WP3: PORT LOGISTICS NEEDS ASSESSMENT

Analysis of the state of the art of IT process (D3.3.2)

for Port of Ploče Authority

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# Introduction

This report presents Territorial Needs Assessment with the analysis of bottlenecks related to port of Ploče and analysis on potential market flows of Port of Ploče.The report is carried out for the purpose of the elaboration of activities defined in the WP3 of the INTESA project related to Territorial Needs Assessment. Report is based on the bottleneck analysis of port of Ploče and its hinterland, according to approved methodology in WP3, collected data and through and comprehensive research.

Report represents analysis of port of Ploče itself, including its location, port facilities, processes, current situation of the port and competition analysis. Also, the whole hinterland bottlenecks were also examined, evaluated and presented, including road and rail border crossings. The report includes quantitative as well as qualitative description and explanation of the outputs.

Report is based also on potential market flows between port of Ploče and Italian ports collected data and through comprehensive research.

This report represents the analysis of port of Ploče itself, including its location, port facilities, processes and current situation of the port. Also, the analysis of existing and potential market is also examined, evaluated and presented, including projection of future traffic flows between Italian-Croatian ports. The report includes quantitative as well as qualitative description and explanation of the outputs.

# Analysis of IT Systems

Port of Ploče Authorithy has implemented a Port community system designed to support processes and stakeholders involved in cargo, vessel, truck announcing and other forwarder to port related operations. At present time there are two IT systems in use at port of Ploče community. A new PCS system and the system ECCOS used for recording persons accessing port area through Luka Ploče main gate.



Diagram 1: System overview and stakeholders interactions

As listed in table below, there are several stakeholders that have active role in processes connected to truck announcing procedures. However, there is a third system on port area in function of monitoring and video surveillance.

## 2.1 Involved parties and roles

On the basis of the common agreement between the project partners about the list of the processes which should be considered, the Port of Ploce Authority listed all stakeholders in the port community , divided them into the groups on the basis of the core business activity and then selected minimum one and in some processes even more representatives who were interviewed. The crucial criteria for the selection was the level of the involvement in relevant processes, then the size and volume of the activities, as well as the readiness to cooperate in the interview.

List of the stakeholders which are identified:

|  |  |  |  |
| --- | --- | --- | --- |
| Terminal operators | Forwarding agents | Public institutions | Port Security |
| 1. Luka Ploče d. d. 2. Adriatic Tank Terminal d.o.o. Ploče 3. NTF d.o.o. Ploče 4. Top Logistics d.o.o | 1. INA d.d. 2. Trans integral d.o.o. 3. Jadroagent d.d. Ploče 4. Adriatic Tank Terminal d.o.o. Ploče 5. Luka Šped d.o.o. 6. Ploče Šped d.o.o. 7. Petra Marina d.o.o | 1. Port of Ploce Authority 2. Customs | 1. Port security d.o.o. |

**Table 15 - PCS List of the stakeholders which are identified**

## 2.2 IT system in use

During analysis Port of Ploče Authority had two IT systems in use. The system for persons and vehicles access control into port of Ploče area, Technical security system and newly build, but not yet fully implemented IT system for broader port community, Port Community System Ploče.

### 2.2.1 PCS (Port Community System

Port Community System is a centralized and automated system for exchanging of information and documentation between organizations and marine transport authorities. It is based on data exchange automation opportunities and the known international standards and requirements of the port’s electronic interaction between the related organizations, systems and customers, transportation terminals, railway and customs administration. Part of PCS system is aimed at covering truck announcements. PCS as main system for all parties involved in port community has been planned to interact and exchange messages regarding truck announcements with Technical Security system used by Port Security.

Constructing modern port terminals, while maintaining the existing level of communication between the parties in the “port community” that is characterized by frequent untimely submission of information, the number of paper documents in which one information is entered several times, the lack of coordination and long duration of the procedures, could not result in full improvement of the efficiency and competitiveness of the port and the overall transport route. Therefore, Port of Ploče Authority decided to start activities on development of the PCS system of the port of Ploce*.*

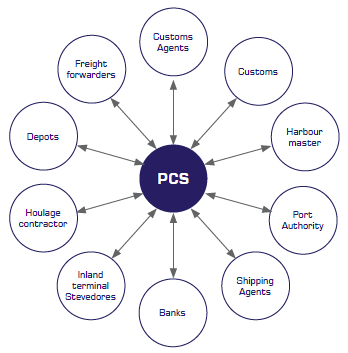
The objective of the PCS is to develop a centralized, web-based and intelligent electronic message switching facility between the all port community members. Through a web-based application all port stakeholders will be able to access to all relevant information in secure fashion. This would provide a single source and an integrated standardized process for data exchange with links to the systems of port stakeholders.

This integration and data exchange will show that different information systems in different port organizations can exchange data efficiently and provide benefit to whole port community.

Key drivers for the establishment of Port Community Systems were, on the one hand, the need for a standardized communication platform in order to improve the systems in terms of punctuality, reliability or costs and, on the other hand, the need to increase competitive position among ports.

A good collaboration with the key authorities, as well as with stakeholders, potential customers and local trade associations, was critical in the setting up of the respective PCS which were – and still are – implemented by means of special training and workshops with the end users.

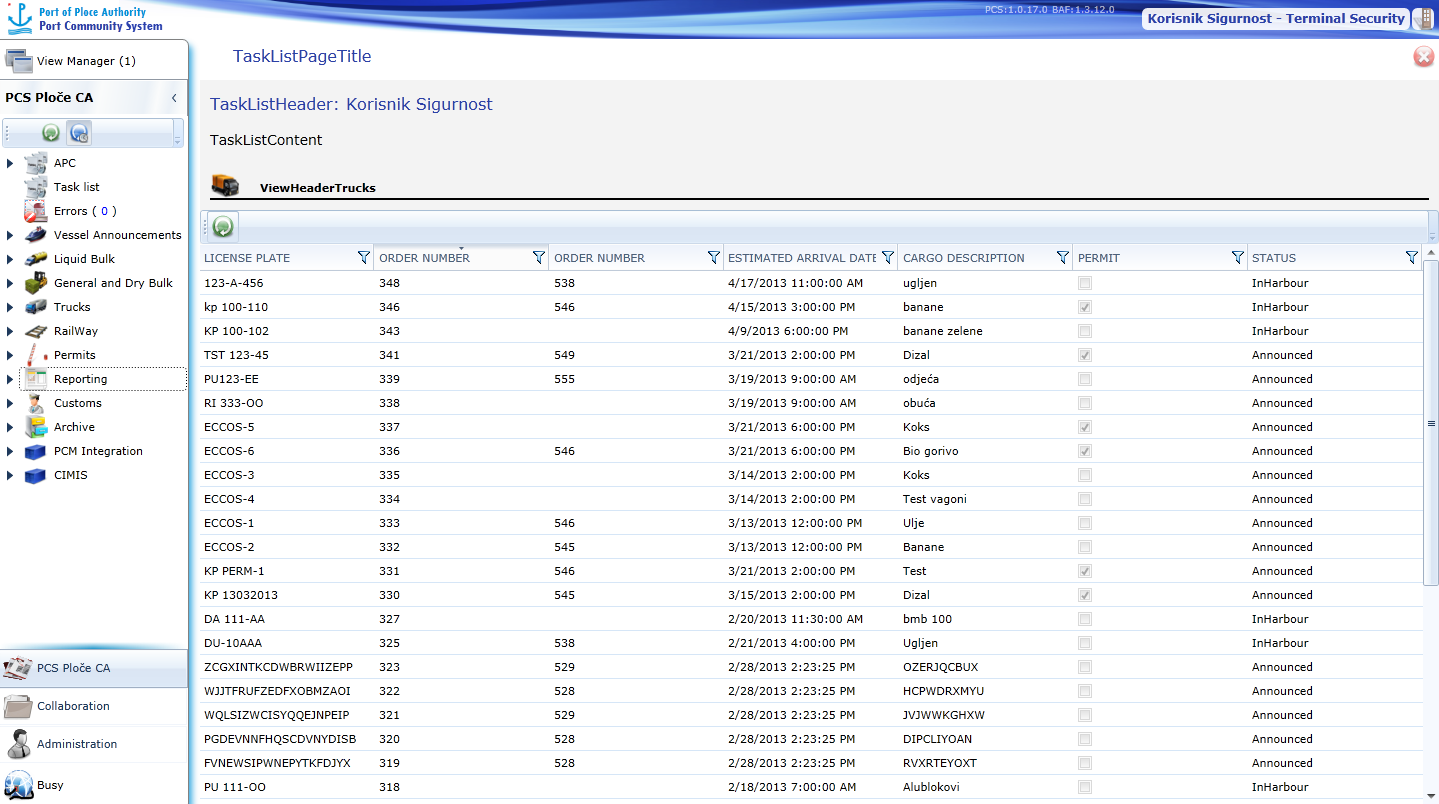
While target market areas differ widely in terms of existing IT infrastructure and use of  functionality, it is arguable that where little or no automated processes are in place either at frontier, port or fiscal and regulatory level, the PCS is ideally placed to form the foundation or backbone of the Single Window vision.



**Figure 22 - PPA Port Community System**

PCS is a centralized and automated system for exchanging of information and documentation between organizations and marine transport authorities. It is based on data exchange automation opportunities and the known international standards and requirements of the port’s electronic interaction between the related organizations, systems and customers, transportation terminals, railway and customs administration. Part of PCS system is aimed at covering truck announcements. Although the functionalities for truck announcement process are developed there is no agreement yet who will prepare the announcement. PCS as main system for all parties involved in port community has been planned to interact and exchange messages regarding truck announcements with Technical Security System.

After user login, the main screen appears:



**Figure 23 - PCS screen example #1**

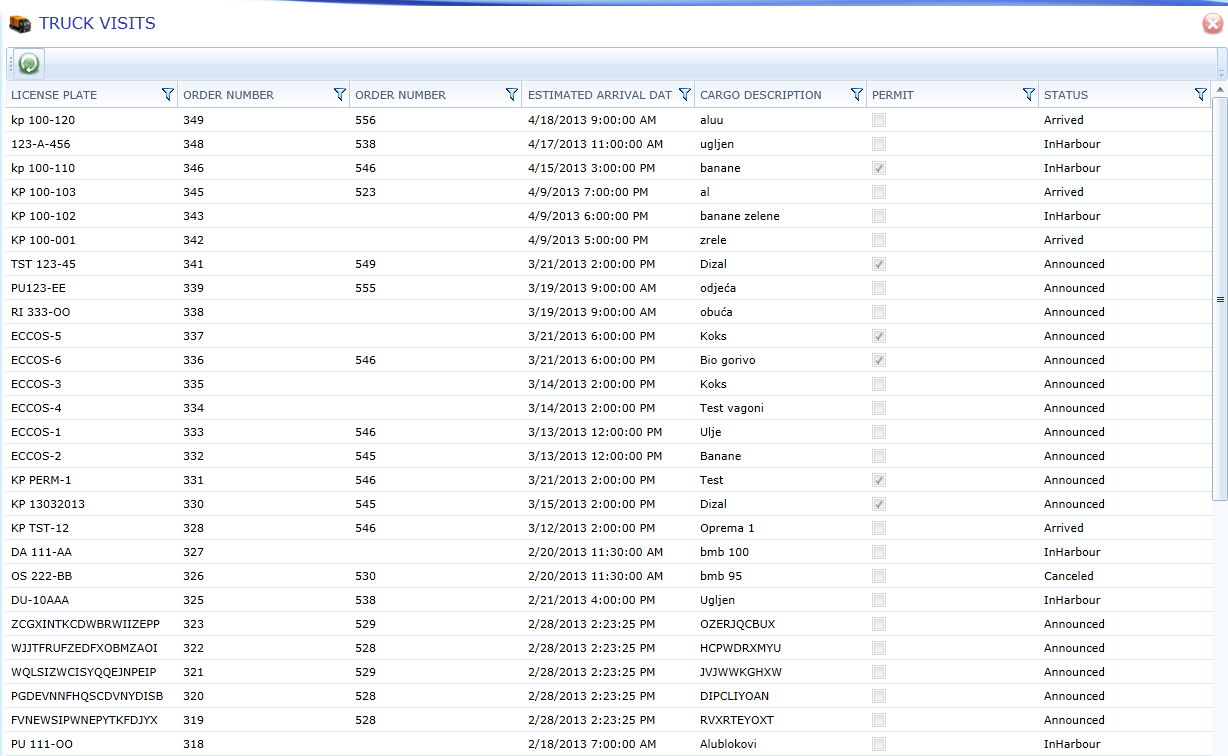
In PCS Menu there are different modules. Modules are APC, Vessel announcement, Liquid Bulk, General and Dry Bulk, Trucks, Railway, Permits, Reporting, Customs, Archive, PCM Integration, CIMIS.

Module APC is used to input data in IMO files.

Vessel announcement module enables working with vessel announcements, meaning that all action about vessel´s arrival and departure can be done by Vessel announcement module.

Liquid Bulk, General and Dry Bulk module enables working with dispositions (work orders). These modules also enable warehouse documents saving.

Trucks module enables working with truck announcements.



**Figure 24 - PCS Truck visit screen**

If user selects one of the truck announcements, selected truck announcement screen will appear.

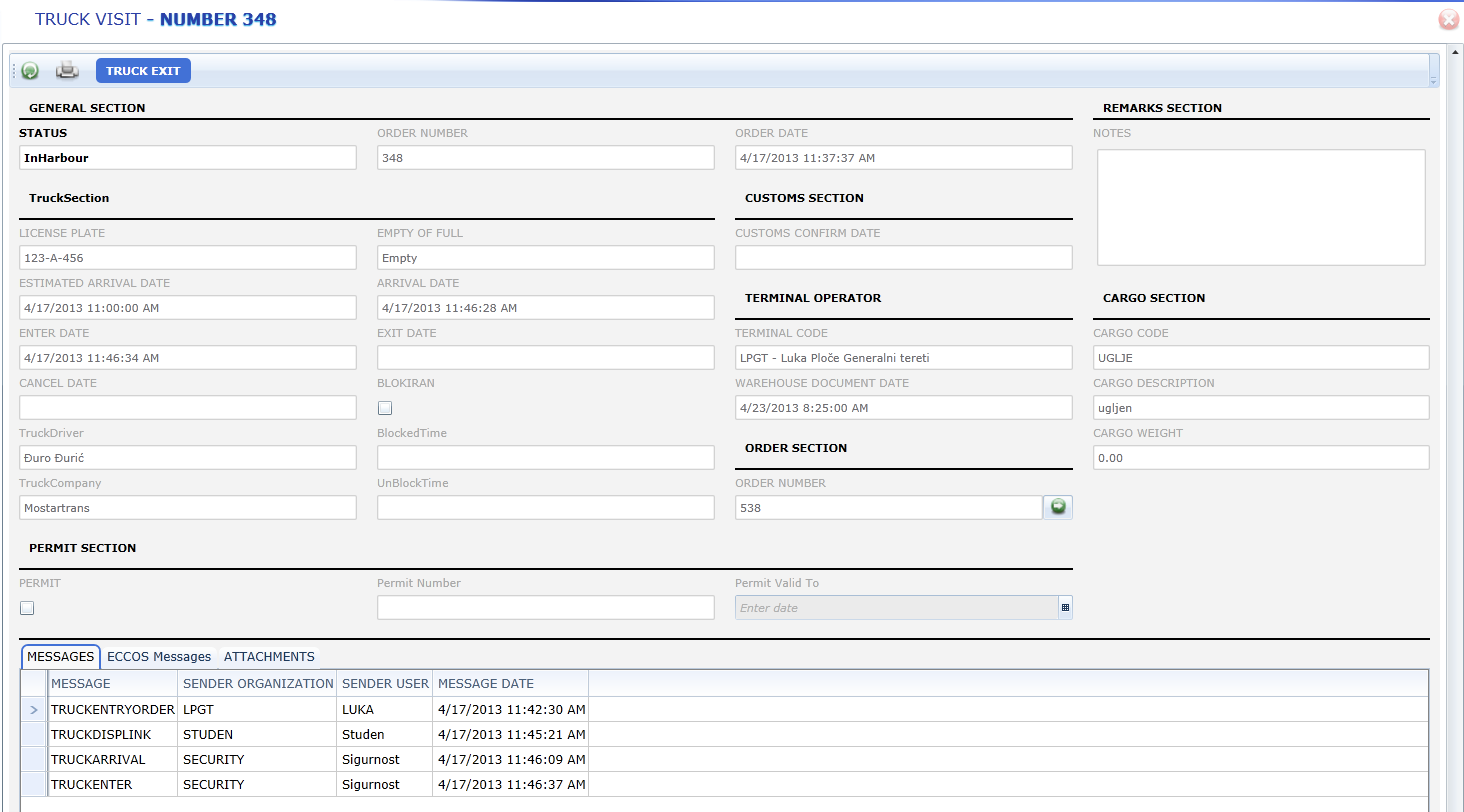


Figure 25 - Detailes of the truck visit screen PCS

Truck announcement screen contains all necessary information about truck.

Railway module enables working with wagon announcements.

Permits module enables working with vehicle permits. Vehicle permits can be issued, modified, printed and saved.

Reporting module is used to save or print different reports, such as Customs report, Cargo report, Vessel report.

Customs module enables customs to search different documents, such as warehouse documents, No obstacles documents, etc.

PCM module is used for all action regarding containers.

CIMIS module is connected with the Croatian Ministry of maritime affairs, transport and infrastructure.

### 2.2.2 Technical Security System

System used by the Port security company to record and control all persons entering and exiting the port area. Port security officer is manually entering data into system. Each person entering the port area has to be recorder in system. In case person is entering with vehicle the license plates and company names are added to driver data.

Port security officer is able to search through history and is able to monitor how many vehicles are present on port area. However, there is no toll to monitor or to keep track of where those vehicles are. Through system the officer is able only to see when each vehicle or person has entered through main gate and when each vehicle or person has exited through main gate. There is no option to keep a record when a vehicle has arrived at external or internal parking, neither when a vehicle has arrived at dedicates quay or port terminal.

In conclusion, system provides limited report options to port security offices that are in charge of providing security. Based on different interviews the officer did not express any concerns regarding different report as there is no need to issue any truck or persons visits reports, congestion reports or to keep statistics about vehicles and pedestrians entering the port area.

## Identification of the main changes and improvements

### General Procedure Requirement

1. **Automation procedures and information exchange**:

* All data will be entered only once into the system;
* Implementation of recognition systems (truck plate recognition, driver licence recognition...);
* Automation of ramp (automatic rise, block...).

1. **Information/data exchange** between different information systems has to be made where reasonable. With information exchange between AGS and PCS can improve process execution, data reliability and single entry of data.
2. **External park lots** - there will be a quick enter process on the external entrance gate; when the truck arrives at the external entrance gate, plate recognition system will recognize truck plates; driver takes the PIN 1 barcode list or show RFID device, and the gate will open. If plate recognition system will not recognize truck plate, entrance procedure is same (truck driver always takes the PIN 1 barcode list) and the gate opens. Daily entrance vehicle permits will be payed at the kiosk. After the driver documents are scanned, and all other documents for entering are prepared, driver will pay the vehicle daily permit by inserting the PIN1 into Kiosk. The truck driver will pay the parking fee only if the truck is parked more than 3 hours in the external parking lot. The parking fee will also be paid at the kiosk by inserting the PIN1. PIN1 barcode ticket or RFID card will “carry” all the data about truck, driver, vehicle permit, and driver ID.
3. **Entrance/exit point** – officers order at port entrance is police, customs, port security. At the port entrance point there are plate recognition system and video surveillance.
4. **Tracking truck all-over the port area** – at the entrance truck driver receive RFID device and all trucks will be tracked inside the port area using plate recognition system and RFID devices.

### Renewed process (use cases)

The information collected prior to the arrival of the vehicle at the port and during the completion of its job inside the port is used to provide the customs police with as many details as possible regarding the goods in transit and supporting documents (especially customs documents). The customs police can make any additional checks on the basis of this information rather than on the basis of further paper documents the truck driver can exhibit.

Alongside the “logistic” checks to establish the feasibility of vehicle jobs, the port entrances also have to perform security checks. The integration of these two processes and of their supporting systems improves reciprocal efficiency and effectiveness and speeds up vehicle transit operations.

All truck and goods entry or exit from harbour must be preceded with approved announcement, declaring:

* The plate number of the incoming/exiting vehicle
* The driver’s identity (name, surname)
* The terminal operator at which loading or unloading operations are to be performed
* The type of operation to perform and details of the goods being transported

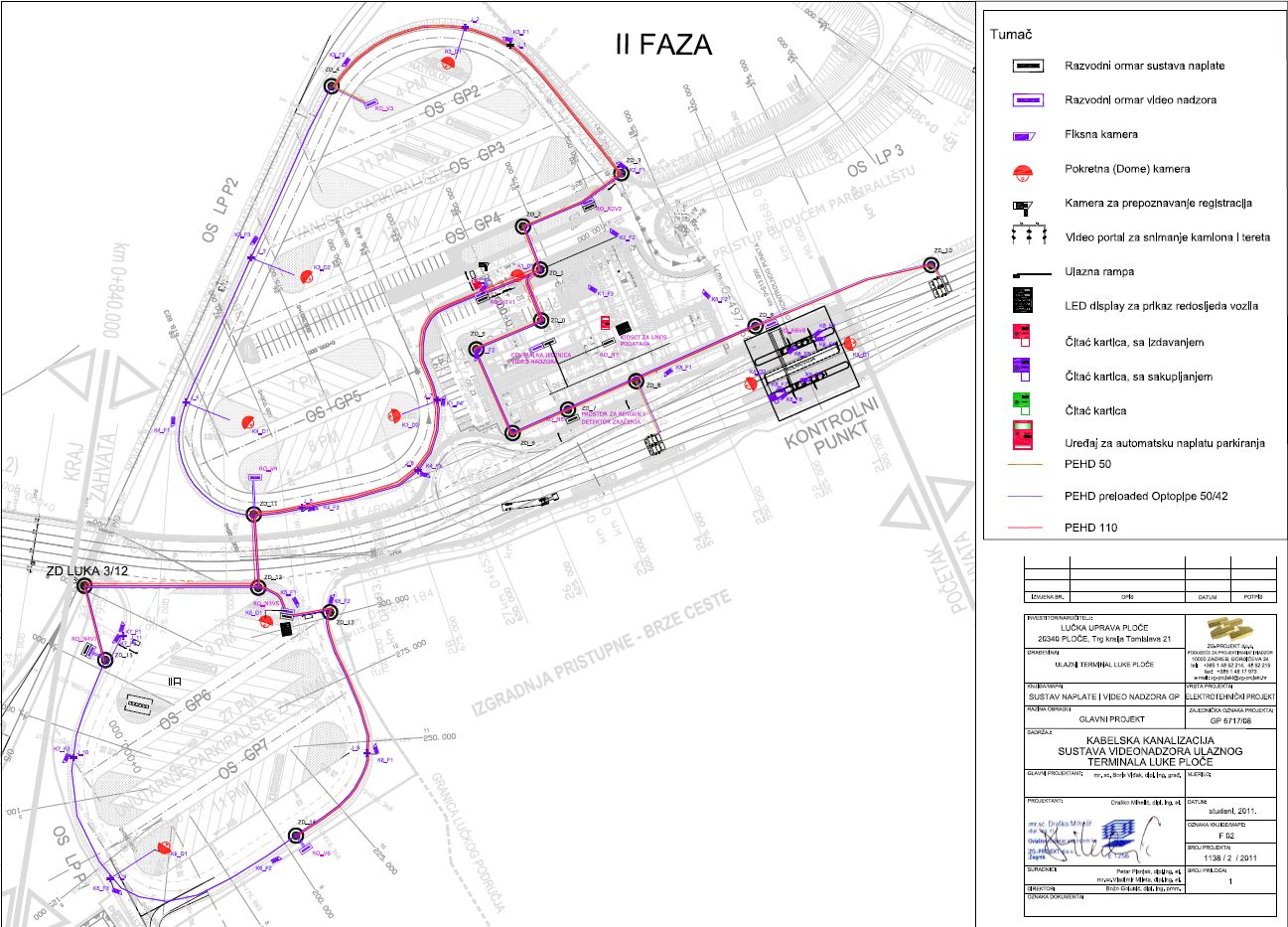
Conditions for a truck to enter a port area are:

* **A truck must have an announcement**
* **A truck must pay an entry permit (daily, half-annual or annual)**
* **A truck must have a terminal confirmation for entrance**

The following figure summarizes the operative moments at the port gate supported by Automatic Gate System and the events that determine the information exchange inside the port areas.



**Figure 26 - Entrance and exit process**



**Figure 27 - New entrance technological schema**

## External parking lots

### Arrival and entrance to external parking lots

Process requirements for entrance at external parking lots is that the truck entrance must be as quick as possible. Minimal identification data have to be collected at entry gate. The truck arrives at the entry gate (an entry barrier on external parking lots).

### Identifying the vehicle

When the truck arrives in front of entry barrier of external parking lots the induction loop under truck activate the ANPR and ADR system.

The ANPR camera takes a snapshot of the truck plate. The information system recognises the truck plate number and sends it to AGS system. If the truck announcement exists for the scanned truck plate number, plate data are combined with the truck announcement in AGS system.

At the same time the ADR system recognises dangerous cargo code and send information to AGS system. In case the truck driver already has a temporary RFID device (annually or half annual entry permit) there is no need for PIN1 ticket. The driver just reads his RFID card (instead of take PIN1 ticket) and RFID data are joined in truck announcement, plate data and ADR data. Semaphore green light will be turned on, gates will open, truck enters on external parking lots.

If there is some problems and green light not lights (lights red light), the driver can use the Intercom device for communicating with Info desk. For example, when maximum allowed dangerous cargo on parking is reached, truck enters with dangerous cargo is not allowed.

When a visitor approaches to external parking gate, OCR system will take a snapshot of vehicle plates. After successfully recognition process on semaphore lights green light.



**Figure 28 - Entrance procedure on external parking lots - sequence diagram**

### Identifying the truck driver and visitor

Truck driver goes to the Kiosk. Put the PIN1 ticket or temporary RFID card into the kiosk slot and choose if he is a truck driver or a visitor.

If a truck has a half-annual or annual permit, driver puts an RFID card into the kiosk slot, and proceeds with identifying procedure.

In case the truck plate was not correctly recognised at the entry gate, the driver has to manually input or correct the plate number. Plate number data inserted by the driver is then combined with the truck announcement and linked to PIN1 ticket ID (or to temporary RFID card).

### Pay the parking fee and daily truck entry permit

Once there is a valid announcement and the driver checked, the driver can pay daily entry permit for the vehicle at a Kiosk. On the screen, choose entry permit options. A daily permit fee can be paid at Kiosk with credit card or cash.

If the truck driver uses valid temporary permit (RFID card) at Kiosk the system show entry permit expires date.

If the truck is parked more than three hour on external lots also parking fee has to be paid.



**Figure 29 - Identifying driver, vehicle and bill procedures – sequence diagram**

### Arrange other documents

Before exiting the external parking, lots and enter in harbor driver has to arrange all necessary documents (customs check disposition...).

The driver can watch his status on the Info panel, which is located in the building of truck terminal and on external parking lots.

An example of the Info panel is on the picture below.



**Figure 30 - Info panel**

**Note:** If “Parking” red light is on, truck´s queue will not change. If a truck is on the top of the list, truck can enter first, but Parking red light is a piece of information for driver, meaning that parking must be paid before exit of external parking lots.





**Figure 31 - Entrance at external parking lots – process chart**

### Exit from external parking lots

When all conditions are fulfilled and truck is for entering in harbor, the truck approaches the exit ramp from parking.

When the truck arrives in front of exit barrier the induction loop under truck activate the ANPR system and truck plate are once more read by OCR.

If the truck has a daily permit, driver reads the PIN1 ticket barcode and if parking fee is arranged semaphore green light is on and gates open.

If the truck has a temporary permit (half-annual or annual), the driver reads an RFID card, semaphore green light is on and gates open.

If there is some problems and green light not lights (lights red light), the driver can use the Intercom device for communicating with Info desk.

Parking building employees (ship agents, forwarders, custom officers, LUP officers…) exit the external parking lots with their RFID device.

Visitors exit the external parking lots with PIN1 ticket given at the entrance. When a visitors' car arrives in front of exit barrier, the induction loop under vehicle activates the ANPR system, vehicle plates are read by OCR. Driver of the visitor's vehicle reads the PIN1 ticket and if parking fee is arranged semaphore green light is on, the gate opens.



**Figure 32 - Exit procedure from external parking lots - sequence diagram**



**Figure 33 - Exit from external parking lots – process chart**

### Vehicles entering in the harbour

Between external parking lots and port entry point, there will be a **Video portal** for the truck all side pictures. Video portal will be placed on both truck entry lanes. At the top of video portal will be placed **Info semaphore**, which indicate if the lane is open or close (red cross or green light). When a truck passes the induction loop, snapshots of truck plates (front and rear) and truck front, back, top and side are taken. Also, an ADR label of dangerous cargo is recorded. All pictures and ADR label is stored in an information system under truck plate number (and pin to PIN1 ticket label).

**Note**: When truck pass Video portal driving speed is limited at 30 km/h. At the front of Video portal can be placed traffic sign for limited speed. When the truck arrives at Video portal and the OCR plate number is made, employers at entry gate are alerted of truck arrival and all information and picture of the scanned truck plate are available. Between video portal and entry gate the truck entry order (truck overtaking) or drive lane must not be modified.

Truck stop before the first entry gate ramp and driver is first checked by Port Police (valid driver licence, passport...). If there is no problem policeman rise first ramp and truck can proceed and stop at the second ramp. Then Custom check truck cargo and if allowed truck entrance in port acknowledge the approval in the PCS system (Block/Unblock message). The driver gives a PIN1 ticket to the Port Security employee. Using barcode reader and AGS information system he checks out if all requirements are fulfilled. If all conditions are satisfied Security employee paired PIN1 ticket ID with the new RFID card ID.

Port Security employee retrieves PIN1 ticket and gives the RFID device to the driver.

**Note**: If truck driver already has an RFID card (temporary entry permit) the Security officer checks the RFID data.

Then Port Security officer opens the gate, and the truck enters the port area.

Immediately after the entrance in port area the radiation detection device will scan the truck (radiation detection device is installed immediately after port entrance). Radiation detection device is not connected to information system and in case of detection of the radiation red lamp will flash and audio signal will be emitted.

If any problem arise and truck not have permission to enter the harbour area the Security employer rise entry ramp and allow the truck controlled turns and immediately leave the port area.



**Figure 34 - Entrance procedure in harbour area - sequence diagram**



**Figure 35 - Enter in harbour – process chart**

### Arrival on harbour exit point and exit procedures

In harbor area are made cargo manipulations (load or unload cargo). After manipulations ended truck has to leave harbor area. If Custom check or other exit procedures are needed truck must stop on internal parking lots. Trucks approach the internal parking lots ramp and when overpass the induction loop OCR of truck plate is taken. Using RFID card raises the entrance ramp.

After arranging exit documents and custom check the truck leaves the internal parking.

Truck approaches the exit ramp from internal parking lots and when overpasses the induction loop, OCR of track plate is taken and using RFID device raise exit ramp.

If there is some problems green light not lights (lights red light) and ramp does not rise, the driver can use the Intercom device for communicating with Port Security. It here is some problems truck driver can arrange it while staying on internal parking, so the possible traffic congestion at the exit harbor gate is minimized.

Before the truck reaches the port exit gate it has to pass through **Video portal**. Video portal will be placed on both truck exit lanes.

At the top of video portal will be placed **Info semaphore**, which indicate if the lane is open or close (red cross or green light).

When a truck passes the induction loop, snapshots of truck plate and truck front, back, top and side are taken. Also, an ADR label of dangerous cargo is recorded. All pictures and ADR label is stored in the AGS system under truck plate number (and pin to RFID card label).

**Note**: When truck pass Video portal driving speed is limited at 30 km/h. At the front of Video portal can be placed traffic sign for limited speed

When the truck arrives at Video portal and the OCR number plate is taken, employers at exit gate are alerted of truck arrival and all information and picture of the scanned truck plate are available. Between video portal and entry gate the truck entry order (truck overtaking) or drive lane must not be modified.

The radiation detection device will scan the truck before the exit port area (detection device is installed immediately before the port exit). Radiation detection device is not connected to information system and in case of detection of the radiation red lamp will flash and audio signal will be emitted.

Then the truck reaches the exit gate.

If the truck plate number is not correctly recognized truck driver has to put an RFID card near an exit gate reader. If all exit conditions are met green light lights. If there is any unfulfilled requirement and green light not lights (lights red light), the driver can use the Intercom device for communicating with Port Security.

For temporary and permanent permit (port employers, annual permit...) exit gate bar rises when green light lights.

For daily entrance permit truck driver has to drop an RFID card in exit gate box and exit gate bar rises. The truck can leave harbor area.



**Figure 36 - Exit procedure from harbor area - sequence diagram**



**Figure 37 - Exit from harbour – process chart**

## Suggestions summary:

* Vehicle permits are no longer printed, that is physically no longer exist.
* Permits for persons no longer printed, that is physically no longer exist.
* Parking on external parking lots is not paid for the first 3 hours.

## Definition of gate in/out scenario for solving bottlenecks

### 13.6.1 Automatic Gate System (AGS)

The AGS system manages the security of the transits through the port gates with different managing levels:

* It controls permissions at the field devices in the port gates: barriers, traffic lights, bar code, RFID readers;
* Is connected with Kiosk and Event display to provide and get necessary data;
* Collects the data of the users and vehicles to which an access license is issued and the authorization levels;
* Exchange data with other IS systems (PCS, VCPS...)
* Exchange data with other platforms (Port Community. TOS, Maritime window)

Actually, is in the use VCPS system, which provides basic functionality for entrance control (licence plate recognition, RFID or automatic gate bare is in use).

The AGS system manages the security of the transits through the main port gates with different managing levels:

1. it controls permissions at the field devices in the port gates: barriers, traffic lights, bar code, RFID readers;
2. is connected with Kiosk and Event display to provide and get necessary data;
3. Collects the data of the users and vehicles to which an access license is issued and the authorization levels;
4. Exchange data with other IS systems (PCS, VCPS...)

Existing surveillance information system and VCPS system have to be evaluated if they meet new operability and extension requirements.

Automatic Gate System controls entrance on port and based on results of processes exchange information with other platforms in port community

### 13.6.2 Interaction with Other information systems and platforms

VCPS and AGS must be integrated with other information systems in Luka Ploče where is reasonable. With information exchange between AGS and other IS can improve process execution, data reliability and single entry of data.

The AGS system must be integrated with PCS system. PCS system is in use basically for port business documents storage and process handling. Integration between AGS and PCS must be established for truck announcement, dispositions and customs approval. Truck announcement, dispositions and customs approval will be handled in PCS system, AGS system will only read data from PCS. Key identification element will be truck plate number.

Integration between code lists will be made according to the principle that PCS code list is principal and all new entry and update has to be made in PCS system. Only code lists, which are unique to AGS system will be arranged in AGS system.

Integration is made with Web services technology and SOA architecture.



**Figure 38 - AGS interaction with other information systems**

### 13.6.3 Integrating AGS and PCS

The table below shows connection between AGS and PCS



**Figure 39 - Integration between AG Sand PCS – Message flows**

A Truck Announcement message is made in the PCS and is sent to the AGS. The truck announcement has **Announce** status since the vehicle has not yet arrived at the external parking lot. Truck Announcement messages can be updated by the AGS system (Licence plate, Truck Driver, Truck Company, other relevant data), however, when updated, the truck announcement does not change the status. When the truck enters at external parking lots, AGS will send a message to PCS and the status of the truck announcement is changed to **Arrive**. When the truck comes in front of the port entrance, customs may block the truck (when documents are cleared, customs will unblock the ruck and the driver will be able to enter the port area). Both messages (**Block/ Unblock**) will be sent from PCS to AGS. When truck enters in the port area, the AGS will send a message to the PCS. The truck announcement in the PCS will change from Arrived to In Harbour. Upon exit, customs may block the truck. After the customs check is performed, the truck driver will be unblocked. Both messages (block/unblock) will be sent from the PCS to the AGS. When the truck exits the port area, the AGS will send a message to the PCS, and the announcement status in the PCS will change to **Departed**.

### 13.6.4 Example of PCS message specification

1. *Truck announcement*

|  |  |
| --- | --- |
| TruckAnnouncementId | integer |
| OrderNumber | string |
| OrderDate | DateTime |
| TerminalOperator | string |
| EstimatedArrivalDate | DateTime |
| LicensePlate | string |
| TruckDriver | string |
| TruckCompany | string |
| EmptyOrFull | WSEmptyOrFull |
| DispositionCode | string |
| CargoCode | string |
| CargoText | string |
| CargoWeight | Nullable<decimal> |
| PermitNumber | string |
| PermitValidTo | DateTime (nullable) |
| HasPermit | Boolean |

This message is made in the PCS system and is sent to the AGS system before a truck arrives. This message can be updated in the PCS system. All updates are sent to the AGS system. Updates are allowed until a truck arrives at the external parking gate.

1. *Truck Arrival*

|  |  |
| --- | --- |
| TruckAnnouncementId | integer |
| LicensePlate | string |
| TruckDriver | string |
| ArrivalTime | DateTime |

This message is made in AGS system and is sent to PCS system. When a truck arrives at external parking lots enter the gate, the AGS sends the message to the PCS system. This message can be updated in AGS system. All updates are sent to PCS system.

1. *Customs Block*

|  |  |
| --- | --- |
| TruckAnnouncementId | integer |
| LicensePlate | string |
| BlockTime | DateTime |

If full truck is entering port area, or full truck is exiting the port area, at port area check point, custom will block truck.This message is made in the PCS system, and is sent to the AGS system.

1. *Customs UnBlock*

|  |  |
| --- | --- |
| TruckAnnouncementId | integer |
| LicensePlate | string |
| UnBlockTime | DateTime |

When customs clearance is done, the UnBlock message sent from the PCS to the AGS system.

1. *Truck Enter*

|  |  |
| --- | --- |
| TruckAnnouncementId | integer |
| LicensePlate | string |
| EnterTime | DateTime |

This message is made in the AGS system and is sent to the PCS system. When a truck passes police control and checks, security officer checks truck data. After security checks, security officer opens port area entrance gate, and message Truck enter is made.

1. *Truck Exit*

|  |  |
| --- | --- |
| TruckAnnouncementId | integer |
| TruckLicensePlate | string |
| ExitTime | DateTime |

After all exit checks, truck approaches the port area exit gate. Truck driver opens exit gate, and message the Truck Exit is made. The truck exit message is mad at AGS system and is sent to PCS system.

If the Video portal has a power failure it will be not possible to capture licence plate number, vehicle pictures and other video material. We assume that this is not critical procedures and all data shall be entered later into the AGS system.

At the entrance in the harbour area Port Security officer checks paper form and manually raises entrance ramp.

At the internal parking lot customs officer shall manually raise and lower the exit ramp.

At the exit gate from harbour a Port Security Officer takes paper form from the truck driver, fills the exit hour and raises the exit ramp. All collected paper forms will be taken to the Info desk, so the Info desk employee is able to enter data in an information system.

In special case, when truck enters regularly with the daily RFID card, Security take the RFID card and raises the exit ramp. If information system works normally Security scans the RFID card and fills in the truck exit date.

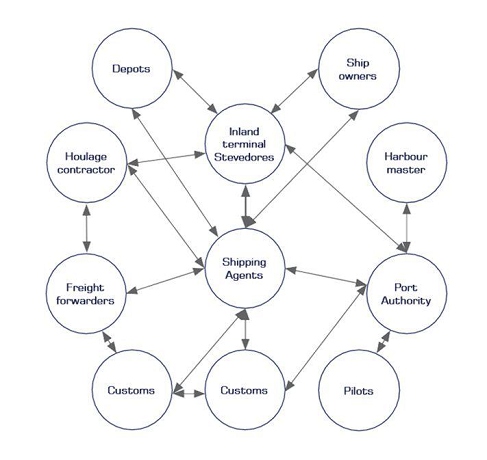
## Port Community System

There is no use of unified port system with ability to exchange all relevant information between port stakeholders and between ports.

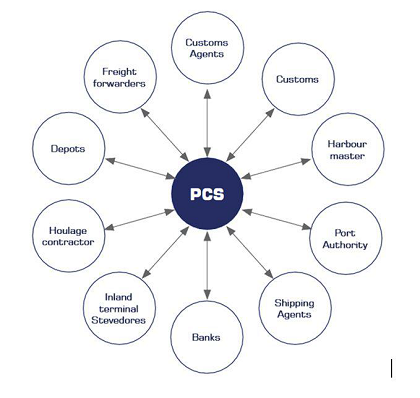
A Port Community System (PCS) is a neutral and open electronic platform enabling intelligent and secure exchange of information between public and private stakeholders in order to improve the competitive position of the sea and air ports communities; Use of Port Community System optimizes, manages and automates port and logistics processes through a single submission of data, connecting transport and logistics chains. PCS is an electronic platform that connects the multiple systems operated by many different organizations that make up a seaport community. PCS is used to standardize message exchange among port community members and centralize all port community information as much as possible.

### Why Port Community System?

In ports without the PCS every port community member (company) sends its information to any other member, who wants or needs the information. The information is sent through fax, email, Electronic Data Interchange (EDI), ordinary mail and telephone. This way every port community member has its own bi-directional lines and sends the same information to all those members who need it (Picture bellow)



When a PCS is used, port community members sends their information to a central system where other involved members get the information they need, either through searching up in the system or the system itself sends the requested information to the eligible member. PCS improves the communication efficiency and effectiveness in the port (picture bellow). Port Community Systems can also be used for inland shipping, intermodal ports, or other kind of transport, so it does not concern only sea born transport.



It is very important for ports and port communities to implement solutions which will improve their competitiveness. The PCS is such a solution.

It is expected that PCS will give the following benefits to the stakeholders:

* A single source of information, integrated and standardized platform for meeting the requirements of all members of port community;
* Provides an e-commerce platform;
* Provide adequate, accurate and timely information;
* Speeds the response time of stakeholders to their customers;
* Improve track and trace efficiency;
* Provide shipment/service visibility;
* Generate alerts about delays or problems;
* Enable moving towards similar procedures across all communities;
* Provide opportunities for re-engineering and adopting best practices;
* Easily accessible and secure;
* Easy to learn, operate and support;
* Reduce the usage of paper documents and forms;
* Automation of business workflows and processes;
* Enhanced data security through access management;
* Increased transparency;
* Better information quality;

### **Modularity of PCS system**

A PCS is a modular system with functionality designed to provide all the various sectors and players within a port community environment with tools specific to them, thus delivering a tightly integrated system. Developed for port users by port users, a PCS encompasses exports, imports, transshipments, consolidations, hazardous cargo and maritime statistics reporting. PCS provide a huge range of services and key features:

* Easy, fast and efficient EDI information exchange, re-use and centralization, available 24/7/365;
* Customs declarations;
* Electronic handling of all information regarding import and export of containerized, general and bulk cargo;
* Status information and control, tracking and tracing through the whole logistics chain;
* Processing of dangerous goods;
* Processing of maritime and other statistics;

Members of the Port Community:

* Carriers,
* Customs,
* Environment Agency,
* Fire Brigade,
* Forestry Commission,
* Forwarding agents,
* Hauling companies,
* Importers & Exporters,
* Freight services,
* IT systems,
* Maritime Police,
* Packers,
* Plant Health,
* Port Authorities,
* Port Health,
* Port State Control,
* Quay operators,
* Railway operators,
* Ship operators,
* Ship owners,
* Shipping agents,
* Shipping Lines,
* Statistics Service,
* Stevedores
* Terminals,
* Veterinary Office,
* Warehouse,
* Pilots,

PCS in different ports are not the same, as the PCS‟s functionality depends on the local characteristics of the port. The PCS is determined by the operation of a port and this is determined by the location of the port and its surrounding. Furthermore, the functionality of a PCS depends on the initiators of the system as they have a large influence on the development of the system. In short, a PCS can be described as a central point for an organization to deliver or receive information. In smaller port communities, PCS tend to serve as extensions to the in-house systems of major players, offering company-specific applications. In large ports, however, they have a more neutral role as a true information broker.

Regardless of the size of the port it is very important that members of the port community agree on the systems requirements. A true sense of community and a general feeling of involvement need to be established. Different prerequisites and interests of e.g. major multi-national companies and one-person service providers need to be overcome. The success of a PCS can only be maximized if all member groups of the port community realize benefits and thus share information. A PCS also should not duplicate functions that are already existent in other systems, but rather focus on general operational processes. It is also very important that sensitive information in the PCS is safeguarded.

### **Improvements by using PCS system**

PCS can improve many parts of the processes in the port:

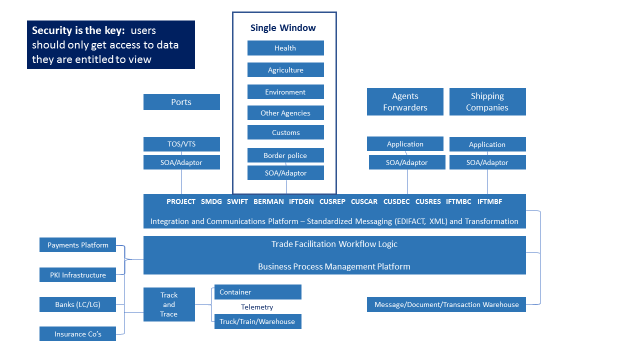
* Reporting to authorities is simplified. Information is distributed to the respective authorities in compliance with effective directives (very important because supply chain performance is increasingly driven by governmental regulations);
* Coordination of operations is enhanced at the physical, information, and financial layer. This means that cooperating and competing firms are bound together. PCSs enhance the efficiency and effectiveness of interactions between port community members and thus help to reduce processing costs by providing a central information network which increases visibility and data quality;
* better data quality:
* The intrinsic category of data quality is related to data accuracy, objectivity, and reputation. PCSs enhance the accuracy of information by checking for input mistakes.
* Data accessibility is enhanced by centralizing community information as much as possible. The structured approach of information exchange via PCSs is better than information exchange through informal information channels. Information is detached from personal communication and thus made available on a 24/7 basis. PCSs also ensure data security by managing access rights and tracing unauthorized access attempts. Information is only made available to authorized members of the port community.
* The contextual category of data quality comprises the dimensions of data relevancy, timeliness, completeness, and data complexity. Besides assuring accuracy, input validations performed by PCSs also enhance data relevancy and completeness. PCSs also help to reduce data complexity by capturing information once and reusing it for different applications, so the need to re-type data can be avoided (“single submission”). Information also becomes more transparent because changes can be traced back to individual organizations or users. Regarding data processing, PCSs can enhance the automation of core workflows and processes based on captured information.
* Representational data quality. Its main dimensions are data interpretability, ease of understanding, concise presentation, and consistent representation. PCSs standardize the message exchange among port community members. All companies involved use the same language in terms of data formats and transmitting services.
* Possibility to launch alert messages/status reports;
* Possibility to implement collaborative planning;
* Higher efficiency and speed regarding port processes for all parties involved;
* Reduction of paperwork. In this way, PCSs contribute to sustainable transport logistics and support the ambitions to meet global carbon reduction requirements.

Using electronic data exchange, the PCS is an effective real-time information system; fast, focused, flexible and multi-faceted, it aims to improve efficiency at all stages of the process of manifesting, through vessel discharge and loading, Customs clearance, port health formalities and delivery in and out of the terminal. PCS offers also improved security, cost reduction and potentially more competitiveness for each user.

### 2.7.4 PCS architecture

The port community is a large community with many stakeholders, and variety of IT systems in place, supporting different administrative and business functions. The Port Community System (PCS) aims at connecting them together, by establishing a unified platform for exchanging information, taking into consideration strict security standards.

An outline of the PCS architecture, according to the best practices, is given below.



**Figure 40 - PCS architecture - best practice**

#### 13.7.4.1 PCS architectural models

The PCS architectural solution can be implemented as one of the 3 e-collaboration models, or their combination:

* **Bilateral Information Model (BIM).** In this model, information is exchanged directly between the different actors on a bilateral basis.
* **Centralized Information Model (CIM).** In this model, data is stored at a central information service provider. Information can be retrieved from this central information service provider by trading partners that have the right to do so.
* **Decentralized Information Model (DIM).** In this model, data is stored and controlled by each individual party. A broker service can help in retrieving the information from the right source.

#### 13.7.4.2 Recent PCS model developments

In addition to the information models mentioned above, Srour et al. (2007) introduced a modular distributed plug & play architecture which purpose is to offer actors a simple way to integrate themselves as a part of the network without months of hard integration work. This can be implemented by using Web Services technologies that make it possible to form interoperable *machine-to-machine* interaction over a network (W3C 2004). These kinds of PCSs have not been truly established yet but a collection of initiatives and plans that focus on realizing fast connect capabilities within a supply chain are under development (Srour et al. 2007).

## CIMIS (MNSW)

CIMIS is the unique MSW (Maritime Single Window) system that implements all national level processes related to the administrative aspect and aspect of navigation safety. The role of the CIMIS system is to manage, store, and provide master data (MDMs) such as ship code (NIB and IMO numbers), ports, berths, anchors, agents, shipping, and so on. Croatian Ministry of the Sea, Transport and Infrastructure (MMPI) has developed advanced IT platform CIMIS (Croatian Integrated Maritime Information System) in order to enhance electronic delivery and exchange of data about ships, cargo and passengers in official administrative procedures related to ship's announcement, arrival and departure.

# Conclusion

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Port of Ploče is one of Croatian biggest ports. It is located near the mouth of the Neretva river on the Adriatic Sea coast. As of 2018, it ranked as the second largest cargo port in Croatia — after the Port of Rijeka — with a cargo throughput of 3.3 million tons, consisting mostly of liquid and dry bulk cargo. Based on the analysis it is determined that almost all parameters within road network meet ports requirements.

The port of Ploče is the first/last node of the supply chain on the southern part of Corridor Vc. The investments in the bulk terminal, the container terminal and other areas have improved the port’s physical capacity and efficiency. However, it cannot be considered independently from the corridor itself where 90 percent or more of the traffic is carried on Corridor Vc. From customers’ perspective, where the time is spent on the corridor, whether in actual transportation time or handling and processing at a port/border/marshalling yard, is irrelevant. What matters is the ability of the corridor to deliver reliable and price-competitive logistics services in a seamless manner.

Since the inception of the Trade and Transport Integration Project in 2006, there have been economic disruptions, market changes, containerization has become important, but rail infrastructure in Bosnia and Herzegovina (BiH) still has important bottlenecks, in particular for container transport, and the rail market, in particular access to the network by third parties is not yet possible in BiH and has not been experienced in the Croatian part, although it is legally possible. In 2013, Croatia entered the European Union, resulting in new customs challenges for trade with non-EU member state such as BiH at border crossing points for road and rail. Therefore, a paper updating the trade and transport issues would be helpful in identifying issues to be address in the realization of the project development objective.

Although it is difficult to regulate and coordinate processes between Croatia and BiH, even more because Croatia is an EU member state and BiH is not, Port of Ploče Authority should aim to achieve even bigger lever of coordination and cooperation, in order to promote the Corridor Vc and remove as many bottlenecks as possible.

Existin cargo traffic flows between port of Ploče and Italy are significant, there are big possibilities for improvement of passenger traffic flows. The main opportunity is to establish a permanent direct fast line between Termoli and Ploče, which can be tenable because of more than 500 thousand tourists visiting Međugorje from Italy every year. Decreasing transit time from 14 hours to 4 hours and 45 minutes and decreasing costs of travel could provide that a direct fast line between Termoli and Ploče becomes permanent.

After the new entrance terminal has been built, the flow capacity of cargo traffic meets all requirements and can be evaluated as extremely good. With direct access to highway, port of Ploče is able to attract more cargo in transit.

Cargo traffic flows between port of Ploče and Italy can also be improved and increased without possibility of congestion, especially since new container, dry bulk and entrance terminals have been built within the port.

As for the possible undesirable effects of developing new traffic, no possible congestion is expected.