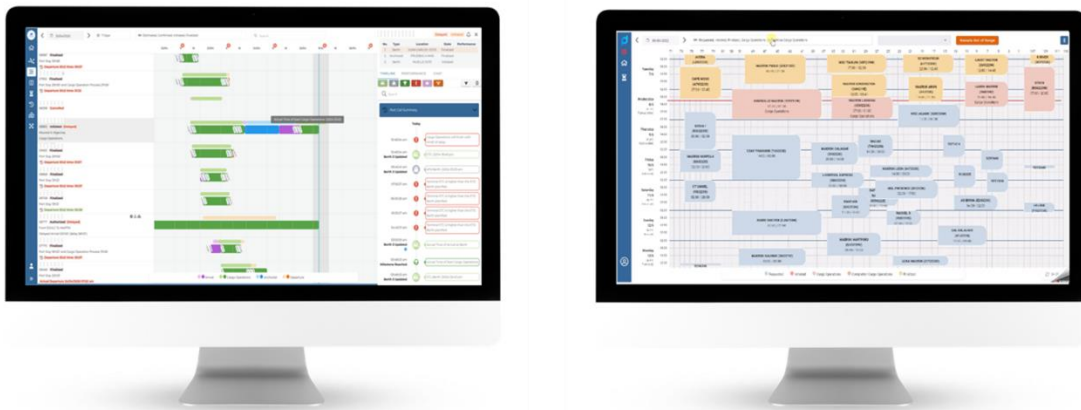
The implementation of the PortCDM platform not only strengthens the competitiveness of the Port of Algeciras in the global maritime sector, but also acts as a catalyst for economic growth and dynamization of the Andalusia region. By

optimizing port operations and improving the efficiency of logistics processes, the platform boosts the economic activity of key sectors such as transport, logistics and associated technical services, generating a significant impact on indirect job creation.

In addition, the commitment to digitalization and technological innovation fosters the demand for highly qualified profiles in areas such as data analytics, digital port management and environmental sustainability, consolidating the Port of Algeciras as a benchmark in the transition to Industry 4.0. This progress not only ensures the maintenance of its strategic position in international maritime trade, but also contributes to the generation of wealth in the local and regional business fabric, strengthening the economy of Andalusia and promoting a long-term sustainable development model.

Use of new technologies, innovation and digitalization:

The functional core of the tool is based on an API engine that enables interoperability between multiple systems and data sources, ensuring a seamless flow of information between terminals, logistics operators, shipping agents, technical services and other players in the port ecosystem. Among its key modules is an advanced real-time monitoring system that provides a detailed view of port operations, from estimated times of arrival (ETA) and departure (ETD) to the allocation and availability of critical resources such as berths, cranes and tugboats. The platform also includes predictive analytics tools that anticipate potential bottlenecks or disruptions, enabling proactive planning.



Furthermore, the advanced visualization module provides interactive dashboards and real-time simulations, allowing users to assess the impact of operational decisions before implementing them. Finally, the platform facilitates direct communication between stakeholders through automatic notifications and real-time updates, ensuring that any changes in operations are immediately shared and coordinated.

The platform goes beyond simply improving communication, fostering true collaboration between all stakeholders in the port ecosystem. Every operational update, from minor adjustments to strategic modifications, is shared in real time, ensuring coordinated and efficient decision making. By acting as a “single point of truth,” it ensures that all parties are working in alignment towards the same goal: optimizing vessel call processes. By adopting this collaborative platform, we are not just participating in the maritime industry; we are shaping its future.

Environmental impact:

The PortCDM platform has proven to be a key catalyst in the transition to a more sustainable port model, contributing significantly to the reduction of the environmental impact associated with maritime-port operations. Thanks to the optimization of operational processes, improved planning and the implementation of Just-in-Time operations, it has been possible to minimize vessel waiting and idle times, thus reducing unnecessary fuel consumption and associated emissions. In the 2022-2025 period, the platform has enabled a decrease of 25,761 tons of CO₂, 16.41 tons of SOX, 644.02 tons of NOX and 12.31 tons of PMX, making a tangible contribution to the maritime sector's decarbonization objectives.

These results not only reflect improved energy efficiency, but also contribute to air quality in the port environment, directly benefiting the health of local communities. Similarly, by promoting interoperability and digitization, the platform drives more sustainable practices throughout the supply chain, aligning with international climate change commitments, such as those established by the International Maritime Organization (IMO) and the 2030 Agenda for Sustainable Development.

These figures reflect the enormous potential of our platform, which not only paves the way towards carbon neutrality, but also offers an unrivalled benefit to users and customers through a sustainable proposition, through increased competitiveness and quality of service; laying the foundation for a greener, more efficient and resilient future in the global maritime sector.

Contribution of the Project to the UN Sustainable Development Goals (SDGs):

The Collaborative Decision-Making Platform (PortCDM) developed by the Port Authority of the Bay of Algeciras (APBA) represents a significant innovation in the maritime-port sector, aligning with several UN Sustainable Development Goals (SDGs). This platform promotes digitalization and operational efficiency, contributing to the creation of resilient and sustainable infrastructures (SDG 9). By optimizing logistics processes and reducing waiting times, PortCDM improves the competitiveness of ports and fosters technological innovation.

In addition, the platform has proven to be a key catalyst in reducing greenhouse gas emissions, contributing directly to decarbonization goals and the fight against

climate change (SDG 13). Thanks to the optimization of operational processes and the implementation of Just-in-Time operations, a significant decrease in CO₂, SOX, NOX and PMX emissions has been achieved.



Digitalization and improved operational efficiency driven by PortCDM also foster indirect job creation in key sectors such as transport, logistics and associated technical services (SDG 8). The demand for highly qualified profiles in areas such as data analytics and digital port management contributes to the economic growth and dynamization of the Andalusia region.

Reducing emissions and improving air quality in the port environment directly benefits the health of local communities (SDG 11). By promoting more sustainable practices throughout the supply chain, the platform contributes to the creation of healthier and more resilient cities and communities.

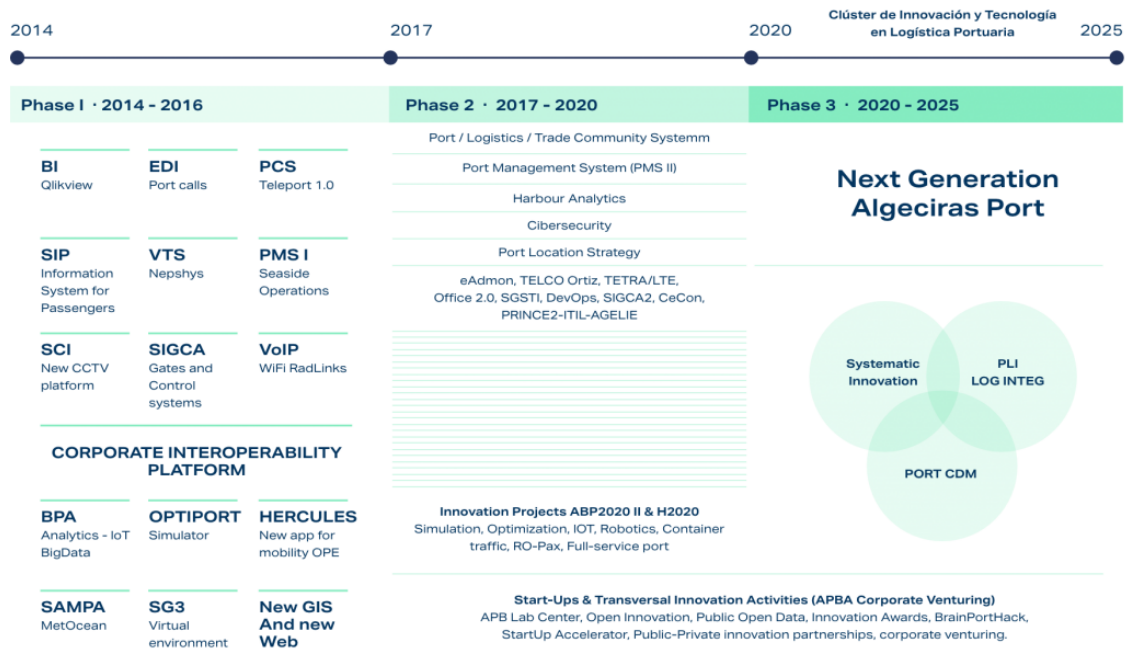
Finally, the PortCDM platform fosters collaboration among multiple stakeholders in the port ecosystem, including port authorities, container terminals, shipping companies, shipping agents and service providers (SDG 17). This collaboration is essential to achieving the Sustainable Development Goals, promoting strategic partnerships and the sharing of knowledge and technologies.

In short, the Collaborative Decision-Making Platform (PortCDM) not only optimizes the operational efficiency of the Port of Algeciras, but also contributes significantly to the UN Sustainable Development Goals, promoting a more sustainable, efficient and resilient development model in the global maritime sector.

Trajectory:

The APBA is no stranger to the current context of the maritime-port industry and is immersed in a profound transformation process to achieve operational excellence. In this sense, the Port Authority is evolving from a role of infrastructure owner and regulator of port services to a business facilitator and orchestrator of the port ecosystem, with the aim of improving service quality and adding value to the business.

To this end, its digital Innovation Strategy (2017-2020, 2021-2025 and its future renewal 2026-2030) and the Algeciras BrainPort Innovation Program (ABP) 2014-2025, conceived as the vehicle axis of the innovation strategy and covering the portfolio of innovation projects and cross-cutting actions, play a key role. One of the pillars of this strategy lies in the deployment of a digital platform capable of optimally, holistically and synchronized coordination of port and cargo logistics operations through the multimodal logistics node of the Port of Algeciras.



However, the starting point for creating value, primarily through data exchange, requires information to flow between different applications working together as a single solution, a “platform of platforms”.

This platform, similar to a system used in a Control Tower, provides end-to-end visibility of all cargo flows through the port, fostering early detection of inefficiencies, alerts or disruptions in logistics chains. It offers capabilities to understand and anticipate operational events and their impacts on port performance, and ultimately allows prioritizing situations, managing exceptions and assisting in the resolution of unforeseen eventualities and bottlenecks.

These concepts materialized with the implementation of the Operations Orchestration Digital Platform, where the Port Authority, from a neutral perspective, fulfils its mission by maximizing the Value of the Port of Algeciras. A value that will undoubtedly strengthen the performance of users and customers, generate loyalty based on data and increase its attractiveness. And this particular initiative, the collaborative decision-making platform, forms a key piece in that “platform of platforms” model and, therefore, in achieving this vision.

The journey of our innovative solution is just beginning. Our next big step? Introducing, additionally, a disruptive approach to date: port-to-port synchronization. Our goal is to optimize vessel calls from their previous port, transforming shipping into a perfectly efficient process from one logistics node to another, improving operational efficiency and reducing our environmental footprint.

This achievement will be accomplished by establishing digital dialogues with upstream and downstream ports, enabling greater operational awareness and superior predictive capabilities. The ultimate goal? To improve the planning process along the entire transportation value chain.

We are also raising the bar by defining and implementing Requested Times of Arrival, communicating directly with vessels to provide them with an accurate schedule with guaranteed dock availability and technical-nautical resources, ensuring a reduction in congestion and waiting times at the destination port.

Our plan for the future is clear: to reinvent, refine and revolutionize the maritime landscape.

