

5.1.3 STUDY ON THE REQUIREMENTS FOR MEETING THE SAFETY STANDARD FOR PASSENGER AND LUGGAGE INSPECTION IN THE PORT OF SPLIT

Document Control Sheet

Project Number:	10249002
Project Acronym	MIMOSA
Project Title	Maritime and Multimodal Sustainable passenger transport solutions and services
Start Date	01/01/2020
End Date	31/12/2022
Duration	36 months
Related Activity:	Work Package 5 A.5.1 Analysing existing, re-use and development of new smart technological tools and advanced solutions D.5.1.3 Study on the requirements for meeting the safety standard for passenger and luggage inspection in the Port of Split
Deliverable Name:	Study
Type of Deliverable	English
Language	Developing tools and harmonizing services for a sustainable intermodal mobility
Work Package Title	5
Work Package Number	PP11 (Dubrovnik Neretva Region)
Work Package Leader	
Status	Final version
Author(s)	PP13 Split Port Authority
Version	1
Deliverable Due Date	December 2020
Delivery Date	20/07/2021

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1. Introduction

MIMOSA – Maritime and multimodal sustainable passenger transport solutions and services

Specific objective – 4.1 Improve the quality, safety and environmental sustainability of marine and coastal services and nodes by promoting multimodality in the Programme area

Lead partner – Central European Initiative Executive secretariat

The MIMOSA Project has the goal of improving the quality and sustainability of cross-border and coastal passengers' mobility between Italy and Croatia. The specific role of WP5 is sticking on a result-oriented approach while also piloting innovative solutions with the main objective of testing the implementation of a sustainable intermodal transport in the cross-border area.

WP5 envisages a first activity focused on new smart technological tools and advanced solutions to be tested in different area of MIMOSA territory, supplying inputs for MIMOSA Position paper on info mobility tools and smart solutions, ranging from devices on safety and security for passenger, to tools for improving info mobility.

The following sections are devoted to the description of the overall goal of the appointed deliverable **(D5.1.3.)**

Section 1. Introduction – introduces the role of MIMOSA project, Split port characteristics together with statistical information collected from the Port Authority archives and other various sources.

Section 2. Involved parties and mapping of the stakeholders – contain a list of every relevant stakeholder that has direct or indirect interests from the MIMOSA project implementation and further advancement of the project.

Section 3. Requirements for meeting the safety standard – consists of general overview of passenger terminal “needs and musts”, referring to the conceptualization of terminal contents, conditions, boarding areas, landing areas and passenger terminal flow. Second part consists of listing specifications for the equipment needed for meeting the safety standard for passenger and luggage inspection in the Port of Split

Section 4. Final remarks – Concluding words from authors regarding the topic and requirements for optimal solutions in port to ensure maximum efficiency.

1.1. MIMOSA project

The main goal of the MIMOSA project is to improve the offer of multimodal sustainable passengers' transport solutions and services, with the promotion of a new cross - border approach for passenger mobility in the Programme area. The project partnership, composed by the main actors at the regional and national level in both countries, is determined to jointly tackle the common challenge of increasing multimodality, reducing the impact of transport on the environment.

As pointed out in the Key Facts analysis of the Italy-Croatia Cooperation Programme, connections between Croatia and Italy show bottlenecks and lack of quality and people self-organise for travelling from one country to the other and back. The Cooperation Programme itself highlights that the cross-border area is characterised by the dominance of road transport on land-bound routes and by limited connections to the hinterland. At the same, there is a strong need to reduce the environmental impact of transport activities by increasing multimodality and shift to most appropriate environmentally friendly modes of transport, as well as the need to reinforce ICT application for making open and easier the access to transport info and intermodal opportunities for passenger's mobility. In general terms, this is also calling for the overall vision well beyond the port, which will then undoubtedly play a key role in the intermodal node.

Having a result-oriented approach, in developing visible outputs, ranging from multimodal solutions to innovative and smart tools and technologies, MIMOSA is focused to change the current situation affecting the cross - border and regional connections, making more accessible, low - carbon and sustainable the mobility of passengers in the whole Programme area.

A cross - border cooperation approach is necessary for solving the common problems of road traffic and of a low level of connectivity between the two countries, for providing citizens and tourists with a wider offer of mobility sustainable options, based on a shared knowledge on transport demand and passengers' habits and needs, which makes the project original in comparison to previous initiatives. Thus, contributing to achieving the medium - term result of passenger's behavioural changes. The project is based on a common cross - border approach at an institutional level and has a result-oriented approach in planning and testing new and concrete solutions for reducing the environmental impact of transport. It seeks to reduce the environmental impact of transport by increasing multimodality and by fostering the shift to environmentally friendly transport modes in passenger mobility.

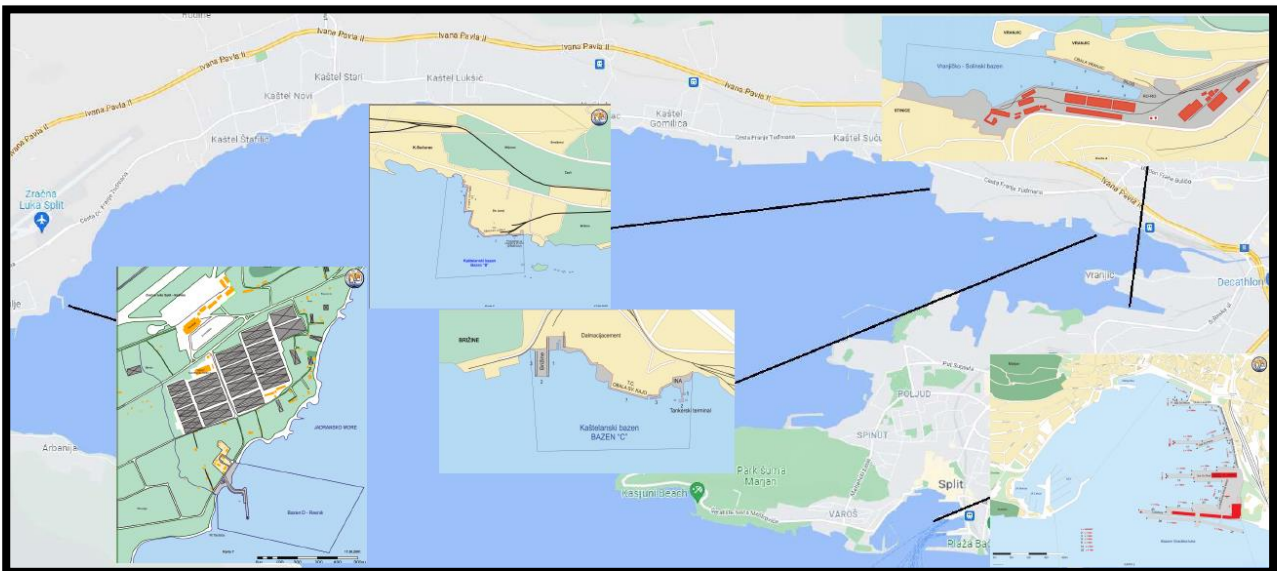
1.2. Port of Split

Port of Split is situated in central Adriatic, and it is the leading passenger and vehicle's port for Croatian destinations on the islands and along the coast. The port of Split also contributes to the international traffic through daily ferry connections to Italy.

Above all, the Port of Split's importance is to transport the local population, connect the medieval islands to the mainland, and serve a large number of tourists, both in transit and at the final destination.

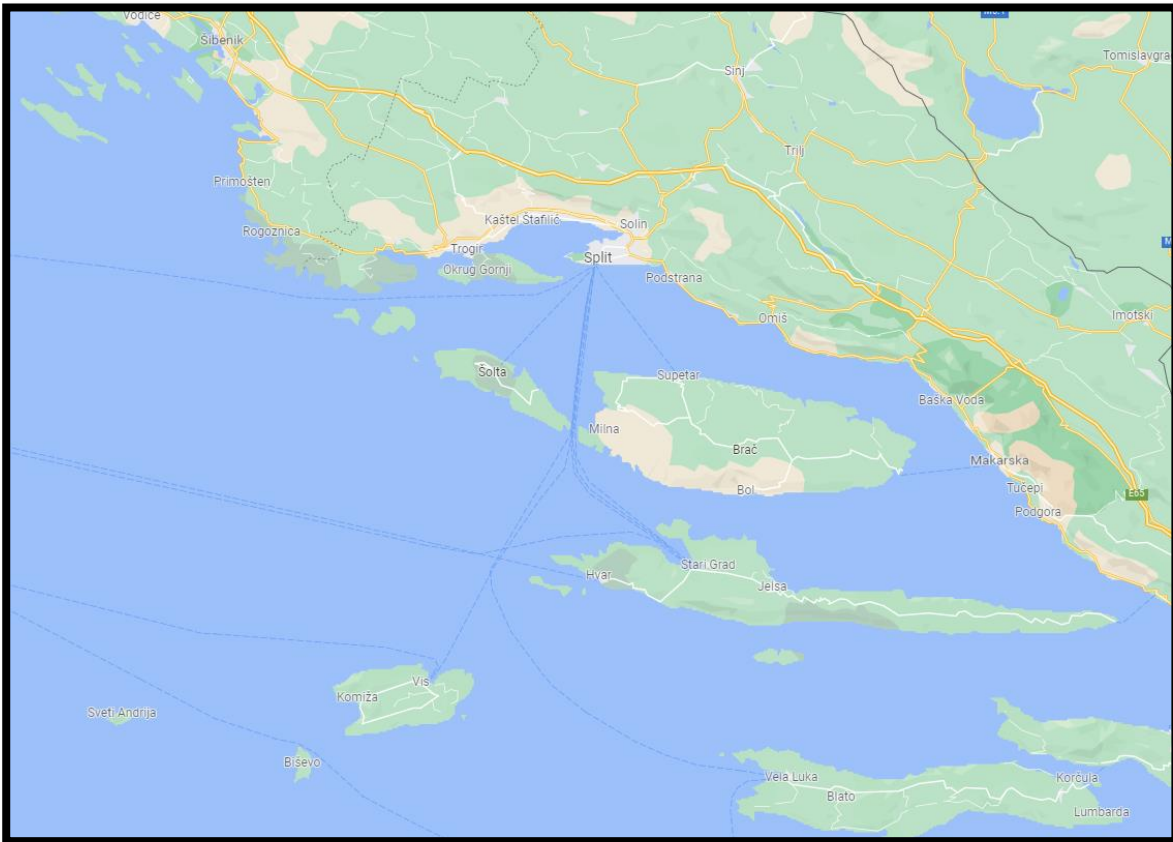
Split port consists of six port areas.

Split's port areas



Maritime traffic in the City Port of Split by ferry lines takes the largest volume on the local lines with national shipping company Jadrolinija and the only international line Split - Ancona (Italy) is maintained throughout the whole year by Jadrolinija, while during the tourist season other foreign shipping companies Blue Line and SNAV engage. The majority of passenger traffic (93%) refers to local lines to islands that gravitate to the port of Split. Other passenger traffic refers to local commercial trips, international ferry line Split - Ancona and cruises (local and international). Compared to other most important Dalmatian ports with maritime passenger transport, the Port of Split has twice as many transported passengers in relation to the other city ports of Dubrovnik and Zadar.

Aerial view of ferry lines connecting Split with islands and Italy



Split to Brač and Hvar Catamaran Ferry

- Catamaran ferry connecting Split with Bol (Island Brač) and Jelsa (Island Hvar).
- Catamaran line No. 9603

Split to Island Vis, via Hvar and Milna (Brač)

- Catamaran ferry connecting Split with Island Vis, via Island Hvar and Island Brač
- Catamaran line No. 9602

Split to Hvar Catamaran Ferry

- Popular catamaran ferry connecting Split with Island Hvar
- Catamaran service line no. 9604S

Split to Island Vis car ferry

- Popular car ferry connecting Split with Island Vis
- Island Vis is the farthest inhabited island off the Croatian mainland and arguably one of the most beautiful islands in Croatia.

- Please note that during high season on weekends personal vehicles have boarding priority
- Car ferry line No. 602

Split to Stari Grad Hvar island car ferry

- This car ferry is the main connection between Split on the mainland and Hvar island.
- Duration of voyage - 120 minutes
- Car ferry line No. 635

Split to Supetar (Brač island) car ferry

- This car ferry connects Supetar on Brač island with Split all year round.
- Duration of Voyage - 50 minutes.
- There are four ferry ports on Island Brač: Bol, Sumartin, Supetar and Milna.
- Car ferry line No. 631

Split - Korčula - Lastovo car ferry

- Lastovo is connected to Split with a car ferry that sails via Vela Luka on Korčula island.
- Car ferry line No. 604

Drvenik - Sućuraj (Hvar) car ferry

- This ferry from Drvenik to Sućuraj on Hvar island runs all year round and is a popular choice if one is island hopping by car. Ferry port Drvenik is situated on the Croatian mainland - Journey time is 35 minutes
- Car ferry line No. 632

Split to Rogač (Šolta) car ferry

- Šolta Island is a popular summer destination and this ferry provides an excellent connection for day trips from Split. During high season it runs 7 or 8 journeys per day.
- Duration of Voyage - 60 minutes.
- Car ferry line No. 636

Makarska to Sumartin (Brač) car ferry

- The car ferry from Makarska to Sumartin on Brač island runs daily and more frequent during the summer. It is a better option than the ferry from Split to Supetar - and it's cheaper if you are located closer to Makarska
- Car ferry line No. 638

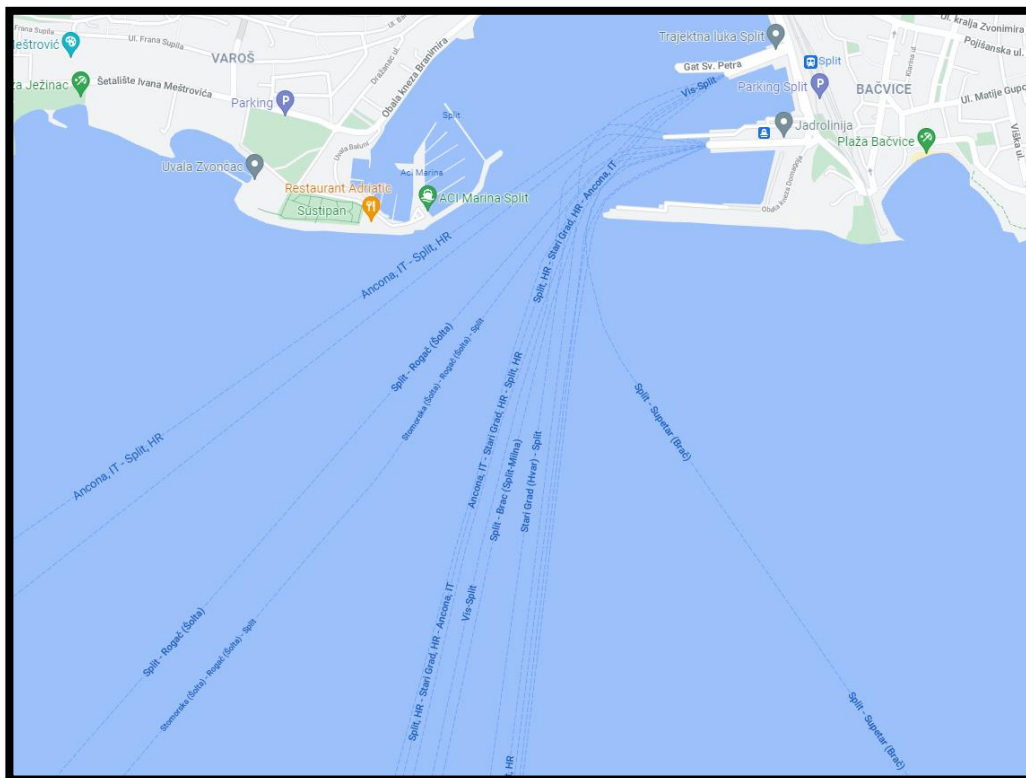
Split to Ancona ferry

- These overnight ferries from Split via Stari Grad (Island Hvar) to Ancona (Italy) are a great option when it comes to saving money for accommodation

Dubrovnik – Split – Rijeka ferry

The coastal ferry line which connects Dubrovnik with Mljet, Korčula, Hvar, Split and Rijeka runs from June until October, two times per week

Ferry lines from Split port



National local lines are divided into the following categories:

- Ferry lines (transport of passengers and vehicles by Ro-Ro ferries)
- Ship lines (passenger transport by ships)
- High-speed lines (passenger transport by catamaran)

Lines of local maritime transport are of national character and according to the Law of Public Transport are divided into:

- Inter-county lines (in the area between counties)
- County lines (in the area within the county)
- Utility lines (in the area of a particular administrative area of the city)

The international maritime traffic of the City Port of Split consists of the international ferry line Split - Ancona, commercial cruise lines and international seaplane traffic. International ferry line Split - Ancona, counted total 258 arrivals in 2018, out of which 54 percent refers to Jadrolinija, and the rest to the Italian carrier SNAV (which maintains the lines only during the summer season when the total traffic is five to six times bigger than in the off-season).

In the last four years, excepting the Covid year 2020, the number of passengers rose on average by 5 % per year and has tripled the number of passengers over the last two decades. The number of vehicles carried is increasing by similar yearly rates.

In the year from 2019, through the Port of Split almost 830,000 vehicles were transported, 5.6 million of passengers and 282 Cruise ships with nearly 360,000 passengers.

In the total local (domestic) Port traffic, the share of local ferry traffic is about 59%, local high-speed lines traffic about 15%, while about 16% is the traffic of domestic tourist vessels.

The majority of the passenger and vehicle traffic in the connections between the mainland and the islands is carried out by the Croatian shipping company Jadrolinija, which also connects Split to the international port of Ancona. Next to Jadrolinija, there are few private-lead operators: Kapetan Luka – Krilo, Bura Line and Krilo Shipping Company (KSC), which maintain the lines between Split, medieval islands and Dubrovnik. The international route Split-Ancona-Split is operated by the Croatian company Jadrolinija and by the Italian companies SNAV and Blue Line.

- **Jadrolinija** operates with ferries, catamarans and classic passenger ships. The complete fleet of the Jadrolinija counts 54 ships; out of this, ten catamarans, 37 smaller car-ferries, four classic passenger ships and three spacious car-ferries operating on international lines.
- **Kapetan Luka – Krilo** is a private-lead company operating with four fast catamarans in their fleet. They are operating on the lines from Split to islands Hvar, Korčula, Brač, Mljet, and Dubrovnik. The tickets can be bought online. The web page is available on Croatian and English language. They are operating during the whole year.

- **Krilo Shipping Company (KSC)** is a private-lead company connecting Split with the islands Brač (town Milna) and Šolta (town Rogač). The tickets can be bought online. The web page is available on Croatian and English language. They are operating during the whole year. In the current Covid-19 situation, they have temporarily closed down all their lines.
- **Bura Line** is a private-lead company operating the line Split-Slatine on the island of Čiovo (near Trogir). There is no option to buy a ticket online. The web page is available on the Croatian and English version

Access to the Port of Split from the sea:

Due to deep protrusion in island area, the port's access is enabled by coastal or internal access waterways through Drvenik, Šolta and Brač channel and "Splitska vrata" ("Split's door").

The passage "Splitska vrata" ("Split's door") is the shortest coastal access waterway to Port of Split. The passage in the length of approximately 2 miles is situated between the island Šolta and Brač. The access to the Port of Split through Hvar and Brač channel in the length of 55 miles is the longest access waterway from the open sea, and less used due to its length.

Split's archipelago and waterway connections



Access to the Port of Split from the mainland:

The Port of Split is located practically in the center of the Split city. This is a specific location where all transport services, except the Airport, are located: the port, the central bus station, the central train station, taxi station. The central bus and train station are located only across the road from the port. Road connectivity is provided by the A1 motorway and the D8 and D1 state roads.

Railway traffic to and from Split takes place via the north-south corridor, which, in the long-term development of railway transport at the level of the European Union, will form a segment of the Adriatic-Ionian corridor. The said corridor consists of two sections under the designations M604 and M202. Due to its size and importance, it is a port of particular international economic interest in Croatia. It is also recognized as part of the Trans-European Transport Network (TEN-T). This network includes ports which are essential for the efficient functioning of the internal market and the European economy.

Split Airport is located 20 kilometres by road from the center of Split and provides transport connections with the most important European destinations. Several possibilities are to reach the port from the Airport:

- shuttle bus,
- public bus,
- land taxi or
- rent-a-car, which is available also at the Airport (several rent-a-car operators).

In some cases, the access Airport to the Port of Split can also be the Airport of Zadar (153 kilometres by road) and Airport of Dubrovnik (248 kilometres by road).

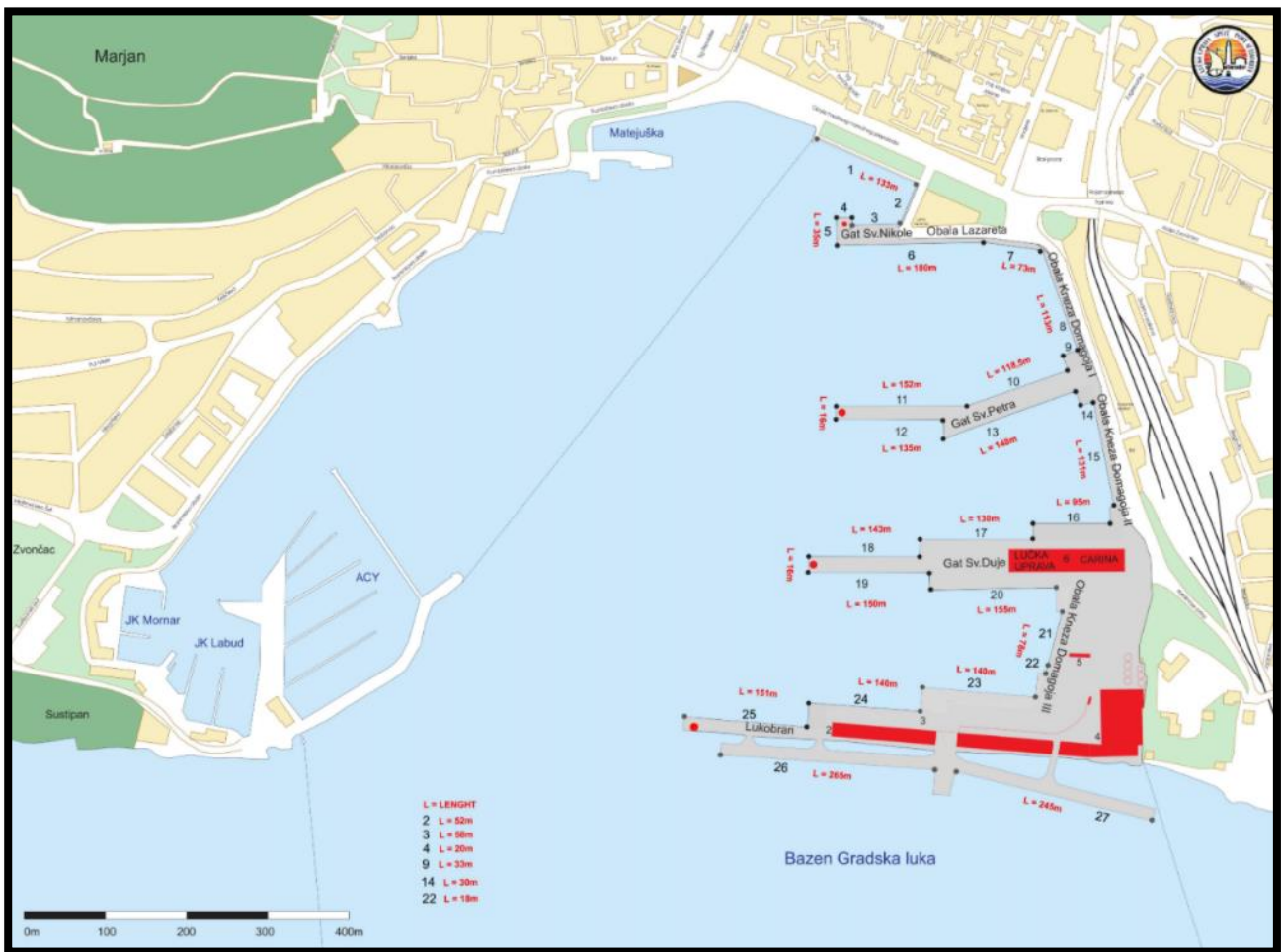
Panoramic picture of the Port of Split



The first conclusion is that the Port of Split is practically speaking a vital part of the city centre, surrounded by all other transport infrastructure, except the airport, which is very well connected to the Port area with the shuttle bus service. It is very simple and quick to come from the central bus and/or train station to the Port, just crossing the road without extra infrastructure needed.

The coastal part of the city port basin comprises the area from the west breakwater to the junction of Obala Lazareta and Obala hrvatskog narodnog preporoda (see grey area in the map provided in following figure), offering 2,136.5 m long operative coast and 25 berths. Berths 23, 24 and 25, intended for mooring of passenger and ro-ro passenger ships in national and international traffic are provided on the breakwater's north (inner) side.

Map showcasing Split's city port berths



The main passenger terminals of road, maritime and railway traffic in Split is located on the eastern part of the city's port of Split, where public transport is taking place, and busses' departure and arrival. Such location enables fast and easy communication and transfer of passengers.

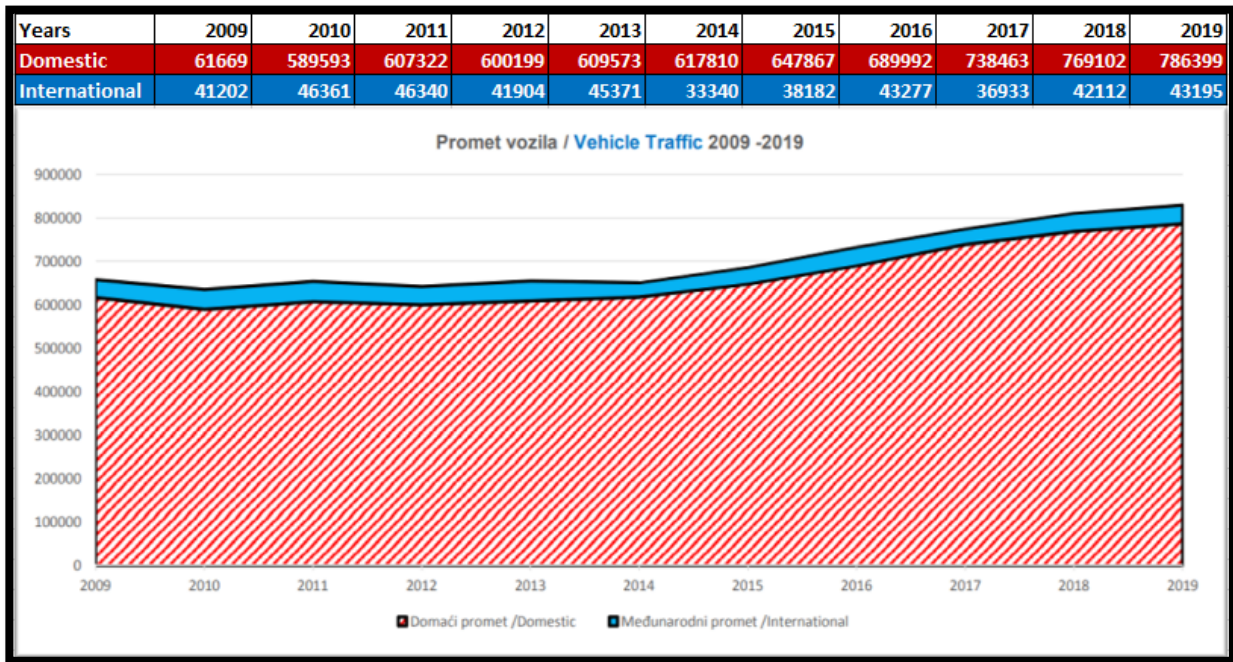
PORT STATISTICS

Statistics is the discipline that concerns the collection, organization, analysis, interpretation, and presentation of data. Statistics is a relatively strictly guided and defined tool which when used appropriately with exact data can produce stats regarding some facility's performance as well as future predictions based on trends.

In terms of maritime transport in 2017, a total of 18,546 ships entered the Main City Port of Split, out of which 5.6 percent refers to international traffic. The largest percentage of the traffic refers to the City Port of Split (approximately 88.6%). The analysis of maritime traffic includes the traffic of goods, passengers, vehicles and other maritime traffic in individual ports.

Passenger and vehicle traffic takes place through the City Port of Split, which in 2017 accounted for approximately 9/10 of the total number of arrivals in ports under the control of the Port of Split. The share of local ferry traffic is 58.9 percent, local high-speed lines traffic 14.7 percent, while 15.8 percent is the traffic of domestic tourist vessels. Of the other ship traffic (inflows) in 2017, there are 258 ships on international lines traffic, 234 ships on cruises, 225 tugboats, work and other ships, and 110 yachts.

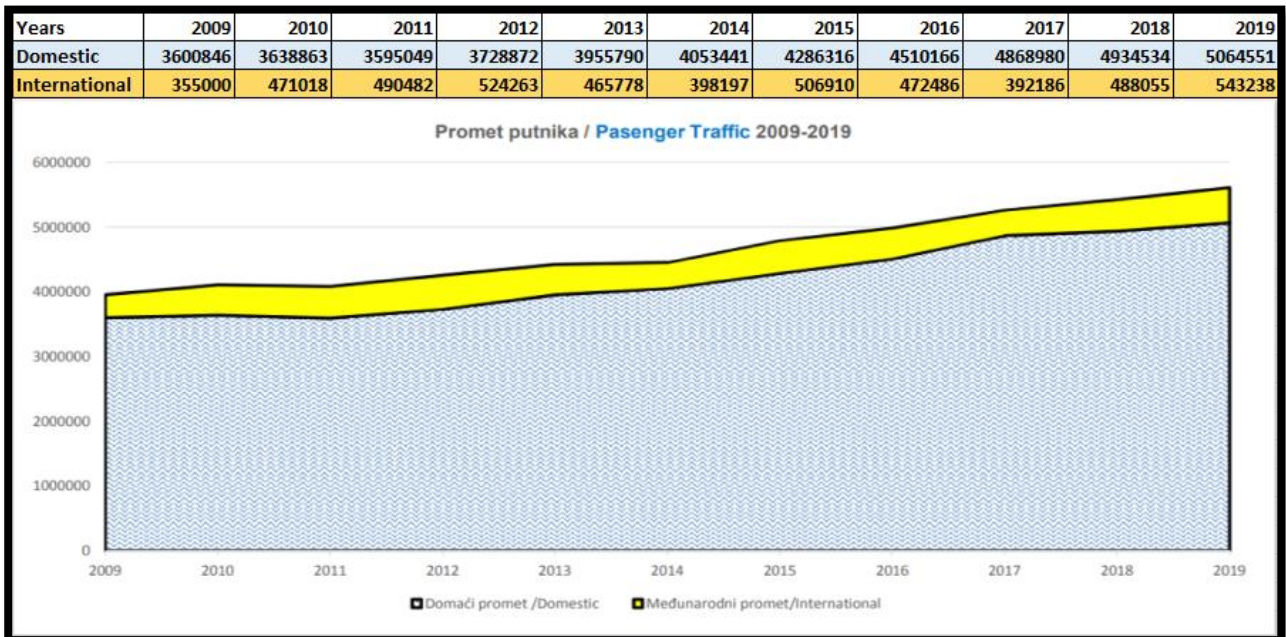
Vehicle Traffic in the Port of Split in the period 2009-2019:



Passenger traffic in 2019 amounted of approximately 5.5 million passengers (domestic 89.3%), vehicle traffic amounted to 829,594 (domestic 94.6%), while truck traffic counted 180,554 trucks (domestic 96.4%). All international truck traffic was realized with Italy on the international line Split - Ancona.

The structure of traffic through the number of arrivals by type of vessel in the period 2009-2019 shows an average daily traffic of 51 ships per day. Real daily turnover changes in the seasonal or off-seasonal period. During the season, the daily number of ship arrivals is approximately 100, while out of season this value drops to 20 to 30 arrivals per day. The most intensive traffic on a daily basis takes place between 08:00 and 20:00 (Port of Split Authority, 2020).

Passenger Traffic in the Port of Split in the period 2009-2019:

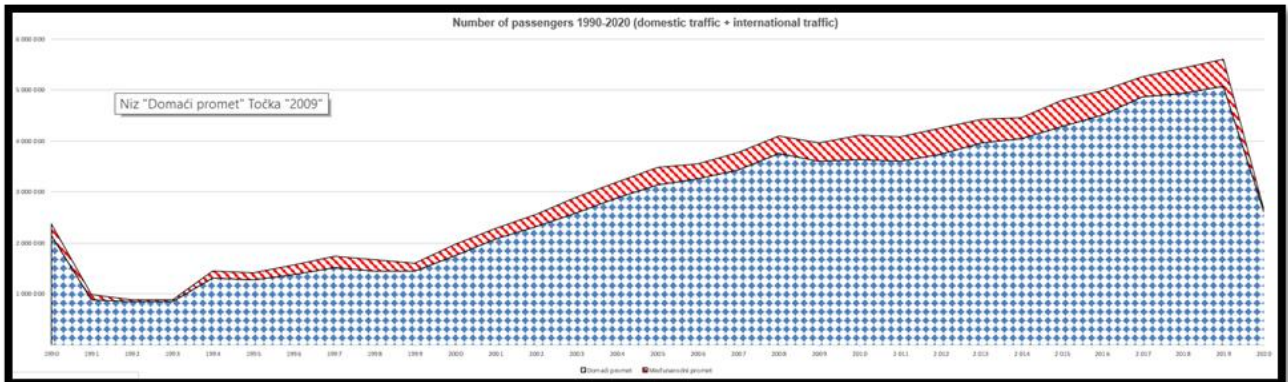


Of the ships entering the City Port of Split, approximately 38 percent are smaller than 500 GT, and those larger than 10,000 GT are approximately 3 percent. Of the ships entering other basins, most are less than 500 GT (approximately 52%), while those above 10,000 GT are approximately 4 percent (Port of Split Authority, 2020).

Since the period from previous charts hasn't encompassed the years 2020 and 2021, the impact done in these years has to be observed looking at the macro picture. Following charts take into consideration a period of 30 years, from 1990 all the way to 2020.

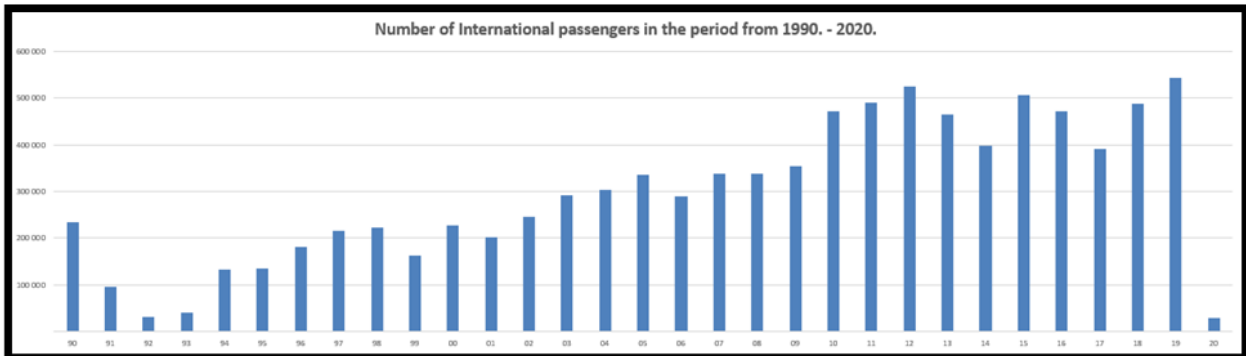
Certain deviations, which can be substantial, can occur (such as COVID-19) resulting in a massive downtrend spike on charts and it doesn't even have to do anything with facility's capabilities, but with impact on statistically based predictions to a point where guessing the direction market is headed is pure speculation.

Number of passengers 1990. – 2020. (Domestic traffic + international traffic)



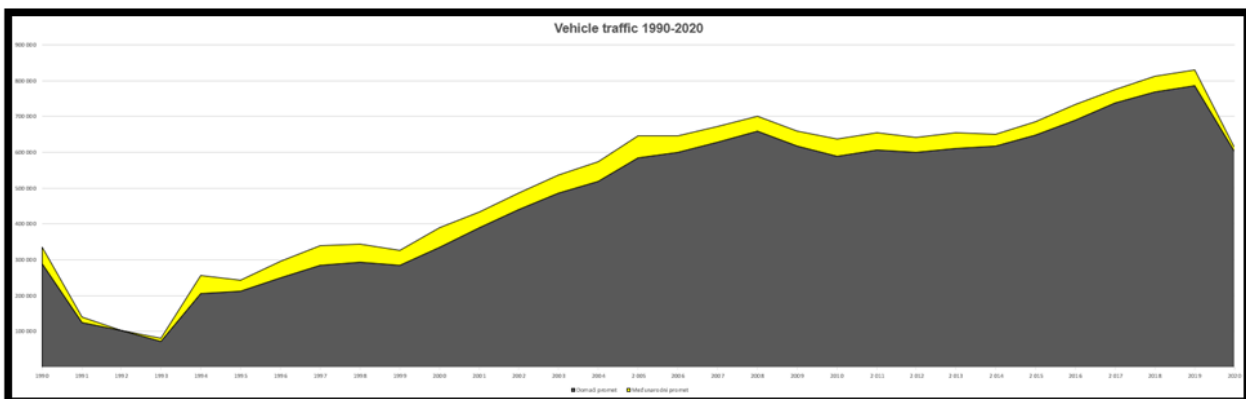
First chart demonstrates the uptrend Croatia had throughout last three decades in number of passengers, category composed of domestic and international traffic in the Port of Split. Like most of the charts from Croatian history, significant fall and period of stagnation occurred in the early nineties during and after the war years. A lot of production facilities and service providers were forcefully stopped during those years resulting in flattening of the observed curve. The peak was in the summer of 2019 when the number of passengers in Port of Split reached staggering 5.5 million. The year following the culmination was the pandemic 2020 which caused almost perfect 50% drop in regards to the previous year.

Number of international passengers in the period from 1990. – 2020.



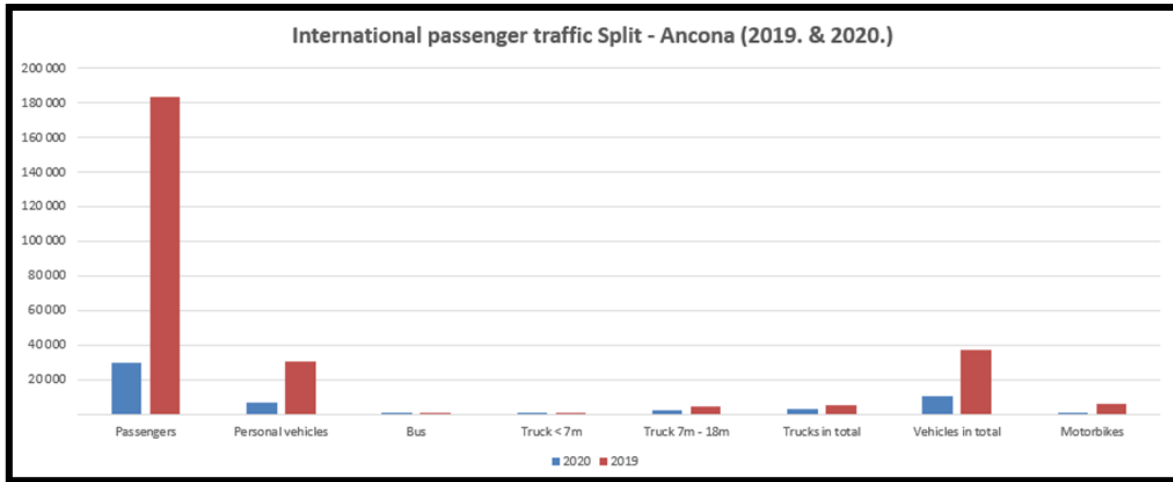
Similarly, to the previous chart, specific trends can be seen. Sharp drop and stagnation period in the early nineties followed by a constant uptrend over the next 25 years. 2020. was an annihilation to any cross-border activities after the global pandemic scenario caused states to close their borders to prevent any kind of unnecessary spreading in what were already weakened economies. The end of the year marked the loss of approximately 93% in regards to the previous year.

Vehicle traffic in the period from 1990. – 2020. (Domestic traffic + international traffic)



Vehicle traffic consequently follows the similar trajectory like the previous charts pointing that the downturn took place two times. Once in the nineties and once two years ago when the COVID-19 crisis presented itself worldwide. However, a lot less significant drop occurred in the vehicle traffic than in the passenger traffic, resulting in only 25% drop from the peak in the 2019.

International traffic Split – Ancona (2019. & 2020.)

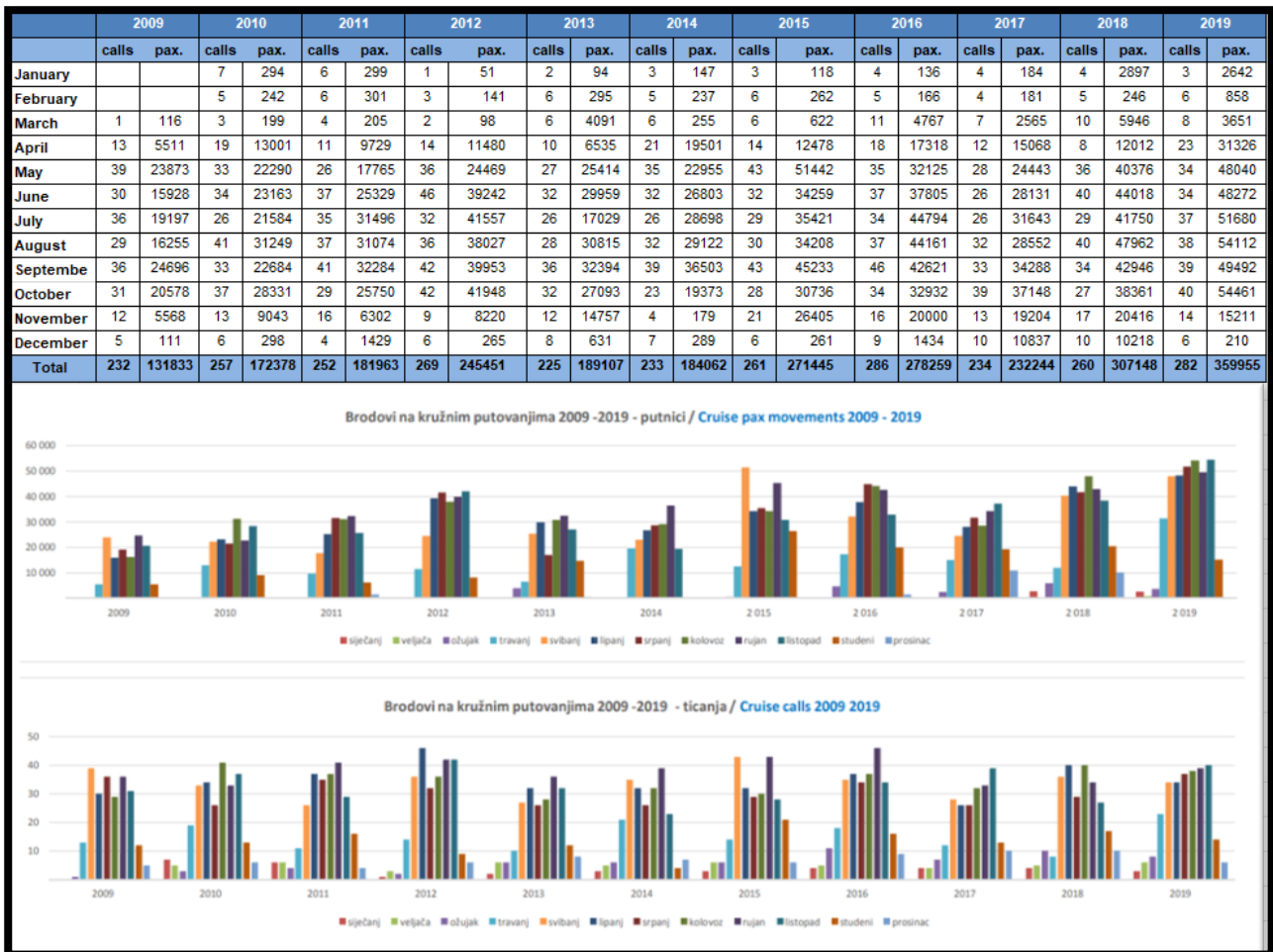


Two passenger shipping companies serve this line, SNAV and Jadrolinija combining their forces to ensure regularity of connection between Croatia and Italy. The table below provides a record from the year 2019. In international regular passenger traffic in the period from 01.01.-31.12.2019. 238 inflows were made.

International traffic in Port of Split – Names and number of ship entries

	Azzura	Aurelia	Pince	Marko Polo	Dubrovnik	Total
I					10	10
II				2	6	8
III				9		9
IV		7		13		20
V	9	4		13		26
VI	3		12	13		28
VII		18		13		31
VIII		26		18		44
IX		14		13		27
X		3		14		17
XI				9		9
XII					9	9
Total	12	72	12	117	25	238

Cruise Traffic in the Port of Split in the period 2009-2019:



Cruise ship traffic in Port of Split was continuously growing throughout the years which can be observed from the chart and table above. The overall growth of the passengers almost tripled in a period of a decade while the number of calls in the port grew by approximately 23%. What is important to emphasize is the fact that the number of calls and passengers didn't grow proportionally which points to a fact that over the years, bigger and bigger ships started to dock in Split's port. That is a global trend but in the last couple of years, this was probably mostly due to the newly built external berths in the city port.

Distribution of passenger traffic on cruise ships indicate that the maximum passenger number differentiated in different months over the years, but overall trend suggests that around 80-85% of traffic is realized in the period from May to October.

2. Involved parties and mapping of the stakeholders

Stakeholders are entities who possess interest in project's outcome. They are typically the members of a project team, project managers, executives, project sponsors, customers, and users. Stakeholders are people who are invested in the project and who will be affected by project at any point along the way, and their input can indirectly impact the outcome. It's a good idea to practice good stakeholder management and constantly communicate with them in order to collaborate on the project. After all, they have a stake in how it all turns out.

Apart from the Split port authority, directly involved stakeholders encompass actors in regular port activities regarding the incoming vessels or vessel departures. Harbormaster's office has to be duly notified about the arrival or departure of the vessel while the police and customs administration are in charge of formalities regarding the security and legitimacy of border crossings.

Port pilotage is a necessity, but following the latest regulations and after acquiring certificates, international ferry ships are a special subject of matter that require presence of pilots via VHF due to the fact that they are docking in the port almost every day and there isn't need for a physical presence of pilot (exceptions are when ships have a new captain)

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3. Requirements for meeting the safety standard

3.1 Passenger terminals

The characteristic of liner passenger shipping is that the transport is performed between the initial and final seaport exactly according to a predetermined and published sailing schedule. Such transport can be direct, and it can also be with stopping points. Liner passenger traffic is divided into classic passenger ships, ferries and very fast passenger ships, and the basic and biggest difference between these ships is in the transport facility. Although this distinction is important for regular passenger traffic and is the main feature of the recognizability of the type of transport in passenger shipping, in the organization of passenger ports it is almost neglected. The reason for this is that most maritime passenger ports are profiled for transshipment and supply of all subtypes of liner passenger shipping, i.e., ports are organized as multi-purpose terminals. This versatility was due to the high costs of building a seaport and the inflexibility of such investments, as it was impossible to build a new port or keep up with any significant development of passenger ships. Therefore, there is a need to build specialized passenger terminals and devices (automated ramps, bridges, etc.) within a port that will be able to receive and respond to all requests of passenger shipping and demand for maritime passenger transport.

The development of passenger ships equally requires the development of the capacity of seaports which, if they wish to participate in passenger shipping, must respond to the challenges posed by such ships. At the terminals for regular passenger traffic, the areas for the accommodation of road vehicles are especially important, as well as access roads and ramps through which boarding and disembarking from the ship and contact with the means of other transport branches are performed. Therefore, locations near the city or those near the terminals of other transport branches are preferred. The most important is the communication with road traffic because the concept of RO-RO passenger ships is based on the possibility of offering a passenger his car during the entire trip. In order to simplify boarding / disembarking, i.e., communication of passengers traveling without vehicles, passenger (covered) drawbridges (similar to airports) have been set up between sea and land terminals in modern passenger ports. They allow direct flow of passengers from the terminal to the ship and vice versa. This regime is particularly effective in international ports for easier and faster police and customs control. The organizational structure of a passenger liner is more complex than the classic transport function, considering that the conditions for offering catering and other services to passengers should be provided on passenger ships.

Passenger terminals are designed to serve the requirements of ferry vessels and their passengers. At the same time, they have to be integrated with transport, tourism, and urban planning strategies of the port-city and nearby destinations. From a maritime viewpoint, terminals need to fulfil minimum requirements for draft, berthing lines, and navigation channels for arriving ships. Inside the passenger terminal, there are provisions for various spaces, including the apron area, terminal building, and ground transportation. Due to the nature of their customers and the nature of nautical operations, connectivity to the city, car parking, and public transport facilities are particularly important.

Sea-passenger ports are one of the important preconditions for the development of traffic, tourism and economic activities in the function of tourist offer and meeting the needs of passengers for transport. The optimal development of the passenger port system can be achieved only with a properly managed port policy in line with the goals and measures of the overall economic policy. The special feature of ports is that they are not an end in themselves, but are in the function of service users, so everyone who benefits from ports should be interested in their business and development. The increase in the average size of a passenger ship and the total size of the passenger fleet was also reflected in seaports. Such a qualitative and quantitative momentum has placed a demand on ports that are in the function of passenger traffic to change the physical appearance and the way of functioning.

International regulation regarding maritime safety and border crossings in Croatia

Supervision of the state border in this sense implies control of the crossing of the state border as well as protection of the state border for the purpose of:

- ensuring the inviolability of the state border and the state territory of the Republic of Croatia;
- protect people's lives and health;
- prevention and detection of criminal offenses and misdemeanours;
- prevention of illegal migration.

For the purposes of this document, entities whose role is unavoidable will be taken into account. The Border Police includes police officers of the Ministry of the Interior who perform state border surveillance, prevention and detection of illegal entry and stay of persons and suppression of cross-border crime in the depths of the state area, maritime affairs and other tasks specified by law. The other entity relevant in this document is the so-called operator, i.e., the Port Authorities of the seaport and inland waters, who manage the port area. They are, more precisely, concession holders in special purpose ports.

Exceptionally, when the Ministry assesses that security reasons and reasons of economy allow it, the Government of the Republic of Croatia may, by a decree, determine that border control at individual border crossings is performed by Customs Administration officials. When this is the case, police officers give them instructions and provide professional assistance.

Border control activities include:

- control of persons,
- control of things,
- control of means of transport.

Control of things includes control of objects that a person who intends to cross the state border has with him or in his means of transport. A police officer is authorized to require a person to show the items he has with him and to inspect them in order to find prohibited items or to find items necessary for verification or identification.

Vehicle inspection is an inspection that includes internal and external visual inspection of the means of transport and verification in searchable databases. For the purpose of performing this work, police officers may use appropriate technical aids and service dogs.

The owner or user of the means of transport and the owner of the items, or the person who owns them, may be present during the inspection or search.

For facilitation of these processes, it is necessary and lawfully required for these state services to be present in any ports which field fall under the category of cross-border importance.

Croatia's accession to the EU did not abolish border controls with EU member states (Slovenia and Hungary).

With the entry into force of the amendments to the Schengen Borders Code on 7 April 2017, the method of border control was changed.

During the border control, a systematic check is now carried out of all persons crossing the state border of the Republic of Croatia, both at the entrance and exit at the internal (land border with Slovenia and Hungary) and external (land border with Serbia, Bosnia and Herzegovina and Montenegro), air and seaports) borders.

Persons with the right of free movement in accordance with Union law on entry and exit are checked for identity and nationality and for the authenticity and validity of the travel document for crossing the border, inter alia by checking in the relevant databases, in particular in:

- Schengen Information System (from the day when Croatia will be included in this system)
- Interpol Database on Stolen and Lost Travel Documents (SLTD)
- national databases containing information on stolen, stolen, lost and annulled travel documents.

Third-country nationals are subject to thorough checks on entry and exit, which, in addition to the above-mentioned systematic checks, also include checking:

- whether they have a valid travel document valid for at least three months after the planned date of departure from the territory of the EU Member States and issued in the previous 10 years
- whether they have a valid visa, if they need one
- justification of the purpose and conditions of the intended stay and whether they have sufficient means of subsistence, both during the intended stay and for return to their country of origin or transit to a third country which they are sure will accept them
- entry and exit stamps in the travel document
- places of departure and destination
- that the person, his means of transport and the objects he carries are not of such a nature as to constitute a danger to public policy, internal security, public health or the international relations of any Member State
- on departure, whether the person has exceeded the maximum duration of stay in the territory of the Member States.

Citizens of other countries may enter the Republic of Croatia under the conditions prescribed in the visa system of the Republic of Croatia.

Map of customs offices and customs crossings of the Republic of Croatia



From classic passenger ports, modern passenger terminals have emerged that must meet the needs of both shipowners and passengers. These are terminals whose function is not finished in the reception of the ship, but extends to the facilities that provide quality reception of passengers, comfort during the stay of passengers at the terminal and efficient reception of funds of other branches of transport.

3.1.1 Terminal contents

Optimal service of the ship means ensuring adequate superstructures of the port capacity. Sub-infrastructure capacities at a modern passenger terminal (ferry or cruise) must be dimensioned and profiled in such a way as to enable fast flow of passengers and vehicles and to provide the necessary comfort for passengers, namely:

- offer (services) in ports: flow, distribution, accompanying contents, offer contents and accessibility;
- kindness of staff, hospitality and cordiality of servers of various services;
- ability and organization of people employed in the workplace (customs, police);
- services (repair services, mechanical services, petrol stations);

- catering facilities and restaurants;
- refreshment and rest stops, resorts, motels, hotels, exchange offices;
- stocked shops, stores, supermarkets;
- public toilets and toilets along roads;
- parking lot (size, sufficient number of places, affordable price);
- additional facilities for travellers (cinemas, entertainment games).

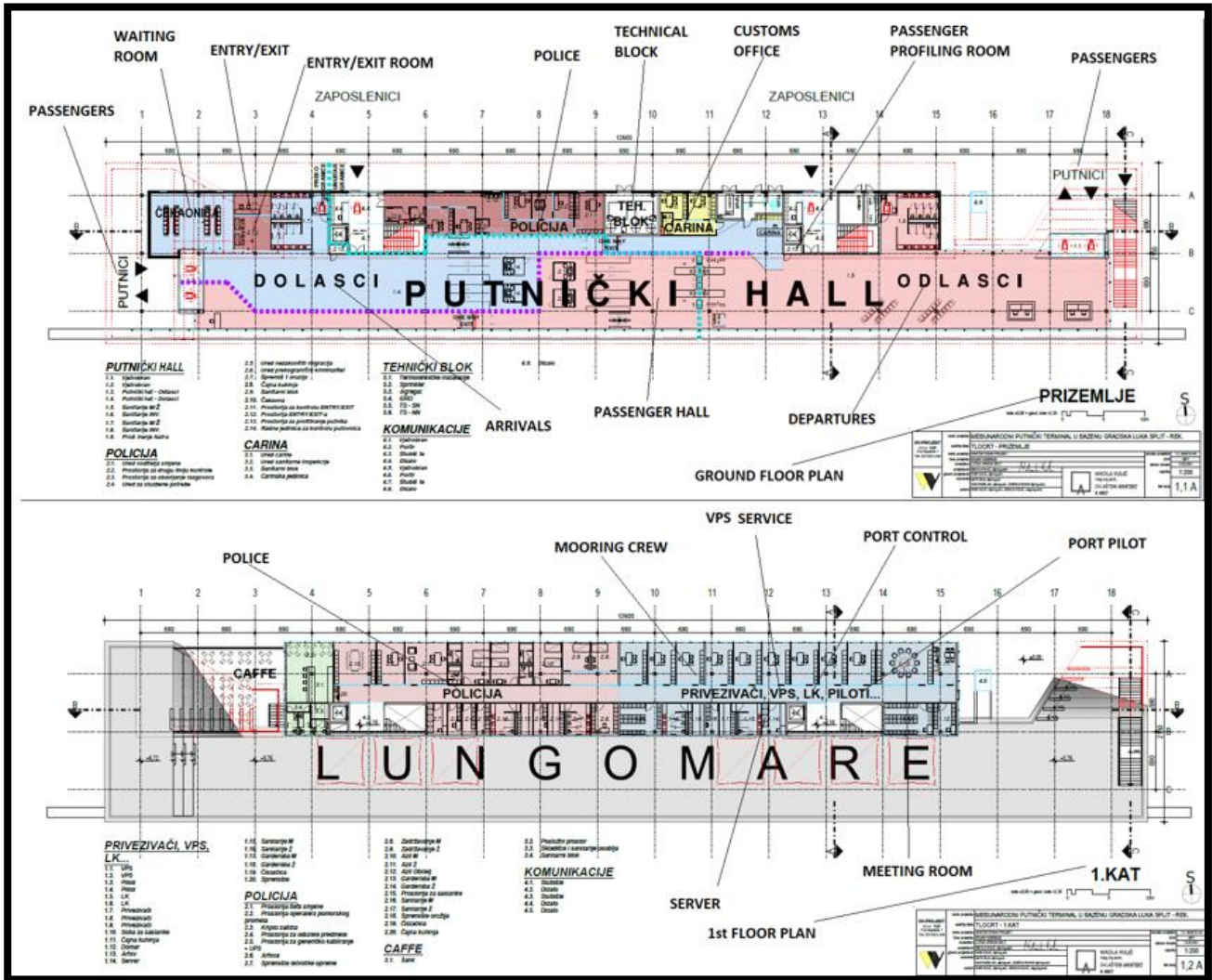
3.1.2 Terminal conditions

In order for such a terminal to justify the invested funds and to optimally use the installed capacities, it is necessary to meet certain requirements from the macro environment, which ensures the market of port services, i.e., attracts passenger flows to ports.

The basic conditions are:

- good transport connections (road connections);
- good connection with places and their economy (hours of travel);
- traffic network ("in the shortest time the safest to the destination");
- branched network of roads / shipping lines;
- connection and integration of different types and branches of transport;
- quality information;
- speed of traffic;
- frequency of connections;
- passability, flow, smooth flow, and normal flow of traffic.

Architectural conceptual design of Split's passenger port



In order to achieve the best possible flow at the terminal, it is necessary to separate international traffic from domestic traffic due to the different speed of boarding. The difference in speed is conditioned by border and customs control of international traffic. Also, an extremely important item is to provide a sufficient parking area. It is estimated that 70% of the ferry's capacity needs to be provided for the parking areas in front of the ferry. In the case of international traffic, due to the need for customs and border control, it is necessary to ensure 100% of the ferry capacity.

It is necessary to set up boxes for international and domestic traffic of vehicles for border and customs control. It is also recommended to separate personal and freight traffic due to the difference in waiting time and volume.

3.1.3 Boarding areas

Inside the terminal building, it is recommended to separate the loading and unloading areas in order to avoid unnecessary traffic jams during simultaneous loading and unloading. Emphasis is placed on separating the flow of passengers on boarding and disembarking for safety reasons, which does not preclude both processes from using common areas.

The entrance area is located in front of the central lobby. It can also serve as an exit space. It is recommended not to place other facilities near the entrance to avoid crowding.

The lobby has the function of the core of the building and provides access to all other facilities of the building. It also includes waiting rooms for passengers waiting to board.

The desks allow passengers to obtain all the necessary information and to pick up and buy a ticket or arrangement. It is important that the counters are located in a visible place to avoid confusion when entering the facility. Baggage retrieval also takes place at the counters, which is the beginning of the transfer of luggage to the ship.

Catering facilities, which will provide waiting passengers with a hot meal or drink. It is recommended to create more catering spaces of different characters in order to get the most diverse offer.

Commercial facilities that will accommodate various stores as well as the sale of excursions, car rental, boats. These contents enrich the offer of the destination itself and are the starting point from where the user gets in touch with the destination.

Security areas allow customs and border staff to carry out checks. It is necessary to organize the space in such a way as not to create crowds and confusing queues. **It is necessary to set up scanners for baggage inspection** and secondary inspection in separate rooms.

Safety scanner before boarding the ship



The waiting area for boarding is a separate area in which passengers stay after a security check. After entering this space, it is no longer possible to return to the central lobby without re-security clearance, so it is necessary to provide toilets for users here. It is also necessary to provide seating areas dimensioned for the expected flow of passengers.

3.1.4 Landing areas

Although the unloading area is just as important as the loading area, it requires less space because it is essentially just a transit area. It requires, as well as all public toilets and an information desk.

Security spaces used to trust the documents of foreign citizens who have disembarked.

Baggage retrieval areas should be dimensioned in proportion to the expected passenger flow. It is necessary to provide enough conveyor belts for incoming luggage and enough space in the environment so as not to create a crowd when waiting and picking up luggage. In the vicinity of the baggage claim, it is necessary to provide space for lost and found items.

Information and reservation desks for vehicles or hotels should be placed in a visible and easily accessible place.

Administrative premises should be in contact with both loading and unloading areas. Within them are the terminal management, terminal supervision, dispatchers, rest areas for staff and warehouses. In addition to these functions, it also houses special police and customs offices. A number of offices and meeting rooms must be provided.

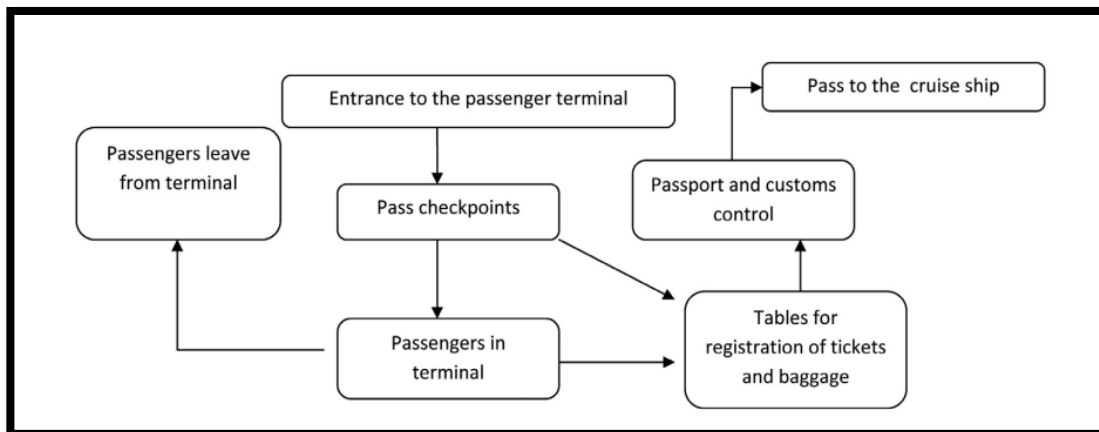
Luggage spaces must be secured and protected from the weather. The organization of the system itself depends on the method of carrying luggage, whether it is a conveyor belt, pallets or forklifts. Baggage must be scanned and marked and sorted, from where it is transported to the ship.

Boarding / disembarking bridges are used for fast boarding on the ship directly from the terminal building. The bridges allow access to ships of different sizes and the disposition of the entrance to the ship due to the flexibility of the bridges themselves. Bridges on rails can move along the coast and move both horizontally and vertically. Bridges must allow the movement of ships moored at the berth in the midst of sea fluctuations and changes in its level.

3.1.5 Passenger terminal flow

- i. Passengers pick up personal luggage delivered by conveyor belts after disembarkation. Also, as an alternative, it is possible to pick up luggage after performing checks, provided that the luggage passes a separate check.
- ii. Completing the form before entering the security check area.
- iii. Passengers gather and form a queue for the first check in front of the counter with staff. It is necessary to dimension the space of sufficient square footage so that there are no problems in forming and waiting for the check. Within this space, it is necessary to provide toilets that passengers will use while waiting in line.
- iv. The staff performs a primary check of all passengers. Passengers who pass the checkpoint go to the exit or to the information and service counters.
- v. Passengers who have not passed the first check are referred to the second check.
- vi. It is necessary to provide rooms for examination and interviews which will be used by the staff for the purpose of the second safety check.
- vii. A control room from which staff have control over the entire process of arrival and departure of passengers.
- viii. Additional spaces that include offices, administration, warehouses, etc.
- ix. Passengers who have passed the controls are free to go out directly or use the content offered by the terminal.

The logistical chain of movement of passengers in the port



Source: V.A. Fetisov; N.N. Maiorov: Mathematical modeling and research of passenger flows in marine passenger port

3.2 Technical specification and viable solutions

When talking about making propositions regarding the viable solutions to the problem, one has to provide a certain list of parameters which will potentially determine if one of the products successfully meets the given criteria.

Technical specification is a specification that documents the requirements of a system or system component. It typically includes functional requirements, performance requirements, interface requirements, design requirements, development standards, maintenance standards, or similar terms.

Any facility connected to any kind of international traffic has to possess a certain amount of security equipment which provides a more thorough check up of the passengers faster and more efficiently. Physical security check-ups are efficient but to a certain degree as it is susceptible to the factor of “human error” which is to be avoided if possible.

Luggage and people security are of utmost importance, thus the criteria for equipment purchase have to be highly thought through while ensuring none of the prerequisites are left out.

Passenger and luggage inspection – requirements for the Port of Split

Technical specification:

Requirements regarding the technical specification needed for the equipment that will enhance port’s efficiency through faster passenger and luggage inspection in Split’s port have to possess a panel version that has a high detection capability with at least 60 detection zones for the purpose of detecting dangerous metal objects or weapons in passengers as well as the ability to identify or distinguish potentially dangerous objects and personal items (watches, coins or keys) that should not trigger the alarm thus resulting in achievement of higher flow of passengers. A minimum of 100 levels to indicate a random alarm has to be a possibility as well as a minimum of 100 working channels for adaptation to the environment.

Sensitivity factor has to also be counted in as the scanner requires a minimum of 100 levels of sensitivity and a detection speed of min. 15 m/s. Maximum reset time (recovery) has to be under 0.2 seconds.

Differentiation of metal types is a prerequisite as there has to be a possibility of distinction between magnetic and non-magnetic materials. When a certain mass is detected, optical and audible signaling must exist.

Passenger counter feature has to be able to differentiate entrance, exit, alarm and compensation options if and when the same person passes twice.

Access to the programming electronics must be protected by a key, and programming by a password in at least three levels.

As an option, it must be able to install radioactive material detectors in such a way that they are installed in the antenna panels, i.e., that after the installation of the detector, the dimensions of the door remain the same.

The installation of a video camera system must also exist as an option - to record the passage and images of persons in real time.

There has to be a minimum of 4 programmable LED bar displays, two at the entrance and two at the exit (left and right) with logical red and green indicators for facilitation of faster passenger flow. In case of a main power source failure there has to be an external source i.e., batteries that are able to support the functions while the main source is back and running. Power supply has to be 100/240 Vac, 50-60Hz and max 85 VA. Operating temperature needs to be in a range from -20 to +70°C while the conditions for humidity shouldn't exceed the 95% level but without condensation.

Dimensions of door detector frame needn't be less than 2010x700mm (h x w) while the external shouldn't be less than 2300x880mm (h x w).

Viable options:

To meet the given requirements, market research had to conduct a thorough comparison of several products that could potentially meet the criteria for equipment purchase. As each individual terminal is structurally different, certain points and features have to be omnipresent at all terminals. Passenger and luggage inspections falls under the category of most important aspects in the international passenger and cargo shipping sectors. Most of the criteria points has to be met to even get into consideration when purchasing equipment of such importance. Document's annex contains these options together with their technical specification.

4. Final remarks

Sea-passenger ports, in the broadest sense, are a huge economic force and have great importance for the economy. With the increase in the number of cruise ship berths, it is necessary to expand and adjust port capacities. The existence of a maritime passenger terminal is one of the important preconditions for the development of transport, tourism and economic activities in the function of the tourist offer and meeting the needs of passengers for transport.

The terminal itself, as a space is extroverted, open to the multitude, on an urban typological scale is a hierarchically highly ranked form. This space creates density, flow, frequency, which encourages urbanity. It is a large infrastructure that integrates all public and private spaces and becomes an integral part of the public space of the city.

The security requirements of the terminal require numerous checks and it is necessary to separate passengers on arrival and departure, i.e., passengers who embark and disembark. It is important that uninterrupted flows are ensured within the system, so that there are no problems in the system.

It is extremely important to enable the flexibility of the terminal building and possible future expansions. Maritime transport is very unpredictable because technology is evolving extremely fast. With technology, the size and speed of ships is growing, which unquestionably affects the terminal building itself. It is necessary to look at the terminal as an infrastructure envisaged for the future that can follow the leaps of technology in shipping and the demand for this type of transport. In order to meet the safety standard for passenger and luggage transported, terminal has to possess a security appliance or equipment suitable for fast and accurate inspection of scanned objects (people, bags, other break-bulk cargo).

Nowadays, bar of safety standards keeps getting higher in order to provide a maximum security of all participants and their belongings, as well as valuables like ship and her equipment in passenger shipping industry.

To meet this level, timely equipment upgrades have to be made especially after taking into the consideration the value of this sector. Like prior to any other purchase thorough market research has to be made. After drafting the technical specifications for the Port of Split, market research has resulted with narrowing down to two products. The PX10.10-MV and HI-SCAN 100100V-2is both seem like professional working equipment that could potentially benefit the business aspect of the Port of Split's terminal, however, after taking into consideration all of the factors and their technical specifications, HI-SCAN 100100V-2is presents itself as the most viable solution.

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ANNEX I: Technical specifications/details

1.) PX™ 10.10-MV – Leidos

Serving the needs of airport baggage and postal facilities, freight forwarders and other air cargo break bulk screeners, the PX 10.10-MV handles a wide variety of packages and freight, including oversized/out-of-gauge cartons and irregularly shaped items. The PX 10.10-MV offers imaging performance and flexibility in a one-meter tunnel. The system combines an optimal belt height and imaging ratio delivering high performance imaging and minimizing the need for manual handling issues.

The PX10.10-MV has a vertical geometry primary view with an optional secondary view module that is horizontal. The system also comes standard with Leidos' latest high current X-ray source. The combination of vertical geometry and high-powered tank deliver high penetration, image resolution and quality to facilitate the operator's ability to rapidly detect multiple targets including weapons, narcotics, explosives and other contraband. The system boasts a modular architecture with segments that can be wheeled individually through a standard doorway and quickly reconnected – allowing the system to be deployed in many areas previously only accessible to much smaller units. This modular architecture also makes it easy to add a second view so customers can choose a dual-view configuration or a single-view system that can later be upgraded in the field. With the multi-language support option, operators can interact with a system that speaks their native language.

GENERAL

Dimensions

Single-view:

3748 mm (147.6") L x 1244 mm (49") W x 1773 mm (69.8") H

Dual-view: 4448 mm (175.1") L x 1654 mm (65.1") / W x 1773 mm (69.8") H

Tunnel Opening: 1013 mm (40") W x 1016 mm (40") H

Conveyor Height: 607 mm (23.9") – can be inclined to 496 mm (19.5") if required

Power Requirements: 1Ø 100-240 VAC ±10% 50/60 Hz ±1%; 1.5 KVA max

Conveyor Speed: 230 mm per second (9.05" per second)

Conveyor Capacity: 200 kg (440 lbs) Option: 300 kg (660 lbs)

Weight

Single-view: approx. 1321 kg (2914 lbs)

Dual-view: approx. 1700 kg (3740 lbs)

Modular Construction: Each module is built with a steel frame and panels on casters. Individual modules can pass through a standard doorway.

X-RAY

Source: 160 kVp high current

Duty Cycle: 100%

Cooling: Sealed oil bath

Beam Orientation

Single-view: Vertically upward

Dual-view: Vertically upward and horizontal

X-ray Sensor(s): 1664 photodiodes per view in L-shaped folded array configuration

IMAGING & PERFORMANCE

Resolution: 38 AWG standard, 40 typical

Penetration: 40 mm of steel standard, 42 mm typical

Display Monitor: 22" high-resolution LCD

ENVIRONMENTAL

Operating Temperature: 0°C to 40°C (32°F to 104°F)

Storage Temperature: -20°C to 50°C (-4°F to 122°F)

Humidity: 95% non-condensing

Airborne Noise Level: <70dB (A)

STANDARD FEATURES

- › Uninterruptible power supply (UPS) and input line filter
- › Adjustable conveyor from 612 mm (24 in) can be inclined to optimize freight handling
- › 22-inch LCD monitor
- › Heads-up operator display interface with touch pad control
- › Configurable operator interface
- › Operator Assist[®] (OA)
- › Image Archiving (IA)
- › Network ready
- › Multi-language support

OPTIONAL FEATURES

- › Operator-proximity sensor foot mat
- › Threat Image Projection (TIP)
- › EU-approved TIP libraries
- › External UPS
- › Remote operator interface (5 m, 30 m, and 100 m)
- › Increased conveyor capacity (300 kg)
- › Additional multi-language support available upon request

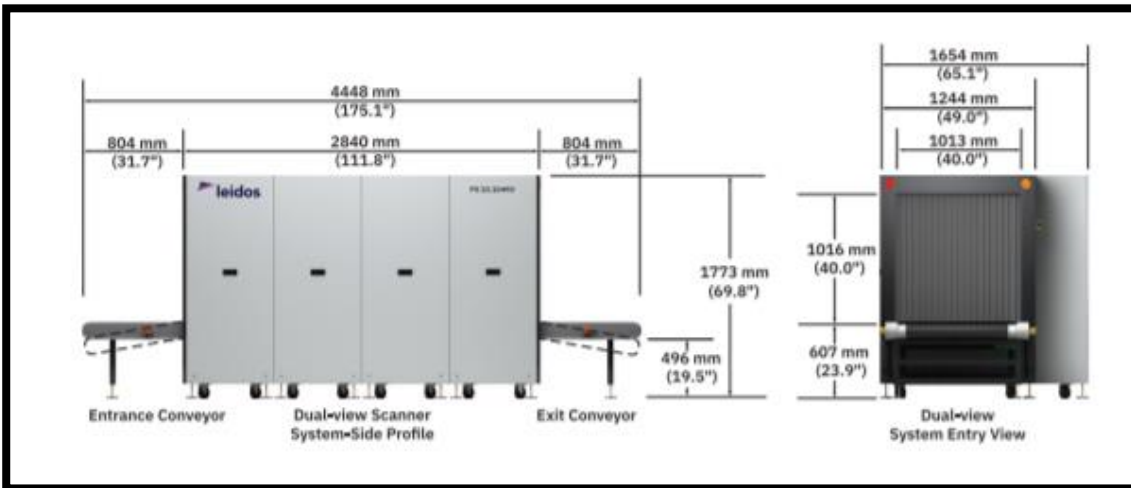
RADIATION

Compliant with USFDA, Center for Devices and Radiation Health Standards for Cabinet X-ray Systems (21CFR1020.40). Typical leakage radiation is less than 0.1 mR/hr compared to maximum of 0.5 mR/hr permitted by the federal standard.

Operational Standards

- › CDRH 21 CFR 1020.40 Cabinet X-ray Systems and maximum leakage radiation less than 0.1mR/hr (1µ Sv/hr)
- › NRTL certified to ANSI/UL 61010-1, CAN/CSA 22.2 No.61010-1 and CE compliant
- › Designed for TIP1A/TIPII/STIP compliance

PX™ 10.10-MV



2.) HI-SCAN 100100V-2is

HI-SCAN 100100V-2is is especially designed to meet the requirements and needs of airports, custom facilities, carriers, parcel services or wherever high security of a large variety of dimensions is required.

The HI-SCAN 100100V-2is is equipped with two 160kV generators in a 90-degree opposition thus providing a horizontal and vertical view of the screened object (Dual View). This particular screening method facilitates reliably inspections of tightly packed objects in one process while shortening inspection times.

Its compact system design provides highest performance on smallest footprint. Additionally, the optimized conveyor load of 220 kg allows the fast screening of break bulk cargo.

GENERAL SPECIFICATIONS

Tunnel dimensions - 1010 (W) x 1010 (H) [mm] • 39.7" (W) x 39.7" (H)

Max. object size - 1000 (W) x 1000 (H) [mm] • 39.4" (W) x 39.4" (H)

Conveyor height - approx. 620 mm (24.4")

Conveyor speed (adjustable with frequency converter) - typical 0.2 [m/s]

max. conveyor load even distributed over the whole conveyor - 220 kg (485 lbs)

Resolution (wire detectability) - standard: 39 AWG (0.09 mm) • typical: 40 AWG (0.08 mm)

Penetration (steel) - standard (view A): 35 mm • typical (view A): 37 mm - standard (view B): 35 mm • typical (view B): 37 mm

X-ray dose / inspection (typical) - HI-MAT: 3.4 μ Sv (0.34 mrem)

Film safety - guaranteed up to ISO 1600 (33 DIN)

Duty cycle - 100 %, no warm-up procedure required

X-RAY GENERATOR

Anode voltage • cooling - 160 kV cp • hermetically sealed oil bath

Beam directions view A / view B - view A: diagonal from side / view B: diagonal from bottom to top

IMAGE GENERATING SYSTEM

X-ray converter - L- shaped detector line

Grey levels stored - 4096

Image presentation - B/W, color

Digital video memory - 1280 x 1024 / 24 bit

Image evaluation functions - VARI-MAT, O2, OS, HIGH, REVIEW, LOW, NEG; electronic zoom: stepless enlargement up to 64 times

Monitor - Flat Panel LCD Monitor

ADDITIONAL FEATURES

Features - fading-in of date/time, luggage counter, user id-number, luggage marking system (acoustic), display of operating mode, REVIEW-feature (to recall previously visible image areas), zoom overview, free programmable keys, USB 2.0 interface, stepless zoom

Options - X-ACT, HI-TIP, HI-SPOT, SEN, XPlore, IMS (Image Store System - stores up to 100,000 images), Xport

INSTALLATION DATA

X-ray leakage - meets all applicable laws and regulations with respect to X-ray emitting devices.

CE-labelling - in compliance with directives 2006/42/EC, 2014/35/EU, 2014/30/EU

Sound pressure level - < 65 dB(A)

Operating / storage temperature - 0° - 40°C / -20°C - +60°C

Humidity - 5% - 95% (non-condensing)

Power supply - standard: 230 VAC or 120 VAC +10% / -15% • 50 Hz / 60 Hz ± 3 Hz

Power consumption - approx. 1.3 kVA

Protection class system / keyboard - IP 20 / IP 43

Dimensions • Weight - 3585 (L) x 1530 (W) x 1750 (H) [mm] • approx. 1050 kg / 141.1" (L) x 60,2" (W) x 68.9" (H) • approx. 2315 lbs

Mechanical construction - steel construction with steel panels, mounted on roller castors
standard color: RAL 7016 (dark gray)

HI-SCAN 100100V-2is

