ACTION PLAN FOR FOSTERING COORDINATED MULTIMODAL FREIGHT TRANSPORT THROUGHT ICT SYSTEMS – TRIESTE

DELIVERABLE D.T3.2.2

Version 2

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1. Executive summary

Located in the heart of Europe, at the intersection between shipping routes and the Baltic-Adriatic and Mediterranean TEN-T core network corridors, the Port of Trieste is an international hub for overland and sea trade with the dynamic market of Central and Eastern Europe.

The intensification of trade and maritime traffic between the Far East and Europe along with the EU enlargement process have revived the importance of the Upper Adriatic, opening up new growth and development opportunities for Trieste maritime industry.

Thanks to this context, Trieste is one of the best north Adriatic gates to serve the Central and Eastern Europe markets, which represent the main trade area for goods arriving in the Port.

Multimodality and an intensive use of rail transport is crucial to reach those markets granting, at the same time, limited congestion of port terminals, a reduction of road traffic and therefore minor emissions of polluting and greenhouse gasses.

However, due to the significant increase in railway freight traffic, there is a problem in terms of capacity of the network to tolerate a traffic growth of 15 - 20% each year.

An improvement of ICT systems represents one of the solutions to promote an increment of the traffic while fostering multimodal solutions.

Within the COMODALCE project, the Output (D.T1.3.2-10) “Strategy for fostering coordinated multimodal freight transport through ICT systems”, along describing the strategy, defined a vision, objectives and priorities in a mid to long-term perspective, including a detailed wish list of measures to be tested in the pilot action.

This document includes the action plan for fostering coordinated multimodal freight transport through ICT systems in the Port Network Authority of the Eastern Adriatic Sea – Port of Trieste and Monfalcone (PNAEAS). Considering the results of the pilot action, it breaks down the goals of the strategy and wish list (WPT1) in specific tasks, KPIs, time line, identification of financial resources and definition of responsible actors.

The pilot action developed an ICT system to exchange the train composition for trains between the Port of Trieste and the Mahart Container Centre, automatically generating CH30 document for inbound trains, as to investigate how ICT can improve real performance in the multimodal traffic.

Along with this pilot action, the activities realised in COMODALCE project highlighted the main areas of intervention capable to foster the multimodal freight transport through ICT: the integration of the processes between ports, dry ports and other logistic nodes, as well as a better interoperability between ICT systems and an improvement of the systems in terms of cybersecurity.

2. The strategy and the pilot action

The "Strategy for fostering coordinated multimodal freight transport through ICT systems" defined in the D.T1.3.2 highlighted the following goals:

Medium term (5 years):

1. Goal #1 – Trieste & Monfalcone: full integration of the ICT systems of the port of Trieste and of the systems of the port of Monfalcone (part of Port Network Authority of Eastern Adriatic Sea since January 2020).
2. Goal #2 – Local dry ports: data exchange interoperability with the ICT systems of the dry ports of Fernetti and Cervignano (the hinterland of the ports of Trieste and Monfalcone).
3. Goal #3 – Blockchain: application of blockchain technology to all relevant data exchanges in the framework of an improved cybersecurity for all critical ICT systems.
4. Goal #4 – Other dry ports: data exchange interoperability with the ICT systems of all dry-ports connected with the ports of Trieste and Monfalcone by direct rail transport.

Long term (10 years):

1. Goal #5 – All systems: "plug and play" interoperability with the ICT systems of future external ICT systems wishing to connect with the ports of Trieste and Monfalcone.
2. Goal #6 – More Cybersecurity: Introduce all relevant new ICT technologies which might emerge that can improve the cybersecurity of all ICT systems in Port, particularly the critical ones.

Since the definition of these goals in D.T1.3.2 (February 2020), we monitored the evolution of the technologies related to the involved topics and found out that some of the assumptions taken in consideration two years ago have changed. The current scenario suggests us to modify the strategy previously defined within the goals n. 3, based on the Blockchain technology, towards the "security by design" paradigm. We observed that the "Blockchain" technology has not spread as forecasted and its security remains strictly linked with the security of the endpoint itself. The "Security by Design" technology consists in a range of security practices based on the fundamental idea that security should be built into a product by design and not afterwards. That's why it is strategic to apply the logic of security by design through the adoption of a new process based on cyber security checks to be carried out as early as during software development, through continuous discussion between developers and analysts. The aim is to achieve a better level of security and optimise the process.

Because of this, we updated the goal n. 3 in "Goal #3 – Security by Design: application of security by design technology in the framework of an improved cybersecurity for all critical ICT systems".

The goals, along with the updated one, are described by the following tables defined in D.T1.3.2.

Perspectives	Goal #1 - Trieste & Monfalcone	Measurement
1. Environmental and safety perspective	An integration of the processes will lead to increased efficiency also from the environmental point of view.	All port systems by law must prepare yearly a comprehensive document (Environmental Energy Planning Documents of the Port Systems DEASP) measuring in detail the carbon footprint of all port activities.
2. Internal processes perspectives	The processes and procedures in the two ports will be harmonized to become a common set of rules	Reduction of number of rules and procedures managed in different ways in the two ports.
3. Innovation and growth perspective	Increased efficiency should lead to a better growth for the two ports.	Statistics for the two ports.
4. Customer / Partner perspective	Transparency portals on website communicate promptly any change in procedures to stakeholders.	Yearly satisfaction survey is distributed to stakeholders.
5. Financial perspective	Funds from European Projects can help Port System Authority in financing activities toward this goal.	Number of EU projects focused on this goal.
VISION: To reach full-fledged development of multimodal freight transport in the Port of Trieste. To steer the development of the port community by promoting technological innovation and boosting digital growth for a fully integrated supply chain. To continually improve the port to make it safer, more efficient and more sustainable.		

Perspectives	Goal #2 - Local dry ports	Measurement
1. Environmental and safety perspective	A better interoperability between ICT systems will lead to increased efficiency, also from the environmental point of view.	All port systems by law must prepare yearly a comprehensive document (Environmental Energy Planning Documents of the Port Systems DEASP) measuring in detail the carbon footprint of all port activities.
2. Internal processes perspectives	All existing or new ICT systems or modules communications must be based on use of standards in order to ease systems interoperability.	Analysis and statistics of communication problems between systems.
3. Innovation and growth perspective	Increased efficiency should lead to a better growth for the ports and dry-ports.	Yearly statistics for the ports and dry ports.
4. Customer / Partner perspective	Improvements in interoperability between ICT systems are usually largely transparent to stakeholders, who will only notice and increased efficiency of the systems (more data, more reliable).	Yearly satisfaction survey is distributed to stakeholders.
5. Financial perspective	Funds from European Projects can help Port System Authority in financing activities toward this goal.	Number of EU projects focused on this goal.
VISION: To reach full-fledged development of multimodal freight transport in the Port of Trieste. To steer the development of the port community by promoting technological innovation and boosting digital growth for a fully integrated supply chain. To continually improve the port to make it safer, more efficient and more sustainable.		

Perspectives	Goal #3 – Security by Design	Measurement
1. Environmental and safety perspective	An improved cybersecurity of the systems can prevent critical situations to ICT systems which would have consequences to port operability and possibly avoid environmental catastrophes consequent to cyber-attacks.	All port systems by law must prepare yearly a comprehensive document (Environmental Energy Planning Documents of the Port Systems DEASP) measuring in detail the carbon footprint of all port activities.
2. Internal processes perspectives	All relevant critical systems where more cybersecurity is deemed necessary must be adapted for use of technologies allowing an increased security.	Periodic evaluation of cyber risks for ports ICT systems (cybersecurity assessment) is mandatary by law in Italy.
3. Innovation and growth perspective	Increased security should prevent possible critical ICT security breaches which could hamper growth for the two ports.	Statistics for the two ports.
4. Customer / Partner perspective	Stakeholders involved will be widely informed about new procedures and technologies they would need to adopt.	Yearly satisfaction survey is distributed to stakeholders.
5. Financial perspective	Funds from European Projects can help Port System Authority in financing activities toward this goal.	Number of EU projects focused on this goal.
VISION: To reach full-fledged development of multimodal freight transport in the Port of Trieste. To steer the development of the port community by promoting technological innovation and boosting digital growth for a fully integrated supply chain. To continually improve the port to make it safer, more efficient and more sustainable.		

Perspectives	Goal #4 - Other dry ports	Measurement
1. Environmental and safety perspective	A better interoperability between ICT systems will lead to increased efficiency, also from the environmental point of view.	All port systems by law must prepare yearly a comprehensive document (Environmental Energy Planning Documents of the Port Systems DEASP) measuring in detail the carbon footprint of all port activities.
2. Internal processes perspectives	All existing or new ICT systems or modules communications must be based on use of standards in order to ease systems interoperability.	Analysis and statistics of communication problems between systems.
3. Innovation and growth perspective	Increased efficiency should lead to a better growth for the ports and dry-ports.	Yearly statistics for the ports and dry ports.
4. Customer / Partner perspective	Improvements in interoperability between ICT systems are usually largely transparent to stakeholders, who will only notice and increased efficiency of the systems (more data, more reliable).	Yearly satisfaction survey is distributed to stakeholders.
5. Financial perspective	Funds from European Projects can help Port System Authority in financing activities toward this goal.	Number of EU projects focused on this goal.
VISION: To reach full-fledged development of multimodal freight transport in the Port of Trieste. To steer the development of the port community by promoting technological innovation and boosting digital growth for a fully integrated supply chain. To continually improve the port to make it safer, more efficient and more sustainable.		

Perspectives	Goal #5 - All systems	Measurement
1. Environmental and safety perspective	A better interoperability between ICT systems will lead to increased efficiency, also from the environmental point of view.	All port systems by law must prepare yearly a comprehensive document (Environmental Energy Planning Documents of the Port Systems DEASP) measuring in detail the carbon footprint of all port activities.
2. Internal processes perspectives	All existing or new ICT systems or modules communications must be based on use of standards in order to ease systems interoperability.	Analysis and statistics of communication problems between systems.
3. Innovation and growth perspective	Increased efficiency should lead to a better growth for the ports and dry ports.	Yearly statistics for the ports and dry ports.
4. Customer / Partner perspective	Improvements in interoperability between ICT systems are usually largely transparent to stakeholders, who will only notice and increased efficiency of the systems (more data, more reliable).	Yearly satisfaction survey is distributed to stakeholders.
5. Financial perspective	Funds from European Projects can help Port System Authority in financing activities toward this goal.	Number of EU projects focused on this goal.
VISION: To reach full-fledged development of multimodal freight transport in the Port of Trieste. To steer the development of the port community by promoting technological innovation and boosting digital growth for a fully integrated supply chain. To continually improve the port to make it safer, more efficient and more sustainable.		

Perspectives	Goal #6 - More Cybersecurity	Measurement
1. Environmental and safety perspective	An improved cybersecurity of the systems can prevent critical situations to ICT systems which would have consequences to port operability and possibly avoid environmental catastrophes consequent to cyber-attacks.	All port systems by law must prepare yearly a comprehensive document (Environmental Energy Planning Documents of the Port Systems DEASP) measuring in detail the carbon footprint of all port activities.
2. Internal processes perspectives	All relevant critical systems where more cybersecurity is deemed necessary must be adapted for use of technologies allowing an increased security.	Periodic evaluation of cyber risks for ports ICT systems (cybersecurity assessment) is mandatary by law in Italy.
3. Innovation and growth perspective	Increased security should prevent possible critical ICT security breaches which could hamper growth for the two ports.	Statistics for the two ports.
4. Customer / Partner perspective	Stakeholders involved will be widely informed about new procedures and technologies they would need to adopt.	Yearly satisfaction survey is distributed to stakeholders.
5. Financial perspective	Funds from European Projects can help Port System Authority in financing activities toward this goal.	Number of EU projects focused on this goal.
VISION: To reach full-fledged development of multimodal freight transport in the Port of Trieste. To steer the development of the port community by promoting technological innovation and boosting digital growth for a fully integrated supply chain. To continually improve the port to make it safer, more efficient and more sustainable.		

Along with the "Strategy for fostering coordinated multimodal freight transport through ICT systems", the D.T1.3.2 provided a wish list of ICT measures.

The COMODALCE Pilot Action developed in the O.T2.1 by PNAEAS helped us to test the wish list:

Wish list of ICT measures			
Title	**Short description**	**Link to the strategic goal**	**Link to the pilot action**
1.	Upgrade of interoperability of the Port Community System towards external systems.	Goal #2 – Local dry ports Goal #4 – Other dry ports	Measure implemented in pilot action. Correct data exchange between systems will be checked.
2.	Interoperability with OCR systems installed at the rail gates to port	Goal #1 – Trieste & Monfalcone	Measure implemented in pilot action. Correct data exchange between systems will be checked.
3.	Evolution of CH30 model and generation of waybill.	Goal #4 – Other dry ports	Measure implemented in pilot action. Correct data exchange between systems will be checked.

PNAEAS performed through ICT systems the "Development of data received in PCS from RUs and railway stakeholders" and the "Data exchange with other foreign platform abroad of dry ports connected with railway lines with Trieste, e.g.: Furnitz, Mahart, etc.". The pilot action included the exchange of the data in the CH30 between the Port of Trieste and the Mahart Container Center (PP10).

The pilot action allowed to eliminate the errors caused by the manual data entry, through the automatic exchange of the train composition for trains between the Port of Trieste and the Mahart Container Centre, automatically generating CH30 document for inbound trains.

The received messages have been tested for a couple of months, period in which it has been possible to perform a data analysis to screen the resulting misunderstandings, errors, data conversions. Currently, a manual data entry reduction of 90% has been reached thanks to interoperability.

The matching between the already implemented pre-arrival notices procedures and the train manifest received from Mahart Container Center has reduced the time required to present the CH30 to Customs in Sinfomar by almost 30%.

These results confirmed the importance to focus on ICT systems to allow the multimodal freight transport becoming more and more efficient in the next future.

3. Identification of the actions

3.1. Mapping the actions

Currently, thanks to the support of automatic optical sensors at the port gates and the capacity to manage IT document flows provided by the PCS, such as the one tested in the Pilot Action developed in the O.T2.1, PNAEAS is creating an increasingly integrated and "multimodal" management system, with the objective to gradually expand it to include the intermodal service nodes of the region and thus, in perspective, the main rail routes (traffic corridors).

The Port ICT system is the fulcrum of this strategy, while its expansion with specific actions is the key to achieve the goals defined in the D.T1.3.2 "Strategy for fostering coordinated multimodal freight transport through ICT systems" and updated in the chapter no. 2.

The action plan PNAEAS evaluated to implement in the next year to reach the strategic goals is summarised by the following table:

ACTION/MEASURE	ESTIMATED COST	TIME HORIZON
Upgrade the gate control access for the ports of Trieste and Monfalcone	200.000 euros	2027
Activation of PCS services in Monfalcone – evaluation survey	0 euros	2025
Upgrade of the PCS app	80.000 euros	2025
Evaluation study to implement the "security by design" paradigm	35.000 euros	2024
Extension of the web service implemented in COMODALCE project to other dry ports	10.000 euros/site	2023
Introduction of API technology to further extend the service implemented in COMODALCE	80.000 euros	2028
ICT assessment of the systems of the port of Monfalcone	50.000 euros	2028

3.2. Setting the actions

In this section, the actions included in the previous table are detailed with their main data:

Action no. 1: *Upgrade the gate control access for the ports of Trieste and Monfalcone*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	The Ports of Trieste and Monfalcone entry permits are currently managed by a system named "ViGate". It consists of a software to manage the authorization procedure (among the Port Authority, the port operators, the Maritime Authority, and the Border Police) and some technological infrastructures to monitor vehicles and persons at the port entry gate. Despite the presence of this technology, the systems itself is updated and not in line with the current technology. An upgrade of the

	overall system, starting from the gate of the port of Monfalcone, would be capable to speed up the port entry control procedures allowing for a better efficiency in the transit times of trucks and goods.
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	Project design Tender Software upgrade Equipment purchase Infrastructural works
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	PNAEAS Maritime Authority Border Police Port community The first three category of stakeholders defined are directly involved in the port entry authorization process; along with the Port Community, they will all be direct beneficiaries of the action
Timeline *Indicate the time horizon for the implementation of the action*	By 2027
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	200.000 € (only for the system/gate of the Port of Monfalcone)
Sources of financing[1] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	PNAEAS own funds and EU funds. The share covered by PNAEAS depends on the EU funds that will -partially or fully- fund this action.
Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	Speeding up the port entry control procedures provides a better efficiency in the transit times of trucks and goods, optimizing the “last mile” connection. A shorter transit time means less congestion, more efficient port procedures and all in all less externalities due to minor emissions of heavy vehicles. This action will contribute to reach the strategic goal n.1 promoting the full integration of the ICT systems of the port of Trieste and of the systems of the port of Monfalcone
KPIs *Please identify the KPI to be used for measuring the action’s impact*	Numbers of annual congestion events

[1] This information, if already available, could be assumed in the draft version and it has to be confirmed in the final one

Action no. 2: - *Activation of PCS services in Monfalcone – evaluation survey*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	The Port of Monfalcone currently does not have a PCS. As described in the "Strategy for fostering coordinated multimodal freight transport through ICT systems" the PCS has a critical role in the development of a port and, especially, its multimodal traffics. The activation of a port community system is a long process that has to be discussed and agreed with all the port stakeholders to reach good results and allow further developments
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	Organise stakeholders' meetings to collect the port community needs Evaluate the PCS services to develop Implement a preliminary project design of the local PCS
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	PNAEAS Customs Port of Monfalcone operators Maritime Authority Each stakeholder listed could benefit from the development of new PCS services, their role in the action is critical to map the Port Community needs
Timeline *Indicate the time horizon for the implementation of the action*	By 2025
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	0 euros
Sources of financing[2] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	The action, at this phase, involves only PNAEAS personnel. No additional costs are forecasted in this preliminary stage.
Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	This action is the first step towards implementing a PCS in the port of Monfalcone. The adoption of a PCS will make the port administrative procedure more efficient, as already seen in the pilot action with Mahart Container Center. This will positively contribute to the growth of the port and its traffic, setting the precondition to foster coordinated multimodal freight transport through ICT systems and the full

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	integration of the ICT systems of the port of Trieste and of the systems of the port of Monfalcone (Goal n. 1)
KPIs *Please identify the KPI to be used for measuring the action's impact*	**N**umber of PCS services defined

Action no. 3: *Upgrade of the PCS app*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	Currently PNAEAS is involved in the development of a mobile app in the framework of the FENIX EU project to provide PCS services related to the integrated management of the traffic flows within the regional logistic sites. The action no. 3 refers to upgrading the PCS app to allow the digitalization of the entry procedures of vehicles
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	Project design Tender Software upgrade
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	PNAEAS Maritime Authority Border Police Customs
Timeline *Indicate the time horizon for the implementation of the action*	By 2025
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	80.000 euros
Sources of financing[3] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	PNAEAS own funds and EU funds. The share covered by PNAEAS depends on the EU funds that will -partially or fully- fund this action.
Impact of the initiative	The upgrade of the PCS app to digitalize the entry procedures is intended to reduce the presence of physical gate infrastructures and make the entry process more efficient and

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Describe the expected future economic, social, environmental impacts of this initiative	traceable. This action will help reaching the strategic goal n. 2 fostering the data exchange interoperability with the ICT systems of the dry ports of Fernetti and Cervignano (the hinterland of the ports of Trieste and Monfalcone)
KPIs *Please identify the KPI to be used for measuring the action's impact*	No. of mobile apps downloaded

Action no. 4: *Evaluation study to implement the security by design paradigm*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	The "Security by Design" paradigm is a new approach to the software and systems development to guarantee greater cyber security standard. The analysis of the software used by PNAEAS and the evaluation of the ones that could benefit by the security by design integration, is a crucial action to guarantee the security of the data and processes and a first step to fulfil the strategic goal n. 3
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	Project design Tender Software upgrade evaluation
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	PNAEAS Maritime Authority Border Police Customs Technology providers AGID (Agency for the Digital Italy) ACN (Agency for the National Cibersecurity) ENISA (European Union Agency for the Cibersecurity)
Timeline *Indicate the time horizon for the implementation of the action*	By 2024
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	35.000 euros
Sources of financing[4] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	PNAEAS and EU programs funds. The share covered by PNAEAS depends on the EU program that will -partially or fully- fund this action

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Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	The development of software -and generally ICT systems- based on the "Security by Design" should prevent possible critical ICT security breaches which could hamper the growth of the two ports. The evaluation if the software in use is based on the security by design is the first step towards preventing a cybersecurity breach rather than repairing the issue and restoring systems after been hit by a cybersecurity breach
KPIs *Please identify the KPI to be used for measuring the action's impact*	Number of software without "security by design" technology

Action no. 5: *Extension of the web service implemented in COMODALCE project to other dry ports*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	The pilot action "Data exchange with other foreign platform abroad of dry ports connected with railway lines with Trieste, e.g.: Furnitz, Mahart, etc." relates to the exchange of the data in the CH30 between the Port of Trieste and the Mahart Container Center (PP10). The positive results observed in the PA could be well extended to other logistic sites dealing with the Port of Trieste (extended port community) to further leverage the proved efficiency in data exchange.
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	Agreement with logistic site Software upgrade Start interoperability
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	PNAEAS Customs Port operators Extended port community
Timeline *Indicate the time horizon for the implementation of the action*	By 2023
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	10.000 euros for each site involved
Sources of financing[5] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	PNAEAS and EU programs funds. The share covered by PNAEAS depends on the EU program that will -partially or fully- fund this action

[5] This information, if already available, could be assumed in the draft version and it has to be confirmed in the final one

Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	The action, as already highlighted by the pilot action with MCC, guarantees a data entry reduction of 90% thanks to interoperability and a reduction of the time required to present the CH30 to Customs in Sinfomar by almost 30%. Making the exchange of the data in the CH30 between logistic partners more efficient and reliable, could surely foster the multimodal freight transport through ICT
KPIs *Please identify the KPI to be used for measuring the action's impact*	Number of new logistic partner connected

Action no. 6: *Introduction of API technology to further extend the service implemented in COMODALCE*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	The pilot action "Data exchange with other foreign platform abroad of dry ports connected with railway lines with Trieste, e.g.: Furnitz, Mahart, etc." testified positive results in terms of efficiency and reliability of the data exchanged. The pilot action could be well replicated to other logistic sites but it would cost 10.000 euros/each. The introduction of API technology (Application Programming Interface) to the data exchange tested, allows different applications to talk to each other. Specifically, the introduction of this technology will allow the application used in each logistic site to connect to the Internet and sends data to a platform. The server then retrieves that data, interprets it, performs the necessary actions and sends it back to the terminal. The application then interprets that data and presents the needed information in a compatible format.
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	Project design Tender Software upgrade
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	PNAEAS Customs Logistic operators
Timeline *Indicate the time horizon for the implementation of the action*	By 2028
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	80.000 euros

Sources of financing[6] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	PNAEAS and EU programs funds. The share covered by PNAEAS depends on the EU program that will -partially or fully- fund this action
Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	The implementation of the API technology to the data exchange will allow different subjects to directly exchange data without the need of further development. The goals reached within the pilot action developed with MCC, could be extended to all the logistic partners involved to reach the strategic goal n. 5, aiming to a "plug and play" interoperability with the ICT systems of future external ICT systems wishing to connect with the ports of Trieste
KPIs *Please identify the KPI to be used for measuring the action's impact*	Number of logistic partners using the API service

Action no. 7: *ICT assessment of the systems of the port of Monfalcone*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	Thanks to COMODALCE project and its pilot actions results, the importance of ICT systems to foster coordinated multimodal freight transport has been highlighted. In order to replicate this potential to other environment, it's critical to guarantee the cyber security of the ICT systems to protect data and processes. The first step to evaluate the actual status of the ICT infrastructures is based on an ICT assessment of the systems.
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	Project design Tender Software assessment
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	PNAEAS Customs Maritime Authority Border Police Logistic operators
Timeline *Indicate the time horizon for the implementation of the action*	By 2028
Investment cost	50.000 euros

[6] This information, if already available, could be assumed in the draft version and it has to be confirmed in the final one

How much will cost the construction/realization of the future initiative/action/technology?	
Sources of financing[7] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	PNAEAS and EU programs funds. The share covered by PNAEAS depends on the EU program that will -partially or fully- fund this action
Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	The assessment of the ICT system of the Port of Monfalcone represents the first step towards the Goal #6 – More Cybersecurity: Introduce all relevant new ICT technologies which might emerge that can improve the cybersecurity of all ICT systems in Port, particularly the critical ones.
KPIs *Please identify the KPI to be used for measuring the action's impact*	Number of security threats recognised

[7] This information, if already available, could be assumed in the draft version and it has to be confirmed in the final one

4. Conclusion

The vision of PNAEAS aims to reach a full-fledged development of the multimodal freight transport in the ports of Trieste and Monfalcone, steer the development of the port community by promoting technological innovation and boosting digital growth for a fully integrated supply chain, along with a continuous improvement of the ICT systems in order to make the port safer, more efficient and more sustainable.

Starting from this vision, six strategic goals have been defined.

According to the goals, an action plan has been evaluated to set up concrete actions capable to align our future ICT development with the vision and goals defined.

The Action Plan is based on 7 actions to be realised by 2030:

- Upgrade the gate control access for the ports of Trieste and Monfalcone
- Activation of PCS services in Monfalcone – evaluation survey
- Upgrade of the PCS app
- Evaluation study to implement the security by design paradigm
- Extension of the web service implemented in COMODALCE project to other dry ports
- Introduction of API technology to further extend the service implemented in COMODALCE
- ICT assessment of the systems of the port of Monfalcone

Upgrading the PCS to all the logistic infrastructures upon the competence of the PNAEAS, will harmonize the different rules currently defined in each site aiming to an increment in procedure's efficiency and, therefore, fostering the growth for the two ports and their dry ports as logistic "buffer areas".

Upgrading the gate control access system and the PCS app will improve the efficiency of the entry process to the port: this will lead positive benefits to the port community and will lower the costs and externalities of the "last mile" transportation.

Using the "security by design" technology for the future ICT systems will improve the cybersecurity and prevent critical situations which would have consequences to the ports operability and functionality. Avoiding these risks will improve the administrative and operational efficiency of the ports and logistic partners fostering the growth of traffics among the integrated supply chain.

Using ICT systems based on common standards and API technology will boost the interoperability of the platform, providing better efficiency among operators, ports and public authorities, with minor costs.

The action plan's vision is based on the following key words: #Neutrality, #Open-Source. #Interoperability. #Use of standards. All these key words are related to specific objectives that must be met to develop an ICT system to be shared and used by different operators, regional as well as European ones.

These actions, focused on ICT systems, have the main effect to reach a strong coordination and information exchange in the port-hinterland interface, providing a better coordination between all stakeholders and public authorities and, therefore, fostering a coordinated multimodal freight transport.

Such a vision considers the application and potential benefits for both the medium and long-distance rail transport and last mile road port-hinterland accessibility.