



Capacity with a pOsiTive enviRonmEntal and societAL footprInt: portS in the future era



D.7.6: COREALIS Networking and Cross fertilisation activities

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List of Acronyms

Abbreviation / acronym	Description
5G	Fifth Generation of mobile telecoms technology
3PL	Third party logistics
4PL	Forth party logistics
BPC	Baltic Ports Conference
CAB	COREALIS Advisory Board
CERTs	Computer Emergency Response Teams
CSA	Coordination and support action
CSIRTs	Computer Security Incident Response Teams
DoA	Description of Activities
Dx.y	Deliverable number y belonging to WP x
EC/EU	European Commission/ European Union
GDPR	General Data Protection Rule (privacy handling within EU)
HPCS	Hellenic Port Community System
ICT	Information Communication Technology
IoT	Internet of Things
JIT	Just in Time
KoM	Kick off Meeting
LL	Living Lab
LSP	Logistic Service Providers
Mx	Month x
OBOR	One Road One Belt
PoF	Port of the Future
PoFSG	Port of the Future Serious Game
QoS	Quality of service
R&D	Research and Development
RIA	Research and innovation action
SB	South Baltic
SIS	Special Interest Session
TAS	Truck Appointment system
TEN-T	Trans-European Transport Network
WPx	Work Package x

Executive Summary

Communication and dissemination processes are essential to assure the success of a project as ambitious and visionary as COREALIS. Funded under the European Union's Horizon2020 Framework Programme, the aim of COREALIS is to develop a strategic, innovative framework, supported by disruptive technologies, including Internet of Things (IoT), data analytics, next generation traffic management and emerging 5G networks, for cargo ports to handle upcoming and future capacity, traffic, efficiency and environmental challenges. Within this framework, the proposed beyond state of the art innovations, target to increase efficiency and optimize land use, while being financially viable, respecting circular economy principles, and being of service to the urban environment.

The current document D7.6 provides a thorough description of COREALIS networking and cross-fertilisation activity, which is considered as an ongoing activity, started early in the project and will continue until its end and it intends to present the results achieved so far. It is connected to Task 7.4: *COREALIS liaison with other projects, ports and logistics associations and events organisation*, within Work Package WP7: Dissemination Strategy and Stakeholder engagement and it capitalises on the findings of both D.7.1: Initial Communication Strategy and Plan, developed on M6 and its updated version D.7.2: Interim Communication Strategy and Plan, developed on M18.

Building up on the aforementioned previous deliverables is automatically creating a snowball effect for increasing the communication outreach both for the project partners and the society. A mapping of the specified COREALIS stakeholders' community, as part of the partners' secure networks and contacts is included on this document, along with the link of each target group to the respective COREALIS innovations. Reference is also made to the project's networking activities as well as to the clustering activities with similar initiatives and how cross-fertilisation is being achieved through the creation of common synergies. Finally, an outline of the preparatory activities related to the organisation of the demonstration events and training seminars required in each of the five COREALIS living labs, is also described.

1. Introduction

The overall objective of the present deliverable is to report on the Task 7.4 liaison with other projects, ports and logistics associations and events organization and more specifically on the networking and cross fertilization activities that have been done so far in COREALIS. As a substantial part of these activities is the close communication with COREALIS stakeholders' community members, an indicative list of these members have been recorded in a directory, and included as Annex (annex B) of the current deliverable.

The listing of events, where COREALIS has been presented and the Stakeholders Directory will be of great use in parallel with the Exploitation Plan reported in D8.1 COREALIS Exploitation Plan, in order to focus on who shall be addressed for the project's result. In addition, the already established liaison with other projects helps to increase the reach of the dissemination stage. In this context a detailed report on previous liaison activities of COREALIS with other projects and in what extend reach the dissemination goal is also described.

Furthermore, as COREALIS project execution is in its development stage, a report on the upcoming and planned activities that will be done to help liaise and disseminate the project results is also included. Last but not least, the current document provides an outline of the preparatory activities mainly related to the foreseen series of demonstration events and training seminars, to be conducted in each of the five COREALIS living labs.

Purpose of the document

The purpose of this this interim communication strategy and plan, is to ensure that the methodology and processes already developed in M6 are up-to-date and that communication with stakeholders' community continues effectively.

1.1 Intended readership

This deliverable is addressed to any interested reader in improving the port operational efficiency and knows who to contact and where to go to present, or to get presented, meaningful efficient solutions for their needs.

1.2 Relation with other COREALIS deliverables

This deliverable lies within Work Package *WP7: Dissemination Strategy and Stakeholder engagement*, and it is strongly related to the following deliverables:

- *D1.2 COREALIS personas and Stakeholder Classification*, which includes a classification and an inventory of COREALIS stakeholders, as well as a description/profiling of personas shortlisted.

- *D7.1 Initial Communication Strategy and Plan*, which includes all the communication activities to be performed by COREALIS partners and summarises all activities until M6 and those planned.

In addition, it is intrinsically linked to the following deliverables, which are due at the same time of the project:

- *D7.2 Interim Communication Strategy and Plan*
- *D7.5 Final set of COREALIS Communication tools*
- *D8.1 Exploitation Plan*

Apart from the above-mentioned deliverables, as communication and dissemination have a horizontal role during the project course, the document at hand has a close indirect relation to all COREALIS achievements that need to be disseminated (to targeted audiences).

1.3 Document Structure

The document is structured in five sections.

Section 1, introduced the purpose and scope of the document.

Section 2, gives an overview of the Stakeholder community and its link with the COREALIS innovations.

Section 3, describes, the networking and liaising activities with other projects.

Section 4, provides a preliminary structure on the demonstration events and training seminars.

Finally, section 5, presents the concluding remarks.

2. Stakeholder Community

2.1 Initial mapping

Based on the stakeholder's surveys conducted at the beginning of the project and initially reported in D1.2 *COREALIS personas and Stakeholder Classification*, an inventory of COREALIS stakeholders and a profiling of personas have been mapped and further reported and updated as part of D7.1 *Initial Communication Strategy and Plan*, also depicted in figure 1 below.

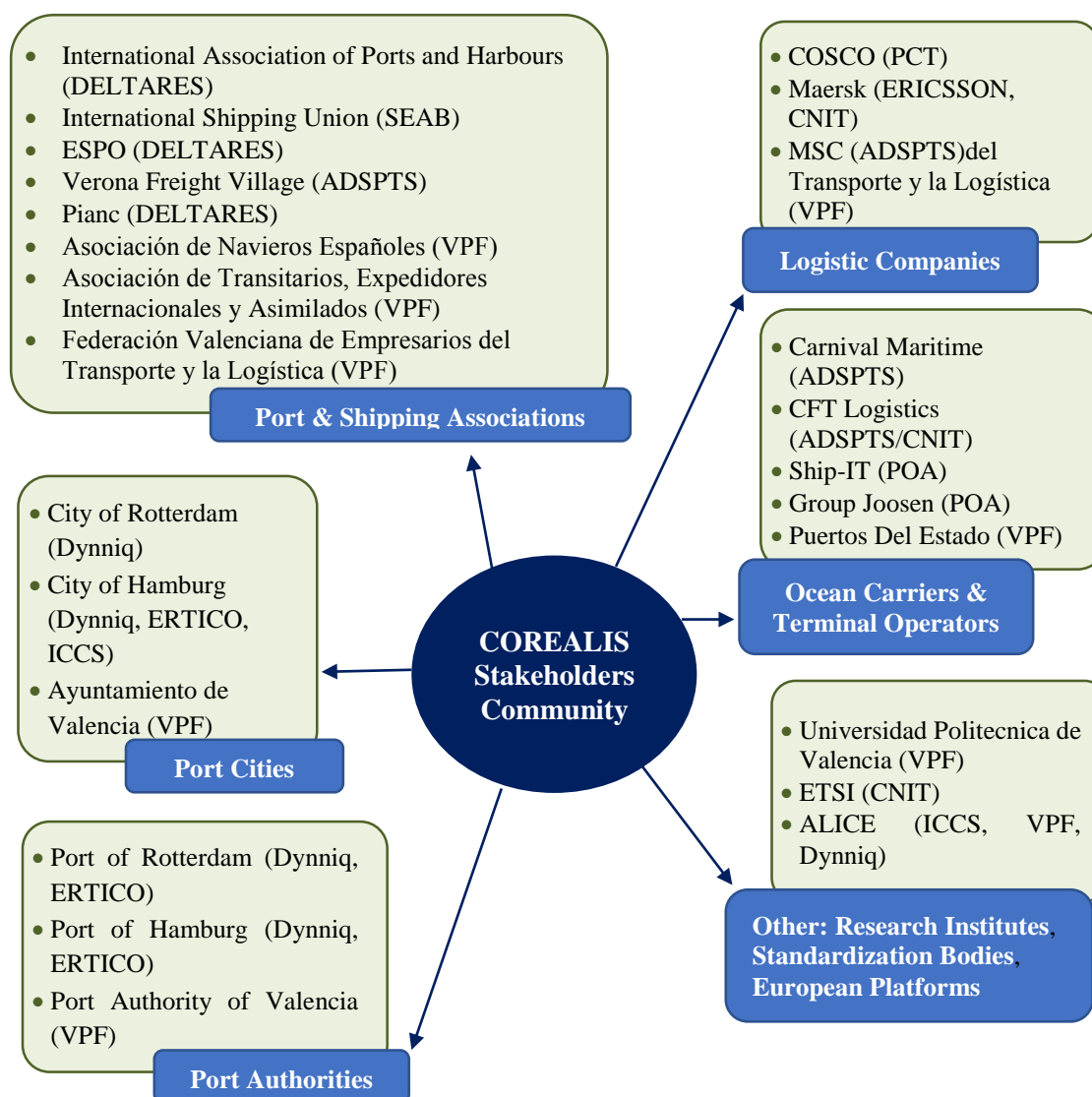


Figure 1 COREALIS initial list of Stakeholder Community

Further to the work done within D7.2 *Interim Communication Strategy and Plan*, for expanding and updating the COREALIS main audiences and Stakeholder groups, consortium partners have been requested to provide their feedback, via using their secure networks and direct contacts, on building the preliminary COREALIS stakeholder's community Directory. The Directory is included in Annex B of the present document.

As the project is still running, the aforementioned directory is subject to continuous updates during the project course, using the below identified updating mechanism. Its final content will be documented within D7.3 *Final Communication Strategy and plan*, due on M32.

2.2 Updating Mechanism

A stakeholder community is a never ending story and is mainly business driven but also human driven. In order to nurture this community, a work plan has been established which is depicted in the following figure 2.

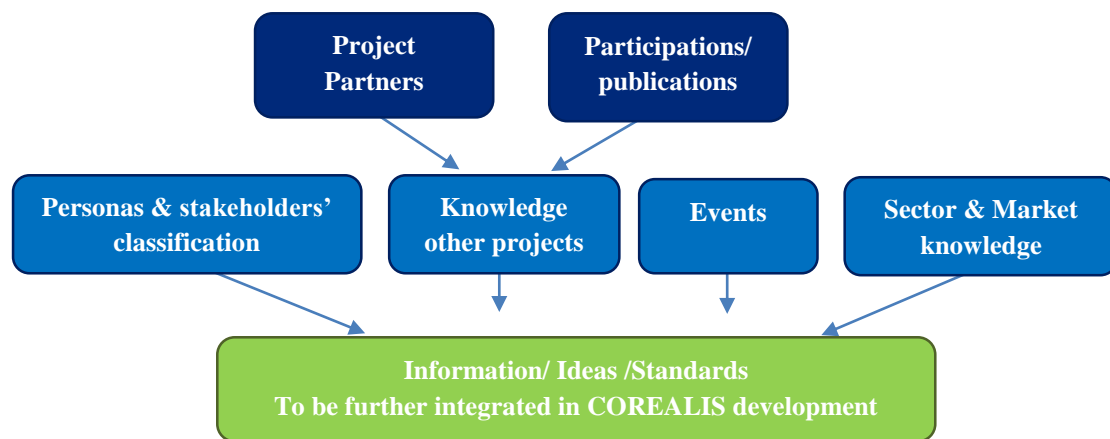


Figure 2 COREALIS external project liaison

Once a first community has been built, there are a number of principles that needs to be followed in order to continue the expansion of such a community. These principles are:

Principle 1: “Sustainability” → Sustain the connection that have been made.

Principle 2: “Oil stain tactic” → once you have a good connection, you increase the knowledge around that connection.

Principle 3: “Increase your horizon” → go beyond what is already known and dare to contact.

During the engagement process, it is also substantially important to understand and comprehend the relationships between stakeholders. As a matter of fact, stakeholders will be consulted for their views on the continuous stakeholder mapping process (when feasible) to ensure an open and transparent relationship. Literally, there are a number of business but also legal considerations to be taken into account. On one side, there is a competition going on, sometimes between countries and sometimes even between port-cities inside a country. On another hand, there is cooperation in order to move forward the logistics business. We are thus in a co-opetition landscape and we work regularly with confidential business information taking also into account the General Data Protection Regulation (GDPR) [1,2] compliancy and purposes within which the data about the stakeholders have been collected (processes have been documented as part of COREALIS Data Management Plan).

2.3 Link between COREALIS innovations and the main audiences

It is a well-known fact that innovations often have to prove themselves to completely different target groups. They, therefore, may have interests and needs that may coincide, but they can also be completely contradictory. To this direction and in order to prepare a more targeted dissemination activities plan, a cross mapping between COREALIS innovations and the main audiences has been done based on the updated identified COREALIS main audiences, and it is displayed in figure 3.

Main COREALIS audiences	Hinterland connectivity			Intra-Terminal Operations				Decision making/Innovation		
	TAS	Brokerage Platform	JIT Rail Shuttle service	Cargo Flow Optimiser	Predictor/ Asset Management	PORTMOD	RTPORT	Energy assessment	PoF Serious Game	Innovation Incubator
Scientific Community	X	X	X	X	X	X	X	X	X	X
Operators	X	X	X	X	X	X	X	X	X	
Authorities	X		X					X	X	X
Companies	X	X	X	X	X	X	X			
Associations/ Communities									X	
ICT Service Providers	X	X		X	X	X	X			
Cities	X							X	X	X
Public Stakeholders & Policy Makers			X					X	X	

Figure 3 Mapping of COREALIS innovations with the identified target audiences

In addition, and in the process of creating liaison with the recently successful finalized H2020 project AEOLIX [3], which has also developed a matrix for its involved stakeholders and the accessible services (see section 3.2.2), the actors' taxonomy as developed on the current mapping, is being used as it helps the process of identifying to which audiences, COREALIS tailored dissemination activities, related to the developed innovations, will be addressed.

It is worth mentioning that some actors presented in the AEOLIX marketplace are not active in the above COREALIS innovations versus target audiences' matrix. These are the production companies, the distribution centers and the vessel agents. By "LSP" is meant Logistics Services Providers in general, without making a difference whether these are 3PL, 4PL, warehouse operators or providers or shipping lines.

2.4 COREALIS stakeholder involvement

For COREALIS, the stakeholder's involvement during its course of action is considered as one of the most important key activities towards gathering useful information and ideas and improving communications via achieving a higher impact booster for the project.

2.4.1 Engagement status

COREALIS supports the perspective that any venture is more likely to succeed if it serves the needs of the people who will be affected by it. Thus, since the project commencement the stakeholders' contributions, perspectives and concerns were taken into consideration through various stakeholder driven co-design processes, which are detailed below:

- *WPI conducted survey*

A comprehensive and systematic recording of current, mid-term and long-term challenges, enablers and barriers that European ports are facing in the era of digital revolution, hinterland connectivity, environmental footprint and sustainability, was developed within Task 1.1. To have a holistic and up-to date overview of the above-mentioned factors, a survey was conducted and a questionnaire was created with the aim to gather relevant information and insights on the expectations and predictions of the stakeholders regarding the COREALIS innovations potential impact on their areas of interest.

COREALIS team used the already identified (since the proposal) indicative list of its stakeholder community, enriched with the agreed members of CAB and partners used their contact networks as well, to distribute the questionnaire and get the required feedback for the study.

Based on the received feedback, a comprehensive report on the identification and profiling of the smart port-city stakeholders in the COREALIS port-cities, their business/operational profile (COREALIS personas) and the areas of intervention and interaction within the COREALIS framework was produced as part of T 1.2 and it is thoroughly described in the corresponding *D1.2 COREALIS Personas and Stakeholder classification*. In addition, the outcomes of study are, in detail, presented in *D1.1 Port of the Future challenges enablers and barriers*.

COREALIS personas acted as a stepping stone and inspiration for the identification of COREALIS user stories and scenarios as part of T1.3 and subsequently fed the collection of the ports' needs and technical, legal/ regulatory, security and data privacy requirements as part of T1.4.

- *Broadcast of the developed material & tools*

The overall aim of COREALIS developed material (e.g. dissemination material, project deliverables etc.) & tools (e.g. website, social media) is to create maximum exchange with stakeholders about the concepts, methods and outcomes throughout the entire duration of the project. The level of stakeholders' involvement ranges from undertaking 'consultation' and providing insights and guidelines for the material improvement (e.g. project deliverables and CAB, participation in invited workshops and focus groups) to simply participating in communication exercises (e.g. newsletters, webinars, social media interaction, distribution of the dissemination material etc.).

Through the COREALIS website, which acts as the backbone of the project's communication activities, any interested individual can be in touch with the project team, ask for general, specific or tailored information about the project and its innovations and access the social media as well as the produced material, while there is also the opportunity of subscribing to the COREALIS newsletter and receiving the latest project news and updates. The open access mode and the availability of the material and tools gives also the opportunity of the easy redistribution through the individual social networks, towards contributing to a higher impact booster, gaining increased publicity and raising awareness.

- *Activities participation & cross fertilisation*

Following its stakeholder driven approach, COREALIS have streamlined a number of stakeholder participating activities, since its commencement, for collecting their sentiments and perspectives on the port of the future vision and the innovations' co-creation. These activities are referring to:

Living Lab Focus Groups

A hands-on scenario co-design interaction, implemented during local focus groups, organised in each of the five COREALIS living labs between M3 (July 2018) and M5 (September 2018) of the project implementation. The purpose of these meetings was to gather stakeholders' viewpoints on each participating-port current challenges and co-create scenarios that would be implemented and evaluated in the project. After a short introduction, discussing the COREALIS concept and specific aims of each Living Lab, participants identified scenarios of interest following an interactive co-design session. A brainstorming session was also conducted during these meetings, where challenges for port stakeholders were further elaborated and possible solutions discussed.

Webinars

Following the conduction of the living lab Focus Groups, COREALIS has proceeded in the organisation of two webinars (on M11-March 2019 and M14-June 2019 respectively), for disclosing the results/information collected to a wider stakeholder

audience. The first webinar was organised to present the already developed scenarios per LL, their objectives and their contribution to the common COREALIS's goal. The ultimate aim was to trigger any interested stakeholder in the local vicinity of the COREALIS LLs but also beyond this, and allowing for a comprehensive understanding and a maximum visibility of the developed scenarios. The second webinar was organised to present the current status and developments on intra-terminal operations and asset management, as well as the scientific work on leveraging data analytics for providing data-driven control actions to intra-terminal operations and getting the stakeholder community's feedback.

Special Interest Sessions (SIS)/Workshops

COREALIS has organised a number of SIS in highly reputable European and International conferences (e.g. ITS World Congress 2018, Collaborative Innovation Days 2018, International Conference on Maritime Transport 2019, ITS World Congress 2019). The main aim was to gather key insights on a specific area of knowledge and technology, where participating members cooperate to affect or to produce solutions within their particular field. During the aforementioned sessions keynote, prominent and well-known speakers were invited by COREALIS, focusing, each time, on specific topics of interest and providing valuable feedback for COREALIS developments. A detailed list of the organised SIS by M18 is provided in Annex A.

2.4.2 Future Plans

The stakeholder's engagement is a non-stop process within COREALIS, that goes hand-in hand with its developments and implementation progress. Further to what is has been described in the previous section, COREALIS is envisaging to plan a number of stakeholder driven activities, such as:

Workshops: The organisation of workshops within prominent events targets in boosting the port of the future concept towards presenting COREALIS innovations and gathering the required feedback for their improvement, based on the stakeholder's community's needs. Thus, the engagement in such an activity is expected to spur participants on providing their viewpoints and to create a sense of community or common purpose.

Training seminars/demonstrations: The conduction of a series of training seminars/demonstrations, one in each of the five COREALIS living labs, mainly focuses on the introduction and demonstration of the capabilities of the developed solutions and at the same time on training the relevant participating actors on the innovations' operating system. The ultimate aim of such an activity is to engage stakeholders and target groups in the decision-making processes, in order to achieve the exploitation of the project results, Relevant local stakeholders and target groups as well as representatives from local media will be invited by the project team to attend. More information about the planning of this activity is presented in chapter 4 of the current document.

3. Networking and Liaison with other projects

3.1 Priority Events where to disseminate - status

In this section, the typology of the events, that COREALIS partners organized or participated during the first 18 months of the project is as of below:

- Congresses and conferences (scientific and business)
- Workshop with (maritime and port) experts
- (Technical papers)
- (Peer-review journal publication)
- “other dissemination activity” (webinars, private meetings)

These event activities aim at presenting COREALIS project and liaising with other parties, interested in project’s outcomes or even more in disseminating and exploiting them, serving at the same time their needs as potential customers.

Furthermore, congresses and conferences link together not only the academic community, but also interested parties from the business and public sector, and therefore constitute a very efficient way to liaise with new stakeholders.

Though, in the already performed events, no additional terminal operators, freight forwarders, logistic service providers or carriers participated, apart from those already participating in the Living Labs. At the same time, the content of COREALIS presentations in the relevant events includes mainly paper results and not yet outcomes of the implementation phase. The main goal of the networking and liaison activities focuses on the attraction of potentially interested parties in the produced results, as being foreseen in section 4.2 of this document.

A list of the organized and attended activities by COREALIS team within the first eighteen months of the project is reported in D7.2 *Interim Communication Strategy and plan* and it is also presented in detail in Annex A of the current document. For each activity a detailed description of the event, the partners involved, the achieved result and the presented material is available at the COREALIS website: <https://www.corealis.eu>.

3.2 Link with other projects

The linkage with other projects is organised according to the following segmentation:

- The projects under the Port of the Future programme;
- The projects capable to further disseminate or commercialize the COREALIS results;
- The projects capable to widen the stakeholder’s range.

3.2.1 Projects under the Port of the Future Programme

The four H2020 projects funded under H2020-MG-2016-2017, Topic: MG-7-3-2017, namely DocksTheFuture (CSA), COREALIS (RIA), PIXEL (RIA) and PortForward (RIA), have engaged in collaborative work, since the commencement period of the three RIAs through the creation of a Port of the Future (PoF) Network, following the European Commission's expectation for an integrated collaborative approach towards Port of the Future vision.

Based on its nature, the CSA action is coordinating the efforts of the network, towards capitalising on the common developed PoF clustering strategy (a detailed description of the strategy is included in D7.1 *Initial Communication strategy and plan*). PoF network participated since October 2018 in jointly organised activities and invited in mutually interested event opportunities, keeping also a close collaboration with European Technology Platform ALICE, to endow the network with higher visibility/impact and to engage a higher number of interested target audiences. The joint activities of the PoF network that took place from October 2018 to October 2019 are listed below:

I. *DocksTheFuture: Workshops with Experts, Porto, Portugal, 29-30/10/2018, SEAB*

The event took place in Porto, on the 29th and 30th of October, and it was hosted by APDL (Administração dos Portos do Douro, Leixões e Viana do Castelo) at the Port of Leixões. The event aimed at getting the vision, sharing knowledge and ideas about the Port of The Future: the DocksTheFuture project. A pool of participants from different sectors of the maritime and port industry were presented. There were experts from a wide range of organisations and institutions like Maritime & Mediterranean Economy Department at SRM, Hellenic Institute of Transport, the Baltic Ports Organisation, Fraunhofer IFF's Digital Innovation Hub, ALICE, PIXEL Ports Project, Delft University of Technology, University of Genova, Port of Barcelona, Kühne Logistics University (KLU), Escola Europea – Intermodal Transport, PortExpertise, PIXEL, Irish Maritime Development Office, KEDGE Business School, etc. PoF network actively supported the interesting discussions, which went on in five breakout sessions on digitalisation and digital transformation, sustainability, port-city relation, infrastructure, means of transport, and accessibility, and competition, cooperation, and bridging R&D and implementation.

II. *Collaborative Innovation Days: "New Global Routes: One Belt One Road Initiative & TEN-T", Athens, Greece, 06/11/2018, ICCS*

ALICE together with ICCS and the Greek Ministry of Infrastructure, Transport and Networks organised the Collaborative Innovation Day – "New Global Routes: One Belt One Road Initiative & TEN-T", that took place on 6th November 2018 at the Greek Ministry of Transport and Communications. ICCS moderated the session on Disruptive technologies and their impact on the OBOR Initiative. Representatives from the Port of

the Future network also substantially contributed to the fruitful discussions of the session, by presenting the advances on their projects.

III. DocksTheFuture MidTerm Conference, Trieste, Italy, 04/04/2019, ICCS

The DtF Midterm Conference, took place in Trieste Italy, with an attendance of nearly 150 participants, promoted fundamental panels for the future competitiveness of European ports and represented the turning point to present the project results achieved thus far, validating concepts, topics and targets for the Port of the Future. During the conference several technical sessions on technologies, processes and capacity building actions took place along with the participation of prominent experts, including the ones already part of the Port of the Future Network (DocksTheFuture, COREALIS, PortForward and Pixel).

IV. European Maritime Days 2019, Lisbon, Portugal, 16-17/05/2019, VPF, POA

The European Maritime Days event was held in Lisboa, Portugal, on 16th and 17th of May 2019. The annual two-day event, was mainly focused on blue entrepreneurship, innovation and investment to transform traditional maritime sectors and boost emerging technologies and value chains. COREALIS participated in the workshop entitled as “What is next for green and sustainable Ports?” in relation to the conference topic “ports and port tech clusters”. The workshop was jointly organised by DocksTheFuture project (as representative of the PoF network) & University of Gavle, with the view to ‘ensure a European dimension by showcasing the innovations and perspectives for the sustainability of ports, engaging the participants in debate through online tools, aiming at showcasing practical solutions/good practices as well as deliver actionable conclusions’.

V. Baltic Ports Conference 2019, Stockholm, Sweden, 04-06/09/2019, ERTICO

The Baltic Ports Conference (BPC) 2019 was orchestrated by the Baltic Ports Organisation and it took place in Stockholm, Sweden. It is considered as one of its most important events, organised on an annual basis, with main focus on discussions around the key and urgent issues for the port business. It works firstly as a great networking platform, where various stakeholders can exchange their knowledge and experiences, making up the maritime community in the Baltic Sea region and beyond. COREALIS project was honourably invited as one of the speakers and it participated, along with the whole Port of the Future Network (DocksTheFuture, PIXEL, PortForward) to present the latest developments and share its vision towards the Port of the Future, during a dedicated session (SESSION 1) entitled as: ‘Ports as the cradles of innovation’, during the 3rd day of the event.

VI. BiLOG conference, La Spezia, Italy, 16-17/10/2019, CNIT

BiLOG conference took place in La Spezia, Italy, and it constitutes a special case, where sustainable, connected and resilient topics on maritime transport with a European spin were discussed. Both the regional as well as the European dimension were analysed, providing the chance to improve the knowledge about EU Transport Policy and EU investments on transport and maritime sector, highlighting the importance of

3.2.2 Projects capable to further disseminate / commercialize COREALIS results

AEOLIX project, which concerns a logistic data exchange platform is of major interest to COREALIS consortium members. This platform acts as a connectivity mechanism, with governance, security, development guidance and tools between data providers, data consumers and data service providers. The COREALIS project participants could act through the platform to reach out to further actors, customers and or service providers. From a supply chain point of view, all actors active in the logistics have access to the core of the platform which propose the following services:

- ✓ *Data collection;*
- ✓ *Data exchange;*
- ✓ *Data management;*
- ✓ *Visibility service;*
- ✓ *Marketplace service.*

These are represented at the inner circle of the following figure 4. In addition, there are optional services which can be subscribed by data service consumers. The currently implemented services are depicted in the outer circle of the below figure 4.



Figure 4 AEOLIX actors and accessible services

The table 1 below reports on the signification of each pictogram. The AEOLIX platform marketplace service is currently reaching a near-market launch, as it was a research and innovation action project which successfully completed at the end of August 2019. It is a near-market as the platform is not totally market ready but the operations by a majority of actors are to be continued “as-is” in order to keep the achieved operational, financial and societal benefits. Some of the developed applications within COREALIS project could be proposed through this marketplace, while some of the COREALIS actors could also be connected to them to further improve their own operations.

























Pictogram	Stakeholder	Pictogram	Service
	Public Authority – Ports, Highways, Road Authorities		Data Collection
	Public Authority – Customs		Data Exchange
	Public Authority – Railway Infrastructure		Visibility
	Shipping Agent		Data Management
	Vessel / Barge Carrier		Marketplace
	Rail Carrier		Estimated Time of Arrival (ETA)
	Truck Carrier		Route planning
	Terminal Operator		Control Tower
	Control Tower		Customs
	Production / Supplier to production		Port
	Warehouse and Freight Forwarder		CO2 Monitoring
	Distribution		e-CMR

Table 1 AEOLIX stakeholders and currently accessible services

- **Open network of hyper connected logistics clusters towards Physical Internet-CLUSTERS 2.0 (<http://www.clusters20.eu/>)**

CLUSTERS 2.0 project aims: (1) at improving the engagement, performance and coordination of terminals and hubs at cluster level, by (2) building a hyper connected network of logistics hubs and clusters and (3) by developing low-cost solutions to reduce operational costs of transshipment. In order to fulfil the above objectives, (4) prototypes of New Modular Load Units will be modelled and (5) enhanced Dynamic Terminal Management Systems for increasing management capacity of the terminals and reducing associated congestion will be developed. To improve, validate and test the proposed solutions, (6) 5 Living Labs (LLs) will be established and run, leading to (7) the development of Business Models and Robust Business Plans for Clusters 2.0 solutions.

The ambition of Clusters 2.0 is to move forward in co-operation of actors and connectivity of clusters within a truly integrated European Transport System. Clusters 2.0 attempts to achieve a significant step forward in the role of hubs, by driving sustainability and competitiveness for their regions leveraging their full potential to meet EU transport challenges, as described in the White Paper on Transport (2011), especially on transport efficiency and modal shift.

CLUSTERS 2.0 has been presented during COREALIS first plenary meeting in Antwerp, by SEAB colleagues, towards providing the context of their nice to have liaison, in three common pillars: In seamless and reliable cargo transfer enabled by new IT solutions to streamline incoming and outgoing information processes, in developing Dynamic Terminal Management Systems to plan and optimize loading and unloading processes in the terminals (taking into account loading and unloading available time slots, traffic conditions and estimated time of arrival of pick up vehicles) and in developing a methodology to assess and benchmark environmental and socio-economic performance of logistics clusters.

- **FENIX- FEderated Network of platforms Information eXchange:**

FENIX is a European research project funded under the Connecting Europe Facility – Transport Call 2018. FENIX is a high visibility project, recently started in September 2019, that will develop the first European federated architecture for data sharing serving the European logistics community of shippers, logistics service providers, mobility infrastructure providers, cities, and authorities in order to offer interoperability between any individual existing and future platforms.

The FENIX concept is built on the idea of a cloud-based technology that will motivate increased horizontal collaboration, optimised routing and dynamic re-routing of freight through plug-and-play solutions for Supply Chain planning and operations. The end goal is a set of integrated services that exploit real-time Big Data streams for real time awareness and visibility, delivered as a service. These services will be based on accurate, reliable and timely information flows and events notifications based on

standards and public-private governance. FENIX will also exploit Internet of Things (IoT), satellite navigation and retrospective historical data, by leveraging automated processes and intelligent algorithms to identify opportunities for more enhanced streamlining of routes, customisation of cargo routing combinations, and optimisation of delivery schedules.

COREALIS and especially Piraeus Living Lab can bridge the innovations developed with the FENIX Greek Pilot and the modules that provide the Hellenic Port Community System (HPCS) with additional functionality and improve the operation processes and visibility of the supply chain for cargos entering or leaving the Free Zone of the Port of Piraeus. Furthermore, the participation of HPCS to the FENIX platform federation will make available the joint services resulting from these projects to any stakeholder joining the FENIX federation.

3.2.3 Projects helping increasing the horizon of known stakeholders

- **Cyber preparedness actions for a holistic approach and awareness raising in the MARitime logistics supply chain- Cyber-MAR (<https://www.cyber-mar.eu/>)**

Cyber-MAR is an effort to fully unlock the value of the use of cyber range in the maritime logistics value chain via the development of an innovative simulation environment adapting in the peculiarities of the maritime sector, but being at the same time easily applicable in other transport subsectors. A combination of innovative technologies are the technology enablers of the proposed Cyber-MAR platform, which is not only a knowledge-based platform, but more importantly a decision support tool to cybersecurity measures, by deploying novel risk analysis and econometric models. CSIRTs/CERTs data collected will be analysed and feed the knowledge-based platform with new-targeted scenarios and exercises. Through Cyber-MAR, the maritime logistics value chain actors will increase their cyber awareness level; they will validate their business continuity management minimizing business disruption potential. Cyber-MAR will act as a cost-efficient training solution covering the maritime logistics value chain.

COREALIS, through its participating entities (ICCS, SEAB, PCT, VTT, VPF) can create a sustainable contact channel with the Cyber-MAR maritime logistics value chain actors, who can provide their insights to COREALIS innovation from a technological point of view. Both projects can benefit since Cyber-MAR will broaden the scope of services that need to be considered for cybersecurity requirements and COREALIS users can benefit for the cybersecurity training and awareness platform build in Cyber-MAR.

- **Simulation using Building Information Modeling Methodology of Multimodal, Multipurpose and Multiproduct Freight Railway Terminals Infrastructures- INTERMODEL (<http://www.intermodeleu.eu/>)**

The main objective of INTERMODEL is the development of a methodology and ICT tools which will allow an advanced simulation of intermodal railway logistics platforms

models in order to support tasks related to both design and planning phases. Using the combination of demand/economic/capacity models as main inputs, an evaluation of scenarios will be possible by means of the comparison of an underlying Building Information Modeling output composed of different data sets such as CAPEX, OPEX or energy efficiency. Moreover, using these new design tool an improvement of the QOS and boost transshipment operations between rail and road transport can be achieved.

COREALIS was invited to the INTERMODEL Final General Assembly meeting that took place on 10th of October 2019, in Brussels, Belgium. During the 3-days meeting, the project and its final results have been thoroughly presented. Special focus was given to the creation of synergies with related projects, like COREALIS. VTT representatives, gave an overview of COREALIS project by mentioning the key points for creating a successful and collaborative bridge, related to the project outcomes and its stakeholder audience.

- **Connect2Smallports (www.connect2smallports.eu)**

‘Connect 2 Small Ports INTERREG project aims at supporting the development of South Baltic (SB) small and medium ports by helping them to implement digital solutions, and thus give a competitive advantage... These digital technologies on which the project focuses are of two sorts: Internet of Things (IoT) and Blockchain. IoT is basically connecting items (containers, port equipment) to an online network. Port authorities, shipping companies and other interested partners would then be able to track, and get information from, containers, vehicles etc. Blockchain will allow paperless administration follow-up, as contracts / decisions / communications will be saved and archived, a new version being securely created without compressing the previous ones. The project aims at improving IT and infrastructural capacity of small ports in the SB region. 15 ports at least are gathered in the project in order to improve their cargo flows, environmental and economic efficiency by June 2021’ [4].

During some of the events and through some existing project partners, a liaison has started with the aforementioned project which it seems to be a good way to liaise further with other regional ports.

3.3 Future links

Other projects around ports and logistics are numerous and there are further projects which are of interest to liaise with, such as Sustainable ports in Africa project, AUTOPILOT, Terminal development project with Kalmar, etc.

Also about the links with associations/fora/technical committees we can cite the already mutual established link with ALICE and also future identified planned links, thanks to COREALIS consortium secure networks, with Waterborne, UITP, POLIS, DTLF, IPCSA, International shipping Union, Asociación de Navieros Españoles, Asociación de Transitarios Expedidores Internacionales y Asimilados, Federación Valenciana de

Empresarios del Transporte y la Logística, ELTC, Finnish Logistics & Purchasing Association, International Association of Ports and Harbours, ESPO, PIANC, IFIA, International Port Community Systems Association, ETSI, Verona Freight village, 3GPP, 5GPP, which have not been yet fully exploited for this project up to now.

The link with the Port of the Future network will also be intensified in order to prepare further the dissemination and exploitation of the COREALIS project results and outcomes.

4. Preparation of demonstration events and training seminars

4.1 Identification of topics to be demonstrated

According to the COREALIS description of action, five demonstrations/ training seminars will be organised towards the end of the project, one in each of the 5 Living Labs. The five demos/seminars are planned to take place in conjunction with the LL final interaction, having as a main aim to familiarise target stakeholders with the actual operation of the developed systems, to collect their feedback and to secure buy in of the developed COREALIS solutions/innovations, as presented in Annex C of the current document. The indicative structure and content of the demonstration and training seminars has been defined earlier in the WP7 and reported in the deliverable 7.1. It did foresee:

First session:

- Project overview
- Port of the Future landscape

Second session:

- Ports within COREALIS
 - o Innovations implemented
 - o Scenarios tested

Third session:

- Port of the Future Serious Game (PoFSG) training tool
- Training Evaluation

Fourth session:

- Key Outcomes
- Wrap-Trends

An evolution to this indicative content is being prepared as some of the trainings have already been conducted among the COREALIS team. For example, the serious game has already been played by the project participants in the plenary meetings 3 in Athens in June 2019 and 4 in Valencia in October 2019.

The intention is to present to local stakeholders the maximum potentially applicable COREALIS innovations at the living labs locations. This would increase further the dissemination and potential of exploitation of the outcomes and results of the project.

It is intended to present the hinterland connectivity applications as TAS, brokerage platform and JIT rail shuttle service, enhanced logistics in port operation through a 5G network, the intra-terminal operations services as cargo flow optimizer, predictor asset management, PORTMOD and RTPORT as well as the green book with the energy assessment, the Port of the Future Serious Game and the innovation incubator to the stakeholders' types mapped in figure 3 (sub-section 2.3)

4.2 Preparation of the demonstration planning

It is now foreseen to do the demonstrations of the, still to be, achieved applications and services and, according to the overall project schedule, between May and November 2020, in each of the five Living Labs.

Substantial part of the planning will be focused on the collaboration with the CSA action DockstheFuture, for attracting a wider stakeholder audience and achieving a higher outreach for the COREALIS demonstrations.

The preparatory activities will include except for the overall structure and planning of the demos and seminars, the invitations to local stakeholders, target groups, relevant authorities, organizations, institutions and associations, as well as, all the required press and media activities (e.g. announcements in local media, press releases at local newspapers, social media and partners' websites etc.).

The final structure and plan as well as the outcomes per demonstration/training seminar will be reported through the last communication plan D.7.3 of WP7.

5. Conclusions

The current deliverable presents the networking and cross fertilization activities that took place within the first eighteen months of COREALIS project and those still planned. Fruitful connections have been established and the similar projects that have been liaised with, look promising to disseminate and exploit the COREALIS project results. The task 7.4 doesn't end with this deliverable but its results, towards the project end, will be reported in the final communication plan and report of WP7.

References

[1] Europe General Data Protection Regulation, available at: <https://www.eugdpr.org/> (last accessed 30/10/2019)

[2] Data Protection Authorities in Europe, available at: http://ec.europa.eu/justice/article-29/structure/data-protection-authorities/index_en.htm (last accessed 30/10/2019)

[3] AEOLIX project, available at: <http://aeolix.eu/> (last accessed 30/10/2019)

[4] Connect2Smallports project, available at: <https://southbaltic.eu/-/connect-2-small-ports> (last accessed 30/10/2019)

Annex A: COREALIS organized & attended activities

Conferences/ Events
<ul style="list-style-type: none"> • Jean Monnet Symposium, Chios-Greece, 28-29/06/2018, DYNNIQ • DocksTheFuture: Workshops with Experts, Porto, Portugal, 29-30/10/2018, SEAB • 4th ITS Hellas Conference & Exhibition, Athens, Greece, 18-19/12/2018, ICCS • DocksTheFuture MidTerm Conference, Trieste, Italy, 04/04/2019, ICCS • European Maritime Days 2019, Lisbon, Portugal, 16-17/05/2019, VPF, POA • Baltic Ports Conference 2019, Stockholm, Sweden, 04-06/09/2019, ERTICO • Seminario sulla Carbon footprint nel sistema portuale dell'Alto Tirreno, Livorno, Italy, 12/09/2019, CNIT • UN SDSN Global Solutions Forum, New York, USA, 25/10/2019, ADSP MTS, ERICSSON & CNIT • BiLOG conference, La spezia, Italy, 16-17/10/2019, CNIT
Technical Papers/Posters
<ul style="list-style-type: none"> • ITS European Congress 2019, <i>Port Multimodal Inland mode of transportation predictor & prescriptor</i>, 03-06/06/2019, MOSAIC –paper presented during the event. • IPIC 2019, <i>Sustainable port development: towards the Physical Internet concept</i>, 09-11/07/2019, ICCS, SEAB, DYNNIQ, CNIT, VPF, PCT, VTT, Deltares –paper presented during the event. • IPIC 2019, <i>RTPORT: the 5G-based Model-Driven real Time Module for General Cargo Management</i>, 09-11/07/2019, CNIT, ERICSSON, ERICSSON research –paper presented during the event. • IPIC 2019, <i>Poster: Big Data and Data Analytics for Ports of the Future</i>, COREALIS, 09-11/07/2019, ICCS, NEC, MOSAIC –poster presented during the event. • Minisymposium: Mathematics of Logistics: emerging trends in Optimization and Simulation Modelling, <i>Port Multimodal Inland mode of transportation predictor & prescriptor</i>, 22-24/07/2019, MOSAIC
Special Interested Sessions
<ul style="list-style-type: none"> • ITS World Congress 2018, <i>Special Interested Session SIS 70: Port of the future towards automation</i>, Copenhagen-Demark, 20/09/2018, ICCS, ERTICO, CNIT • Collaborative Innovation Days: “New Global Routes: One Belt One Road Initiative & TEN-T”, <i>Moderated session: Disruptive technologies and their impact on the OBOR Initiative</i>, Athens, Greece, 06/11/2018, ICCS • International Conference on Maritime Transport 2019, <i>Moderated session: ‘Ports of the Future: Sustainable intelligent ports for smart and autonomous ships and logistics’</i>, Rome Italy, 10-12/09/2019, VPF • ITS World Congress 2019, <i>Special Interested Session SIS48: ‘Towards a Sustainable Technology Driven Port City Development Management’</i>, Singapore, 21-25/10/2019, ICCS, ERTICO, CNIT, DYNNIQ
Mass Media Publications
<ul style="list-style-type: none"> • Greek Kick-off Press Release, 15/05/2018, SEAB, ICCS, PCT • Italian Press Release on 5G technology, 27/09/2018, ERICSSON, CNIT • COREALIS Italian radio interview, 25/10/2018, CNIT • Article in Levante El mercantil Valenciano, 17/11/2018, VPF • Article in Satama Stevedco’s customer magazine, 10/12/2018, VTT, STEVECO
Project events

- **Kick-off meeting**, Athens-Greece, 07-08/05/2018,
- **Livorno Focus Group**, Livorno-Italy, 17/07/2018
- **Haminakotka Focus Group**, Kotka- Finland, 30/08/2018
- **Piraeus Focus Group**, Piraeus- Greece, 04/09/2018
- **Antwerp Focus Group**, Antwerp-Belgium, 05/09/2018
- **Valencia Focus Group**, Valencia-Spain, 25/09/2018
- **COREALIS 1st plenary meeting**, Antwerp-Belgium, 03-04/10/2018
- **COREALIS 2nd plenary meeting**, Kotka, Finland, 12-13/02/2019
- **COREALIS 1st webinar**: COREALIS Webinar: Living Labs as a stepping stone to the Port of the Future, 7/3/2019
- **COREALIS 2nd webinar**: Intra-Terminal Operations State-of-the-Art, 14/6/2019
- **COREALIS 3rd plenary meeting**, Athens, Greece, 26-27/06/2019
- **COREALIS 4th plenary meeting & 1st exploitation workshop**, Valencia, Spain, 16-18/10/2019

Other activities

- **Presentation of COREALIS project to Lemesos Port**, Lemesos, Cyprus, 28-29/03/2019, [ICCS](#), [SEAB](#)
- **Presentation of COREALIS project to INTERMODEL Final General Assembly**, Brussels, Belgium, 10/10/2019, [VTT](#)

Annex B: COREALIS stakeholders' Directory

Main audience	Stakeholder groups	COREALIS stakeholders Directory
Scientific Community	Academic and research Institutions, professional societies, funding institutions, educational staff, Standardization Bodies, EU platforms	<ul style="list-style-type: none"> • Aalto University (VTT) • ALICE (ICCS, VPF, Dynniq, ERTICO, STEVECO) • CENIT (ERTICO) • CETH-HIT (ERTICO) • CHALMERS (ERTICO) • CTAG (ERTICO) • Delft University of Technology (DELTAES) • Dinalog (ERTICO) • ETSI (CNIT) • ICOOR (ERTICO) • LIST (ERTICO) • LOGIS.NET (ERTICO) • MULTITEL (ERTICO) • Northampton (ERTICO) • Polytechnic of Bari (ERTICO) • TNO (ERTICO) • TRAIL (ERTICO) • TSB Berlin (ERTICO) • TU Delft (ERTICO) • UNITS (ERTICO) • Universidad Politécnica de Valencia (VPF) • University of Turku (ERTICO) • VTT Technical Research Center of Finland (ERTICO)
Operators	Port operators, terminal operators, freight operators, nautical service operators, rail operators, barges operators, ocean carriers	<ul style="list-style-type: none"> • COSCO (PCT) • Ferneti (ERTICO) • Fraport (ERTICO) • Maersk (ERICSSON, CNIT) • MSC (ADSPTS) • NTEX AB (ERTICO)
Authorities	National regional and local authorities, Port authorities, Partners municipalities	<ul style="list-style-type: none"> • Austriatech (ERTICO) • Bilboa (ERTICO) • Calabria Region (ERTICO) • CEREMA (ERTICO) • City Council of Vigo (ERTICO) • Hellenic Republic Ministry of Infrastructure and Transport (ERTICO) • IFKA (ERTICO) • Institute of Logistics and Warehousing (ERTICO) • Luka Koper (ERTICO) • PCT – Baltic Container Terminal Gdynia (ERTICO) • Pomorze Zachodnie (ERTICO) • Port of Antwerp (ERTICO) • Port of Brussels (ERTICO) • Port of Lemesos (SEAB)

		<ul style="list-style-type: none"> • Piraeus Port Authority (PCT) • Port of Rotterdam (Dynniq, ERTICO) • Port of Hamburg (Dynniq, ERTICO) • Port Authority of Valencia (VPF) • RailPort (POA) • Livorno municipality (AdSTPS) • Port of Haminakotka, Kalmar (STEVECO) • Port of Lisbon (MARLO) • RCM (Region of Central Macedonia) (ERTICO) • Ruse Region (ERTICO) • Uniport Bilbao (ERTICO) • viadonau (ERTICO)
Companies	Logistic company, shipping company, trucking company, Telco industries	<ul style="list-style-type: none"> • Ahlers (POA) • Alpe Adria (ERTICO) • AM Logistica (ERTICO) • Autamarocchi (ERTICO) • AZKAR Dachser (ERTICO) • BETA (ERTICO) • Cablerias Group (ERTICO) • Carnival Maritime (ADSPTS) • Caterpillar (POA) • CFT Logistics (ADSPTS, CNIT) • COOP (ERTICO) • CT Lorenzini (AdSTPS, CNIT) • DB Schenker (ERTICO) • DHL (ERTICO) • DOW Chemicals (POA) • DP World ((POA) • Evonik (POA) • Exla Plásticos (ERTICO) • Greenery Zuid Europa (ERTICO) • Group Joosen (POA) • Interporto Quadrante Europe/Verona Interporto (AdSTPS) • JandeRijk (ERTICO) • KLOK (ERTICO) • LCS (ERTICO) • Mondelez intl. (ERTICO) • MSC (AdSTPS) • Nagel Group (ERTICO) • Novalog (ERTICO) • Oresund Logistics (ERTICO) • Panlog (ERTICO) • PEARL (PCT) • PCDC (PCT) • Puertos Del Estado (VPF) • Royal Boskalis Webminster (DELTAES) • Samer (ERTICO) • SeaWay (ERTICO) • SEPIAeb Ltd (ERTICO) • Ship-IT (POA) • SpediGo Polish Group (ERTICO) • SRG Global (ERTICO) • Terminal Darsena Toscana (AdSTPS)

		<ul style="list-style-type: none"> • TIM (ERICSSON) • TLS (ERTICO) • Total (ERTICO) • Transporte Augusto (ERTICO) • TX Logistik (ERTICO) • Unilever (ERTICO) • Van Moer Logistics (POA) • Vigotec (ERTICO) • West (ERTICO)
Associations/Communities	Port associations, shipping associations, port user communities	<ul style="list-style-type: none"> • International Association of Ports and Harbours (DELTARES) • International Shipping Union (SEAB, PCT) • ESPO (DELTARES, ERTICO) • Verona Freight Village (ADSPTS) • Pianc (DELTARES) • Asociación de Navieros Españoles (VPF) • Asociación de Transitarios, Expedidores Internacionales y Asimilados (VPF) • Federación Valenciana de Empresarios del Transporte y la Logística (VPF) • DTLF (ICCS, ERTICO) • IPCSA (PCT) • WATERBORNE (VPF) • ELTC (VPF) • Finnish Association & Purchasing Logistics (VTT) • IFIA (SGS) • PSA (POA) • International Port Community Systems Association (POA) • 3GPP Association (ERICSSON) • 5GPP Association (ERICSSON) • ALICE (ERTICO) • APCS (ERTICO) • Barcelona Catalonia Logistic Center (ERTICO) • BGL (ERTICO) • Canary Islands Cluster for Logistics and Transport (ERTICO) • CEAGA (ERTICO) • CETC – EGTC (ERTICO) • Chambers of Commerce Thessaloniki (ERTICO) • CLECAT (ERTICO) • CLOSER (ERTICO) • CNA (ERTICO) • CONNEKT (ERTICO) • Distretto del Condizionamento e della refrigerazione industriale (ERTICO) • ECG (ERTICO) • Effizienz Cluster management (ERTICO) • ERAA (ERTICO) • Estonia Logistics Cluster (ERTICO) • European Shippers (ERTICO) • EVO (ERTICO) • FNTR (ERTICO)

		<ul style="list-style-type: none"> • Freight Transport Association (ERTICO) • HOLM (ERTICO) • IAPH (ERTICO) • IRU (ERTICO) • i-Trans (ERTICO) • ITS Niedersachsen (ERTICO) • ITS UK (ERTICO) • Logistic Hub Scandinavia (ERTICO) • Logistics Cluster of Lower Austria (ERTICO) • Logistics in Wallonia (ERTICO) • Logistics Initiative Hamburg (ERTICO) • Logistiknetz Berlin-Brandenburg (ERTICO) • Logistique Seine-Normandie (ERTICO) • Lyon Urban Truck & Bus (ERTICO) • Madrid Logistica (ERTICO) • Materials management and logistics network (ERTICO) • MLC ITS Euskadi (ERTICO) • Mobility and Logistics Cluster Spain (ERTICO) • MoWiN.net (ERTICO) • NGIL (ERTICO) • Pôle d'intelligence logistique (ERTICO) • Rhône-Alpes Cluster Logistique (ERTICO) • SEVE (ERTICO) • Smart Freight Center (ERTICO) • Sopron Régió Logisztikai Klaszter (ERTICO) • Sweden Logistics (ERTICO) • Swedish Maritime Cluster (ERTICO) • The Danish Maritime Cluster (ERTICO) • The Danish Transport Academy (ERTICO) • The Transport Innovation Network (ERTICO) • Thessaloniki Chamber of Commerce and Industry (ERTICO) • Trekantmradet Transport Forum (ERTICO) • UNTRR (ERTICO) • Verein Netzwerk Logistik (ERTICO) • VIL (ERTICO) • Wolfsburg Logistic Association (ERTICO) • World Customs Organization (ERTICO) • ZAB Logistics Cluster (ERTICO)
ICT Service Providers	ICT service providers	<ul style="list-style-type: none"> • Aguila (ERTICO) • ATOS (ERTICO) • DBALAB Group (AdSTPS, CNIT) • DataCH Technologies (CNIT, AdSTPS) • Ericsson Corporate (ERICSSON) • ETRA (ERTICO) • Gecoinsa (ERTICO) • Giventis (ERTICO)

		<ul style="list-style-type: none"> • Go Swift (ERTICO) • GS1 (ERTICO) • ITENE (ERTICO) • Kaleeido Ideas & Logistics (ERTICO) • Kapsch TrafficCom Arce Sistemas (ERTICO) • Logica (ERTICO) • M3Systems (ERTICO) • MARLO (ERTICO) • Marsan (ERTICO) • Movelco Mobility (ERTICO) • NEC Europe (ERTICO) • NeoGLS (ERTICO) • Novacom (ERTICO) • Puservice (ERTICO) • PTV (ERTICO) • Teamnet (ERTICO) • Telvent (ERTICO) • TIM (ERICSSON) • TJS (ERTICO) • Tjörns Bilservice AB (ERTICO) • TLN (ERTICO) • Traxens (ERTICO) • TREDIT (ERTICO) • T-Systems (ERTICO) • Vicomtech (ERTICO) • Viza Automacion (ERTICO)
Cities	Port Cities	<ul style="list-style-type: none"> • City of Rotterdam (Dynniq) • City of Hamburg (Dynniq, ERTICO, ICCS) • Ayuntamiento de Valencia (VPF) • City of Piraeus (PCT, ICCS)
Public Stakeholders & Policy Makers	National and regional government, ministries, city council, EU citizens, general public, international policy makers, groups & institutions	<ul style="list-style-type: none"> • Dutch embassies in Latin America (DELTARES) • Tuscany Region (AdSTPS)

Annex C: Explanatory list of COREALIS innovations

1. The COREALIS Green Truck Initiative

a) Truck appointing system referred as well as TAS – “Truck Appointment System”

An innovative Truck Appointing System (TAS) designed as a modular, upgradable solution, for external trucks that are calling in the port to deliver or pick-up containers. In its most primary version the TAS is intended to minimise waiting time at the port gates, prevent traffic congestion, regulate trucks flow within the port and surrounding area of the city and organise workload of terminals based on the estimate time of arrival (ETA) of trucks. During subsequent phases TAS offers the possibility to:

- Incorporate a pre-booking function (users able to partially fill a reservation and pre-select a slot)
- Share booking or pre-booking information with another company to complete the information in the system
- Introduce a virtual queue or priority queue
- Interface with 3rd party applications for delivering / retrieving data (port community systems, city traffic, weather forecast, strikes, other)
- Use geoposition, machine learning and analytics to propose alternative slots and routes to drivers based on preferences

b) The Marketplace and chassis brokerage platform referred as “Marketplace & Yard Equipment Brokerage Platform”

A marketplace/cloud-based brokerage platform will facilitate swift and seamless interactions among the port and the leasing entity, allowing online booking of chassis and serving as a hub for operational data. The marketplace will comprise i) A catalogue of services for ports and their clients so that ports and their clients can book equipment or services for a given time, ii) Yard equipment pool management with emphasis on chassis or other relevant for the CT, iii) Spot booking, and iv) Rating/benchmarking of service providers from the port operators

2. The COREALIS PORTMOD referred as “Port Operations Process Modelling tool”

Process modelling of cargo and data flows in CTs can improve their competitiveness by more efficient operations and better compatibility with regulations. The focus of the PORTMOD modelling tool will be operational efficiency, safety for personnel, emission analysis using LIPASTO databases and improved data sharing (e.g. via a PCS). In practice, PORTMOD describes in detail the container placements in the container movement chain.

3. The COREALIS RTPORT (Model-Driven Real-Time Control module) refereed as “5G-enabled Smart Terminal Operations”

Model-Driven Real-Time Control module (RTPORT) will coordinate and support port operation, providing measurable feedback to the models of PORTMOD. It will perform real time control of operations collecting data via yard vehicles and implanted sensors (including cameras), using a private 5G end to end network and taking operating decisions based on on-line analytical processing and PORTMOD models.

4. The COREALIS Predictor – Asset Management referred as “Predictor – Asset Management tool”

An efficient asset management requires an optimal use of port assets, e.g. yard vehicles (forklifts, cranes and trucks), tyres and spare parts. Storing and managing bulky assets takes up significant space of the port. The Predictor tool goes beyond classic ERP static preventive maintenance tools by realising a powerful predictive analytics module; this enables monitoring and dynamic prediction of the total life-cycle cost of port assets that improves over time.

5. The COREALIS Cargo Flow Optimiser referred as “Cargo Flow Optimisation tool”

It is an innovative data-analytics based cargo flow optimisation component; AIS data for the vessel ETAs will be multiplexed with (big) data from the rail operators and barges ETAs so that cargo flows are streamlined; the aim is to minimise containers’ waiting time at the port. This process will improve current land/infrastructure use and the overall supply chain connection to the port. Besides, through innovative machine learning, cargo flow prognoses for short-, mid- and long-term will be implemented so that the port managers and urban planners may be facilitated in their infrastructure investment planning.

6. Green Cookbook – Energy Assessment Framework

The Green cookbook helps ports to lower their environmental footprint and move to cleaner transport modes and cleaner energy sources.

7. Port of the Future Serious Game

The Port of the Future Serious Game (PoFSG) is an innovative and interactive training and simulation tool that is used to assess the feasibility and sustainability of the socio-economic and environmental/physical development of a port within the surrounding coastal and urban area. The tool will visualise the anticipated impacts – positive and negative – related to social, economic, and environmental aspects.

8. Innovation Incubator Scheme

The COREALIS Innovation Incubator Scheme, aiming to make the port the epicenter of the local industrial landscape and support the growth of local entrepreneur SMEs and start-ups.