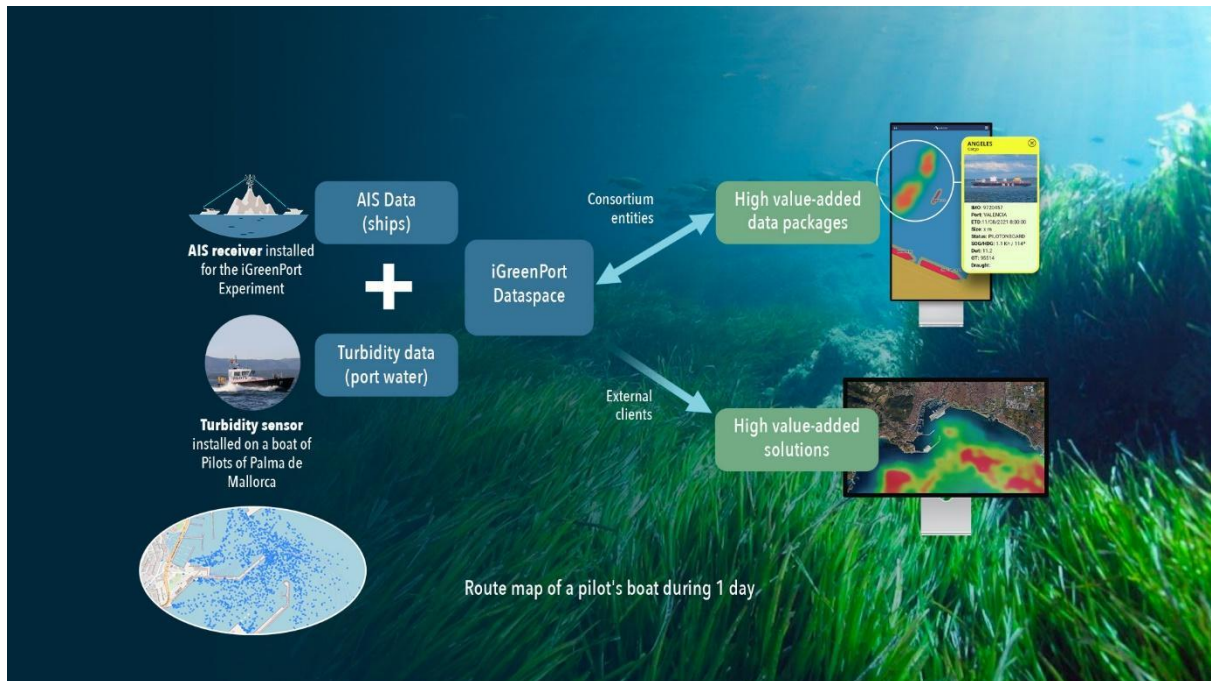


## iGreenPort

a dataspace to monitor seawater quality in  
SmartPorts



SmartPorts and Green Ports

## iGreenPort: a dataspace to monitor seawater quality in SmartPorts

With the contribution of:



- **HIADES Business Patterns SL**

# Challenge & Context

**Did you know that the largest living being in the world, 8 km in diameter, is in danger of extinction?** We are referring to the meadows of Posidonia plants, which are found in the Balearic Islands, under the sea. Posidonia is an endemic Mediterranean aquatic plant that is a treasure for marine biodiversity.

It is not for nothing that the meadows of Posidonia plants in the Balearic Islands are a World Heritage Site. On the seabed, Posidonia contributes to the oxygenation of the water, and serves as a reserve for fish, molluscs, and crustaceans, since they are places of refuge and food. In addition, Posidonia makes the waves break less intensely on the beaches, thus avoiding the loss of sand.



Figure 1. Global socio-economic context of iGreenport. Source: iGreenPort's webpage: <https://www.igreenport.com/>

iGreenPort arises from the real need identified by the Port of Palma de Mallorca. The Port Authority of the Balearic Islands requests the support of the maritime pilots of the Port of Palma de Mallorca to digitize the control of the quality of the port's seawater, due to the high impact of water pollution on Posidonia, caused mainly by maritime traffic (the anchoring of ships and discharges of poorly treated water).

The environmental perspective has been one of the biggest forgotten elements in the port's digital transformation so far. Currently, seawater quality data in all port maritime areas does not exist in near real time, nor is it integrated with AIS data, which is the data sent each 3 or 6 seconds by all the ships sailing at sea, with their characteristics and position. The crossing of seawater quality data

with AIS data is very important to identify the ships that could cause water pollution.

Therefore, **having a single platform with these two datasets (water quality and AIS data) is of high value to port authorities, to monitor seawater in near real time. This platform or Dataspace would contribute to the PortCDM** (Collaborative Decision Making) model, which the most digitally advanced ports are investing in, in which information is shared between all stakeholders in real-time, without paper and with fewer radio calls.

Regarding the context of seawater monitoring, it is noteworthy that:

- Globally, the market value of marine and coastal resources is estimated at 3 trillion dollars per year or about 5% of global GDP. More than 3 billion people depend on marine and coastal biodiversity for their livelihoods.
- Current acidity levels in the seas have increased by 26% since the beginning of the Industrial Revolution, and coastal waters are deteriorating due to pollution and eutrophication, which is expected to increase by 20% by 2050.
- According to the SDG 14, the European Sea Ports Organization created an Environmental Code of Conduct, instructing Port Administrations to develop instruments that enable them to manage environmental problems.

-

## Solution

iGreenPort is a pioneering project that offers Port Authorities and other port agents with environmental competencies. It offers **a Dataspace to share and consume environmental and operational data (such as the seawater quality in the port) in near real time, with which they will be able to take more intelligent and faster decisions aimed at the efficiency and environmental sustainability of its ports.**

The iGreenPort's Experiment, in its first phase, is aimed at creating a data marketplace with two types of data collected in near real time in the Port of Palma de Mallorca (Balearic Islands):

- **the seawater quality of the port** (we have started with turbidity among the 15 indicators mandatory by law),



- **the AIS data of the vessels**, which gives information about them every 3-6 seconds (their characteristics, position, etc), which can be crossed with the seawater quality data, in order to obtain conclusions about their involvement in the contaminated areas.

And how do we collect the data?

Real-time AIS data is received directly through a hardware receiver or through integration with port AIS stations.

Turbidity data is received by a sensor installed on a boat belonging to the maritime pilots of the Port of Palma de Mallorca. These boats are the best platform for this purpose because they are in continuous movement throughout the day, and therefore ensure a complete and frequent sweep of all areas of the port.

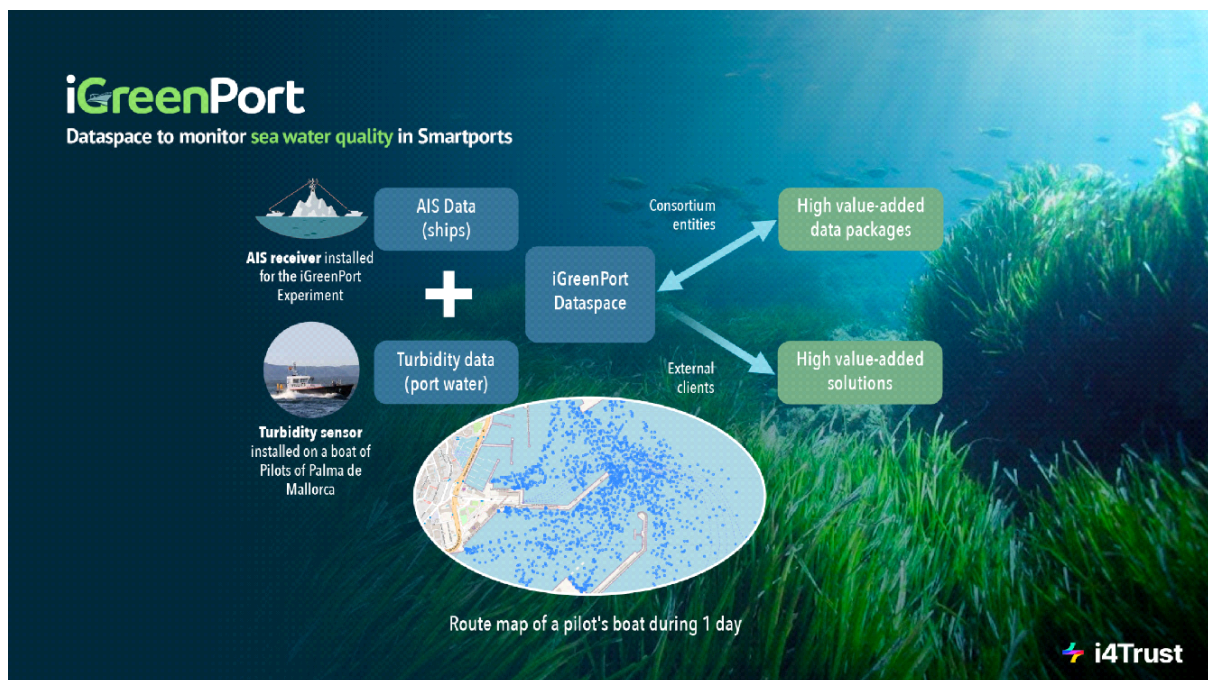


Figure 2. iGreenPort Dataspace. Source: HIADES.

These datasets will be shared through a Marketplace with the entities of the iGreenPort consortium, who will use them and add value, thus creating new data packages and advanced services related to the monitoring and analysis of seawater monitoring and analysis, aimed at both entities of the consortium as well as external clients, such as Port Authorities.

The iGreenPort consortium is made up of a group of Spanish companies with highly specialized personnel in all the fields involved in the project. We have experts in business consulting in the port sector, specialists in Smart Cities

platforms, specifically in FIWARE and the i4Trust standard, and also developers, experts in Artificial Intelligence, Internet of Things and sensors, and in the creation of data exchange platforms.

All the companies are established in the Canary Islands, with the exception of the Pilot Corporation of Palma de Mallorca (Balearic Islands):

- **HIADES Business Patterns SL** is the leader of the project. It is a software provider specialized in the digitization of nautical services, with its suits of products 'AMURA', deployed in more than 20 international ports. HIADES has business specialists, analyst programmers and system integrator experts specialized in the Port sector, and it is highly positioned in the Port sector.
- **CIDIHUB**, the Canary Islands Digital Innovation Hub, gives support to the coordination and results dissemination.
- **MNX Online** is an IT consulting and software development company with a certified FIWARE Expert and i4Trust Local Expert in B2B Data. MNX is the coordinator of iGreenPort Orchestrator.
- **PALMA PILOTs** is the Corporation of Maritime Pilots in the Port of Palma de Mallorca (Balearic Islands). It is a Data Consumer of some data packages of the Marketplace which, with its own quality certification system, will allow a highly improved service to Balears Port Authority. With PALMA PILOTS we have the direct client inside the project.
- **PLEYONE Management Capital SL** is a software provider of advanced IT solutions with a highly innovative component, focused on the port and maritime sector. PLEYONE has experts in IT, IoT and GIS systems.
- **CANARY Islands Connection SL** is a provider of data analysis services, specializing in AI models.
- **JEMINOAL FARMAGROUP SL** is a company provider of machinery, equipment and supplies.

We have defined the **iGreenPort Data Value Chain**, where at each level there is a member of the iGreenPort consortium –who is a Data Provider or Data Consumer in the Marketplace (or both)- and data transfer goes from left (data

providers) to right (data consumers). Consumers create innovative products and services with shared datasets.

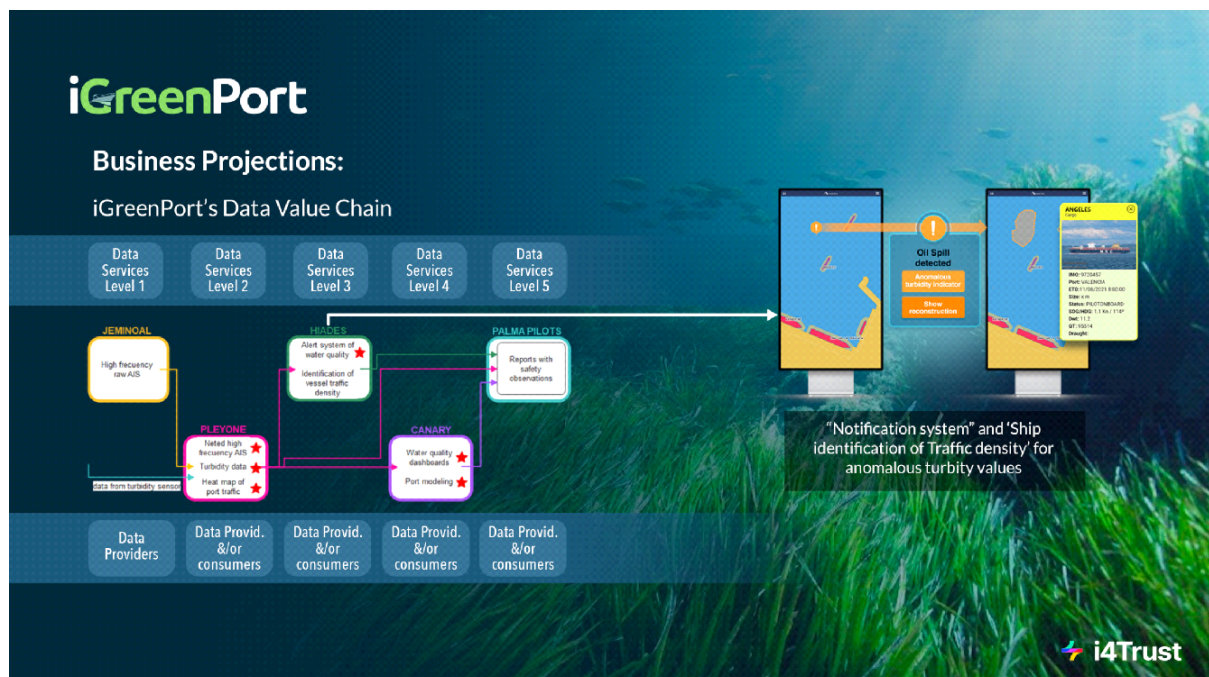


Figure 3. iGreenPort's Data Value Chain, with data packages services aimed at seawater monitoring in near real time. Source: HIADES.

Specifically, in iGreenport's Data Value Chain, JEMINOAL is a Data Provider at Level 1, since it provides the AIS raw data at high frequencies, whilst HIADES, PLEYONE and CANARY are both, Data Consumers, and also Data Providers, creating new data packages or data services shared through the i4Trust Marketplace:

- At level 2: PLEYONE provides data packages of processed AIS data, and data service of the "seawater quality heat map of the port", where the different areas from lowest to highest turbidity and ship traffic are visualized in real time.
- At level 3, HIADES provides a "Ship identification of traffic density", a reconstruction of port status and vessel information in case of anomalies of turbidity, and a "notification system of anomalous indicators" to the competent authority.
- At level 4, CANARY creates real-time dashboards and port characterization models based on water quality historical data.

In short, through the iGreenPort Marketplace, it will be possible to provide all types of users with high-value data package services for monitoring and analyzing the seawater quality of ports, among which are:

- Heat maps with seawater indicators in all the maritime areas of the port displayed on an interactive monitor
- Alarm system when anomalous seawater indicators are detected
- Reports of vessels that sailed before the contamination incidents as possible causes of them
- Dashboards with historical data of seawater indicators, etc.
- Predictive models about (type of) vessels with more probability to cause pollution incidents, etc.

## How it works

iGreenPort Experiment facilitates data exchange through a FIWARE-powered platform with an i4Trust Marketplace. To develop iGreenPort, it is necessary to have a structure based on FIWARE technology that supports BigData from IoT in near real-time data combined with iShare standards to enable a Marketplace with a robust, secure and agile authentication system.

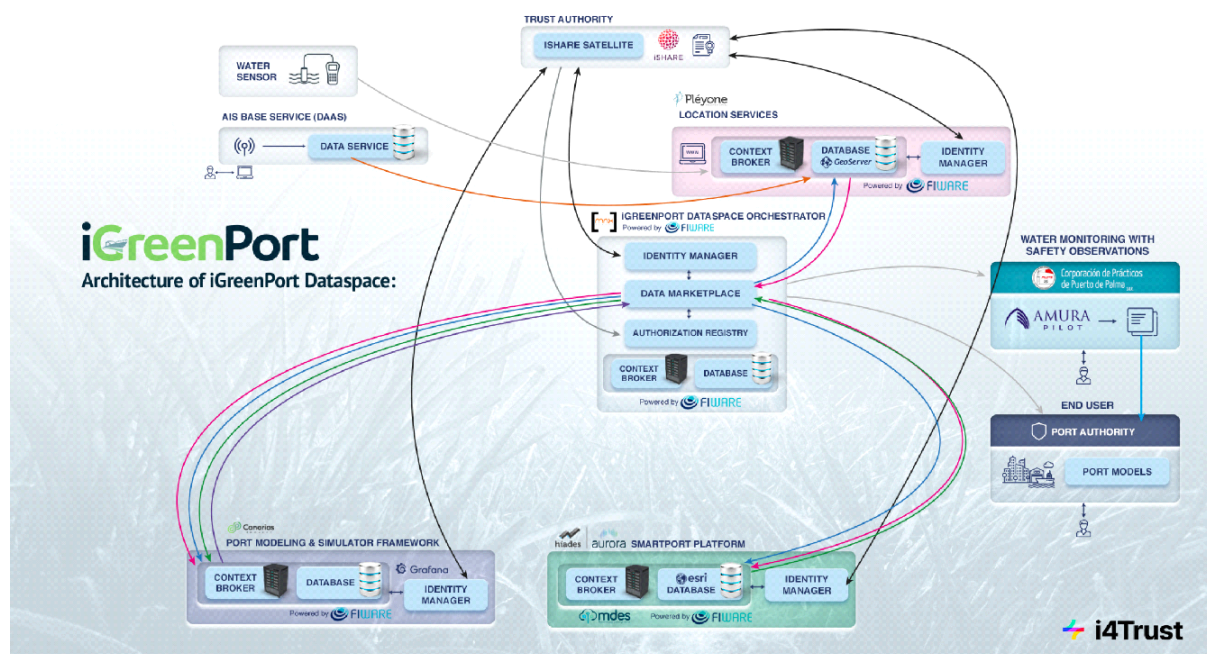


Figure 4. Architecture of iGreenPort. Source: HIADES.

Following the philosophy of i4Trust, and using FIWARE technology and its different components, such as a Marketplace, a security component and the



storage of large amounts of data in real time, as well as those of iShare for a multinational electronic identification, iGreenPort allows to create a space in which the different entities involved in a Port can exchange data in an efficient, secure, traceable, automatic manner. This creates what we call a DataSpace, a place where these entities and their systems can exchange information and generate new value, thanks to the aggregate data.

The HIADES, PLEYONE and CANARY entities have a FIWARE structure, while for the JEMINOAL and PALMA PILOTs entities it is not necessary.

JEMINOAL collects the raw AIS and sends it to PLEYONE for processing and delivery to the Marketplace in response to specific requests. The intake of seawater quality data is also carried out through PLEYONE, which receives the data directly from the sensor installed on the pilot boat.



*Figure 5. Boat of Pilots of the Port of Palma de Mallorca, with the sensor of seawater quality (turbidity).  
Source: HIADES.*

End users (Port Authorities, etc) can request data/service packages through the Marketplace. Each specific request to the Marketplace, once validated as a trusted entity, eventually translates into the data acquisition request to each data provider, which is intercepted by their respective PEPs.

iShare Satellite will enable, in coordination with the Identity Provider and Authorisation Registry, the validation of whether participants sharing data in the iGreenPort Dataspace are trusted organizations.

## Benefits & Impact

The competences in the prevention and control of emergencies due to marine pollution in the service area of the ports (Zone 1) are assigned to Port Authorities, which are investing in specialized surveillance that allows rapid action in the event of pollution incidents. iGreenPort provides a pioneering tool to monitor seawater quality in near real time and identify ships that could cause water pollution.

The results are oriented, as end-users, to Port Authorities, or by delegation, PortControl, coast guards or pilots, and also, to their suppliers, and other port agents and research groups in this field.

Under a conservative assumption to reach 59 ports in 5 years, that is, a SOM of 5,1% of TAM, being TAM=1.164 ports from Spain and South/Central America (where HIADES already has commercial networks) and USA (a market that is currently opening HIADES), with the following sales forecast:

<b>iGreenPort Dataspace</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
New implementations in ports	2	6	10	15	21

<b>iGreenPort Services</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
Data packages (punctual sales)	160	640	1440	2640	4320
Heat maps (1-year subscription)	20	80	180	330	540
Alarm system (1-year subscription)	6	24	54	99	162
Reports of vessels (1-year subscription)	6	24	54	99	162
Dashboards (1-year subscription)	12	48	108	198	324
Predictive models (1-year subscription)	10	40	90	165	270

iGreenPort will have more than 6M€ in the fifth year and an interannual increase of profit during the following 5 years, above 30%.

Some future plans, in addition to commercial actions, are to extend iGreenPort to a new customer segment, such as pollution monitoring on busy beaches.

## Added value through i4Trust

The i4Trust program has provided us with:

- Training and knowledge of a new architecture to develop in the company a promising line of business such as the sale of data packages.
- New tools to explore and analyze data-driven business models
- The expansion of our network of partners, with mentors, our consortiums, etc.

The main value-added created in iGreenPort has been the development of a new architecture, based on the i4Trust standards, with which for the first time many companies can share data on the quality of seawater in ports in almost real time. Likewise, it is of high value to amplify the reach and accessibility of this data to a large number of end users.

The application of Smart Cities platforms to Smart Ports is one of the most important trends for the next years in the port sector. i4Trust is a suitable technology for big data exchange projects (mainly collected from IoT) in the port sector, as well as more and more demanded.

## Next steps

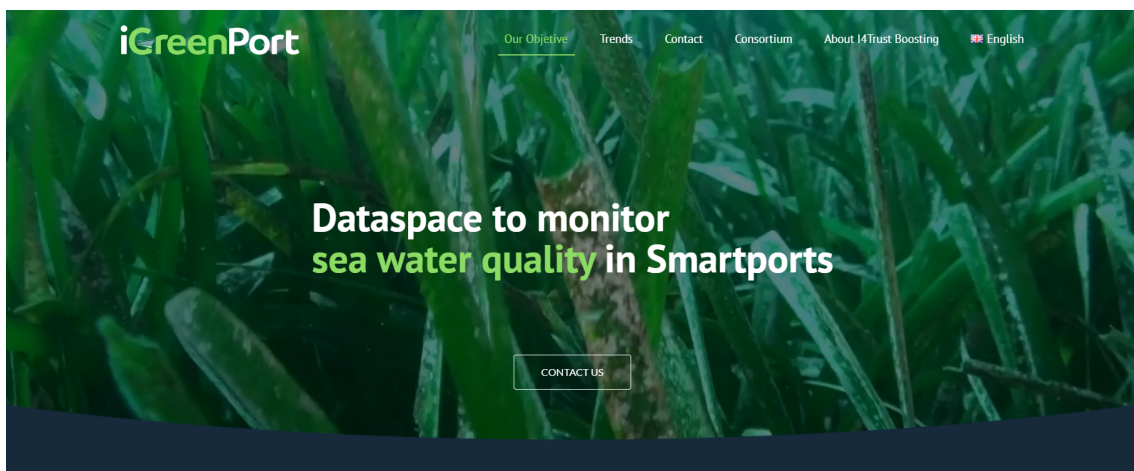
The next step for iGreenPort is to enhance it by integrating this solution with another AMURA Ziday project, created by HIADES and the company Orbital EOS and supported by European funds through the DigiCirc (Blue Economy) Program. AMURA Ziday, developed based on the same Smart Port platform powered by FIWARE, consists of a digital solution for the early detection of oil spills on the sea surface through satellite observation. The result of the integration of iGreenPort and AMURA Ziday will be a more complete and stronger product.

Another project that HIADES has designed (and presented to the second call for i4Trust), is SmartEDIPort, consisting of the creation of a Dataspace for the sharing of so-called EDI data, used by Port Authorities, terminals, shipping agencies and other port agents.

## References

During the execution of the iGreenPort project, HIADES has created numerous project dissemination resources and done an intensive communication activity, through the official web of the project, a dossier, slides, social media posts (mainly in LinkedIn), newspaper articles, etc. Below we list a selection of them:

- Video of the iGreenPort project:  
<https://www.youtube.com/watch?v=nbVWhq2VW4U>
- Webpage of iGreenPort project:  
<https://www.igreenport.com/>



*Figure 6. Webpage of iGreenport project, made by HIADES.*

- Dossier and slides of the iGreenPort project:





At the end of this document, a slide presentation of the project is added.

- [https://www.linkedin.com/posts/h-ades-business-patterns\\_iot-smartdatamodels-smartports-activity-6906501226494509056-KafV](https://www.linkedin.com/posts/h-ades-business-patterns_iot-smartdatamodels-smartports-activity-6906501226494509056-KafV)
- [https://www.linkedin.com/feed/update/urn:li:activity:6912661798978514944?updateEntityUrn=urn%3Ali%3Afs\\_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6912661798978514944%29](https://www.linkedin.com/feed/update/urn:li:activity:6912661798978514944?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6912661798978514944%29)
- [https://www.linkedin.com/feed/update/urn:li:activity:6912661798978514944?updateEntityUrn=urn%3Ali%3Afs\\_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6912661798978514944%29](https://www.linkedin.com/feed/update/urn:li:activity:6912661798978514944?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6912661798978514944%29)
- <https://www.linkedin.com/feed/update/urn:li:activity:6930396204476346368>
- [https://www.linkedin.com/posts/h-ades-business-patterns\\_des2022-maerlaga-igreenport-activity-6942454642064683008-fluh?utm\\_source=linkedin\\_share&utm\\_medium=member\\_desktop\\_web](https://www.linkedin.com/posts/h-ades-business-patterns_des2022-maerlaga-igreenport-activity-6942454642064683008-fluh?utm_source=linkedin_share&utm_medium=member_desktop_web)
- [https://www.linkedin.com/posts/h-ades-business-patterns\\_igreenport-des2022-maerlaga-activity-6942775594673700864-JHkB?utm\\_source=linkedin\\_share&utm\\_medium=member\\_desktop\\_web](https://www.linkedin.com/posts/h-ades-business-patterns_igreenport-des2022-maerlaga-activity-6942775594673700864-JHkB?utm_source=linkedin_share&utm_medium=member_desktop_web)
- <https://www.linkedin.com/feed/update/urn:li:activity:694351661693658316>
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- [https://www.linkedin.com/feed/update/urn:li:activity:6976149983490117632?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/feed/update/urn:li:activity:6976149983490117632?utm_source=share&utm_medium=member_desktop)
- [https://www.linkedin.com/feed/update/urn:li:activity:6980405765920444417?updateEntityUrn=urn%3Ali%3Afs\\_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6980405765920444417%29](https://www.linkedin.com/feed/update/urn:li:activity:6980405765920444417?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6980405765920444417%29)
- [https://www.linkedin.com/posts/logistop\\_logaedsticaportuaria-tecnologaeda-sostenibilidad-activity-6983355152392949760-d6Yh?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/logistop_logaedsticaportuaria-tecnologaeda-sostenibilidad-activity-6983355152392949760-d6Yh?utm_source=share&utm_medium=member_desktop)
- [https://www.linkedin.com/feed/update/urn:li:activity:6973172919988293633?updateEntityUrn=urn%3Ali%3Afs\\_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6973172919988293633%29](https://www.linkedin.com/feed/update/urn:li:activity:6973172919988293633?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6973172919988293633%29)
- [https://www.linkedin.com/feed/update/urn:li:activity:6982942546545004545?updateEntityUrn=urn%3Ali%3Afs\\_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6982942546545004545%29](https://www.linkedin.com/feed/update/urn:li:activity:6982942546545004545?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6982942546545004545%29)

- [https://www.linkedin.com/posts/h-ades-business-patterns-fiwaresummit22-gran-canaria-activity-6974994741448822784-WHD?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/h-ades-business-patterns-fiwaresummit22-gran-canaria-activity-6974994741448822784-WHD?utm_source=share&utm_medium=member_desktop)
- [https://www.linkedin.com/feed/update/urn:li:activity:6975388821030862848?updateEntityUrn=urn%3Ali%3Afs\\_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6975388821030862848%29](https://www.linkedin.com/feed/update/urn:li:activity:6975388821030862848?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6975388821030862848%29)

## Plataformas digitales SmartPorts

Por su parte, Coqui García Román hizo hincapié en la importancia de trabajar con plataformas de datos que aseguren la compartición de la información a tiempo real, principalmente entre los actores que intervienen en cada proceso. Esta utilización de datos fiables en tiempo real, tal y como hace referencia García Román, permite disminuir el uso del papel, así como de las comunicaciones por radio y por email, simplificando la comunicación en procesos en los que están involucrados diferentes agentes de la cadena. En esta línea, destaca además la necesidad de homogeneizar los modelos de datos que se utilizan en cada proceso.

García Román destaca el papel de las plataformas digitales SmartPort claves para la realización de esta integración de datos del entorno portuario, lo que derivará en un incremento de la conciencia situacional, la competitividad, la seguridad y la sostenibilidad.

Como ejemplos de casos de éxito, García Román explica las soluciones digitales iGreenPort y AMURA Ziday creadas para la detección temprana y control de incidencias de contaminación en aguas portuarias.

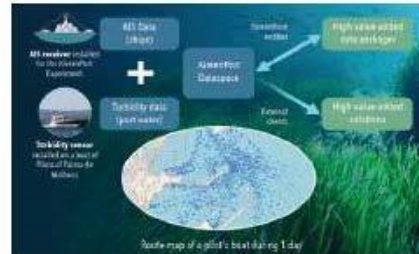
*"Hay muchas soluciones dedicadas a la eficiencia, pero muy pocas orientadas a la sostenibilidad medioambiental y es ahí donde tenemos que poner el foco de nuestras próximas acciones"*

Coqui García Román, directora del departamento de I+D+i & Product Manager,  
Hiades Consulting

*Figure 8. Article post-session 'Claves y retos del futuro de la logística portuaria' organized by LOGISTOP (Sept 29, 2022): <https://logistop.org/claves-y-retos-del-futuro-de-la-logistica-portuaria/>*

## IGREENPORT: HACIA UN PUERTO VERDE E INTELIGENTE!

En la actualidad la innovación tecnológica está empujando a todos los sectores de la economía a transformarse y, cada vez se toma más conciencia sobre las consecuencias acuciantes del cambio climático. Especialmente el sector marítimo y sus Puertos están haciendo un esfuerzo por convertirse en corporaciones inteligentes, dirigidas por datos y conocimiento, bajo el modelo de Puerto inteligente.



El ritmo vertiginoso de la actividad de los puertos, la intensidad del tráfico marítimo, así como el gran volumen de las operaciones de *bunkering* afectan negativamente a la biodiversidad de las aguas del puerto, por lo que las autoridades competentes han empezado a invertir en sistemas digitales de monitorización medioambiental.

¿Por qué la necesidad del monitoreo ambiental de las aguas?

El proyecto iGreenPort nace de la necesidad real de los puertos, como es el caso del Puerto de Palma de Mallorca, en la que la Autoridad Portuaria de Baleares busca apoyo en la Corporación de Prácticos de Palma para diseñar una herramienta digital para monitorizar la calidad del agua de mar del puerto, debido al peligro de extinción de la Posidonia, planta acuática endémica del Mediterráneo que está desapareciendo por la contaminación del agua.

La Posidonia es, al igual que los bosques terrestres, consumidora del CO<sub>2</sub> de la atmósfera, desempeñando esta decisiva función con aún más eficacia que las masas forestales. Constituyen verdaderos bosques subacuáticos y son el hogar de abundantes especies marinas imprescindibles para el funcionamiento adecuado del ecosistema marino.

De la idea al Proyecto iGreenPort

El objetivo de iGreenPort consiste en la creación de un Dataspace para la comparación de datos medioambientales en

un Smart Port, orientado a la creación de nuevos productos y servicios para la monitorización de la calidad del agua de mar en diferentes zonas de un Puerto, entre los que se encuentra una herramienta visual de detección temprana de incidentes de contaminación del agua de mar, con un sistema de alarmas e informes automáticos sobre los barcos que navegaron cerca de dichas zonas afectadas, posiblemente involucrados en los incidentes.

El Dataspace recopila casi a tiempo real dos conjuntos de datos: datos geolocalizados de la calidad del agua de mar en todas las áreas del mar del puerto -en la fase experimental se ha empezado con el indicador de turbidez-, y los datos AIS que emiten los buques que maniobran por el puerto -y por tanto, uno de sus principales factores contaminantes de sus aguas-, pudiendo ser consumidos ambos datasets tanto por empresas del consorcio de iGreenPort como por empresas externas, para la creación de nuevos productos y servicios de valor añadido.

Los valores de calidad del agua son proporcionados por un sensor instalado en las lanchas de los Prácticos de Palma de Mallorca, que están en continuo movimiento durante todo el día, asegurando un muestreo completo y frecuente de todas las zonas del puerto, sin el coste adicional que implicaría disponer de un barco dedicado exclusivamente a esta finalidad.

Los nuevos productos y servicios que pueden crearse al consumir y cruzar ambos



datasets se encuentran paquetes de datos con información de la calidad del agua en diferentes zonas portuarias, monitor con mapa del puerto con el tráfico de navegación a tiempo real al que se le añade una capa con un "mapa de calor" con indicadores de calidad del agua, informes de los barcos que navegaban en los momentos previos a los incidentes de contaminación, modelización del puerto en función de la calidad del agua realizado en base a históricos de datos almacenados, etc.

iGreenPort es un proyecto canario financiado en la 1ª convocatoria del Programa i4Trust de fondos europeos y está promovido por: Híades (líder del proyecto y consultoría tecnológica de desarrollo de software especializado y digitalización en el sector portuario), CIDIHUB (Digital Innovation Hub Canarias), MNX Online (empresa de desarrollo de software y consultoría de IT con certificación Rware Expert y i4Trust Local Expert), Corporación de Prácticos de Palma (servicio de practicaje en Palma de Mallorca), Reysone (proveedor de soluciones informáticas innovadoras orientada a Técnica de Sistemas e IoT), Canarias Project (servicios de analítica de datos) y Jeminol (proveedor de maquinaria y equipamiento).

Figure 9. Article 'iGreenPort: towards a Smart and Green port', published by 'La Gaveta Económica' (Sept 2022) [https://www.linkedin.com/posts/airamrodriguez\\_iot-smartdatamodels-smartports-activity-6965185517093072896-pclm?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/airamrodriguez_iot-smartdatamodels-smartports-activity-6965185517093072896-pclm?utm_source=share&utm_medium=member_desktop)

- Dissemination actions at events and images of execution of the project:



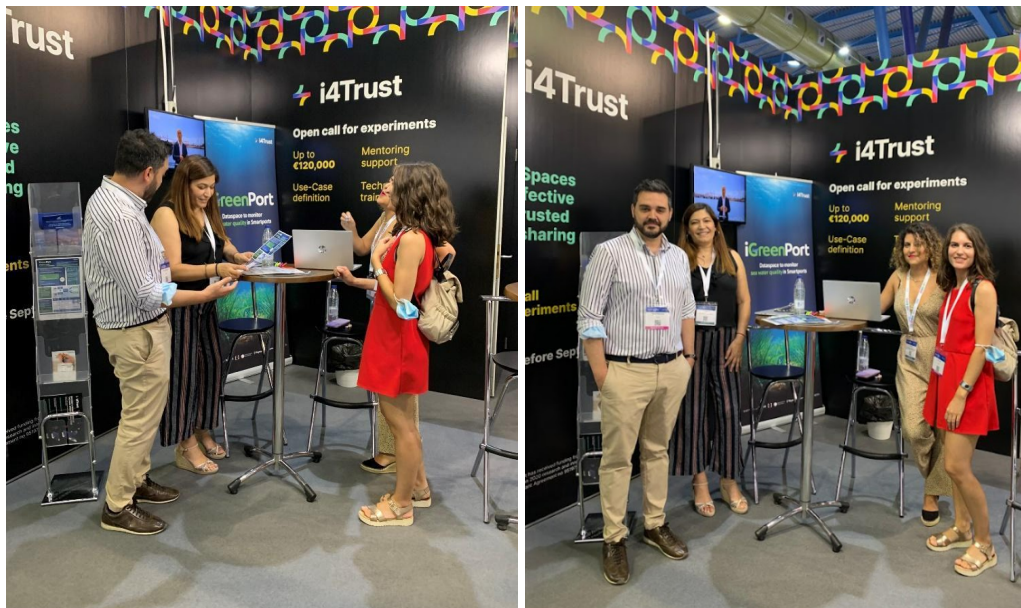


Figure 10 & 11. Digital Enterprise Show (DES-Show), Málaga, Spain (June 14-16, 2022). (<https://www.des-show.com/es/>)

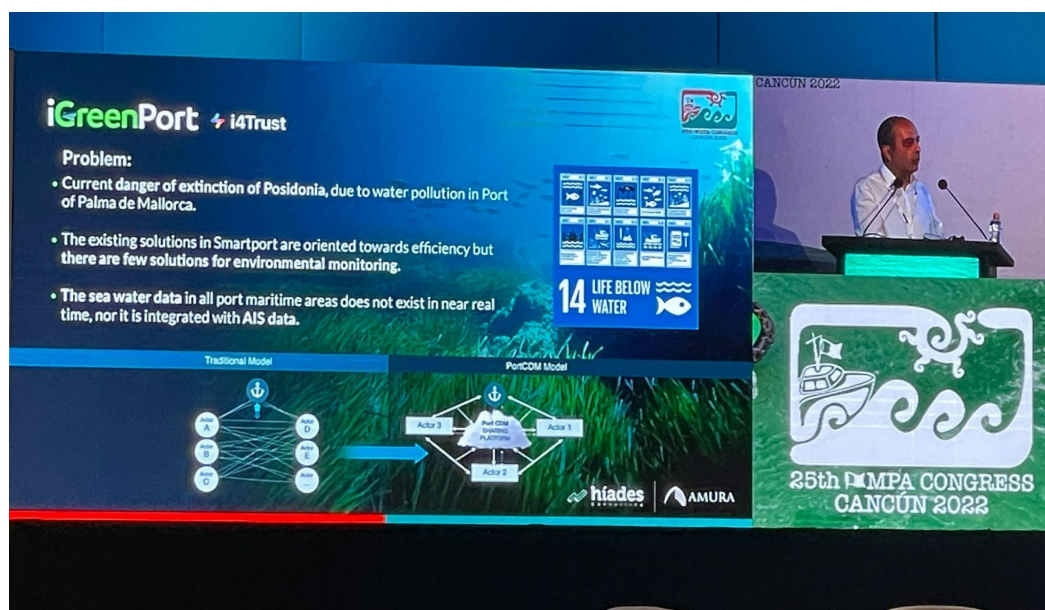


Figure 12. IMPA Conference, Cancún, Mexico (June 12-18, 2022). (<https://www.impa2022.com/>)



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Amazing session at the **FIWARE** Global Summit on smart ports where one of the i4Trust experiments is presenting. **#iGreenPort** digital ecosystem controls and monitor the sea water quality in different areas of any port. Different datasets (geoposition data on water quality, AIS navigation real-time data, etc..) are shared in iGreenPort data space to create several data packages at different levels of the 'data value chain' to be utilised both by iGreenPort partners as well as external entities, particularly authorities with environmental competencies in ports (Port Authorities, or by delegation, PortControl, Pilots or Cost guards), their suppliers, and research groups in the field.

**Coqui García Román, PhD, Hiades Business Patterns** is also presenting Amura Smart Port Management system powered by **FIWARE**.

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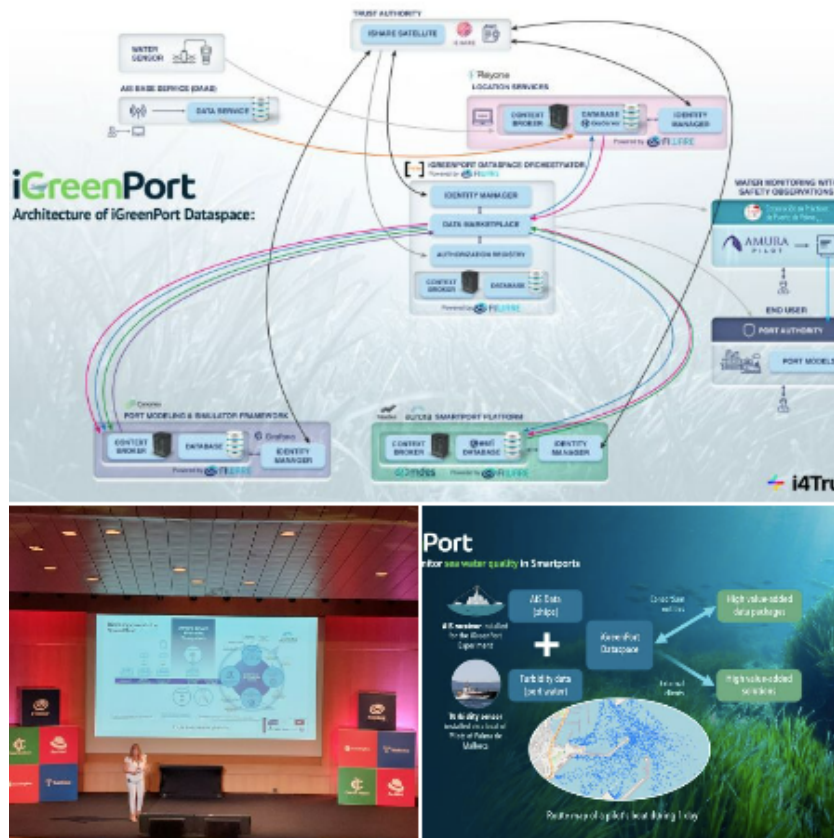


Figure 13. iGreenPort presentation at the Summit Fiware Gran Canaria, Spain (Sept 15, 2022).

Source:

[https://www.linkedin.com/posts/i4trust\\_igreenport-activity-6976149983490117632-q4IG?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/i4trust_igreenport-activity-6976149983490117632-q4IG?utm_source=share&utm_medium=member_desktop)



Figure 14. Part of iGreenPort team at the Global Fiware Summit, Gran Canaria, Spain (Sept 14-15 2022)

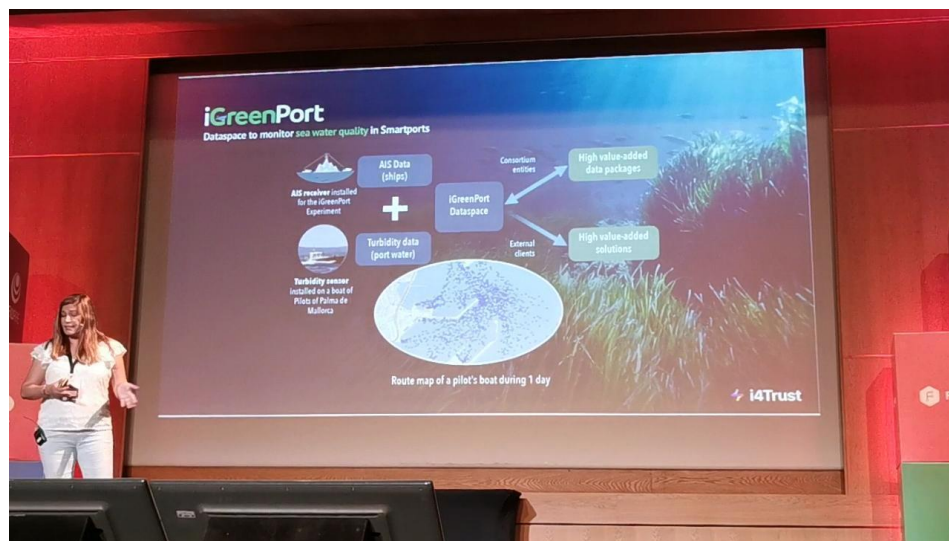


Figure 15. iGreenPort presentation by Coqui García at the Global Fiware Summit, Gran Canaria, Spain (Sept 14, 15 2022)





Figure 16. i4Trust Bootcamp at the Global Fiware Summit, Gran Canaria, Spain (Sept 14, 15 2022)



Gran Canaria, 14-15 September, 2022 | #FIWARESummit



[www.fiware.org](http://www.fiware.org)

Figure 17. Visit to the port of Palma de Mallorca during execution of iGreenport project. April 1, 2022



Project Management

JANUARY-JUNE 2022 (Stages 0-2)

EXECUTION: ARCHITECTURE

- Revision of Smartdata Models in Ports (March):
  - Context for water quality, for device and for Meteo (already existing)
  - Context for ship (revised 'BoatAuthorized', but it's only for 'small craft' ISO 8666:2021). Construction of a new context 'Ship' (in revision/validation)
- Sequence diagram of a case of use of data Exchange (AIS) (April).
- First deployment of Orchestrator (April).
- Test certificates for iShare Satellite (April-June).
- Deployment of Fiware structures and APIs for information sharing of some companies of the consortium (April-June).

EXECUTION: SENSOR ON PILOTS' BOAT

- Research on the suitable turbidity sensor for sea water: literature review, meetings with experts (April-May).
- Travel to the Port of Palma de Mallorca to analyze the best installation of the sensor on Pilot's boat (April 1, 2022).

Figure 18. Slide of iGreenPort project management

JANUARY-JUNE 2022 (Stages 0-2)

EXECUTION: 1<sup>st</sup> WORKING PROTOTYPE

- Use case: HIADES obtains the AIS data of Pilot's Boat in the Port of Palma de Mallorca, involving the APIs of HIADES (Service Consumer) and PLEYONE (Service Provider), once the contract has been made in iGreenPort Orchestrator.
- Once HIADES receives the data, they are represented on a map with the location of the pilot boats in the port of Palma almost in real time.

Figure 19. Slide of the execution of the iGreenPort project

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User(s):

ports, Port of Balearic Islands, Puerto del Estado

Key words:

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# iGreenPort

a dataspace to monitor seawater quality in  
SmartPorts

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