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**Summer school**

**SUSTAINABLE DEVELOPMENT OF YACHTING AND CRUISE INDUSTRY**

**Topic T2\_S3: Planning and development of marina  
and cruise port infrastructure**

**Lecturers: Maja Škurić, PhD; Zoran Kovačević, PhD**

**Kotor, 21/07/2022**

**Project no. 609675-EPP-1-2019-1-ME-EPPKA2-CBHE-SP**



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## Topics of the lecture

- Types and activities of cruise ships
- Infrastructure and services in cruise ports
- Embarkation and Disembarkation Processes
- Case study: Kotor cruise port



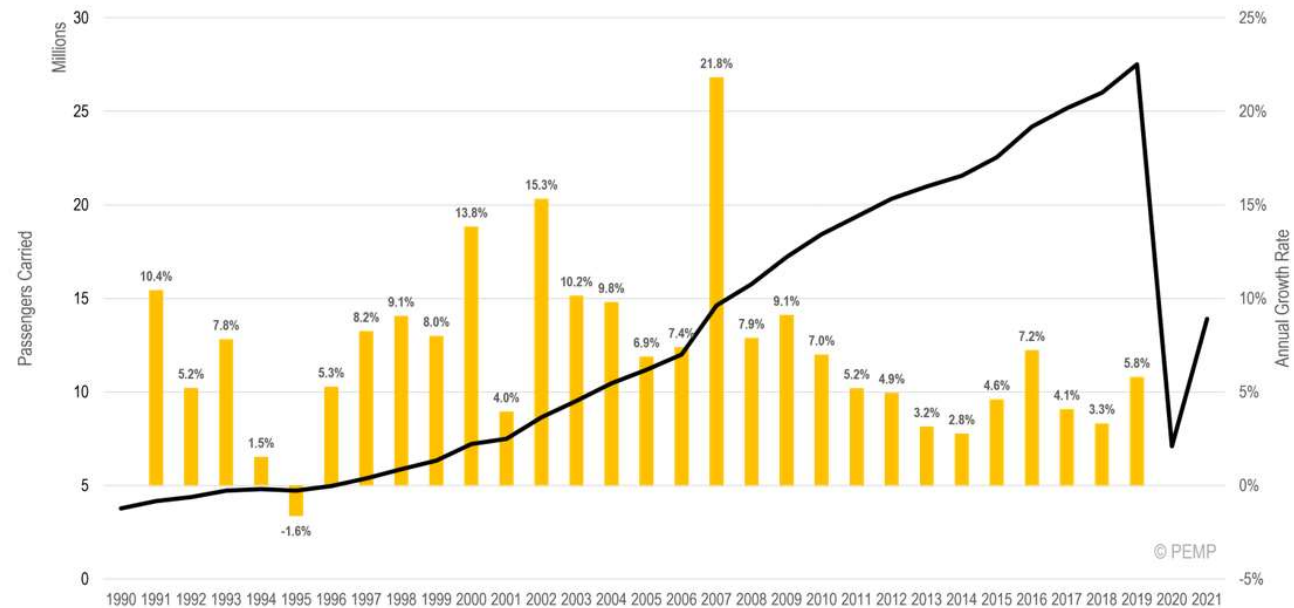


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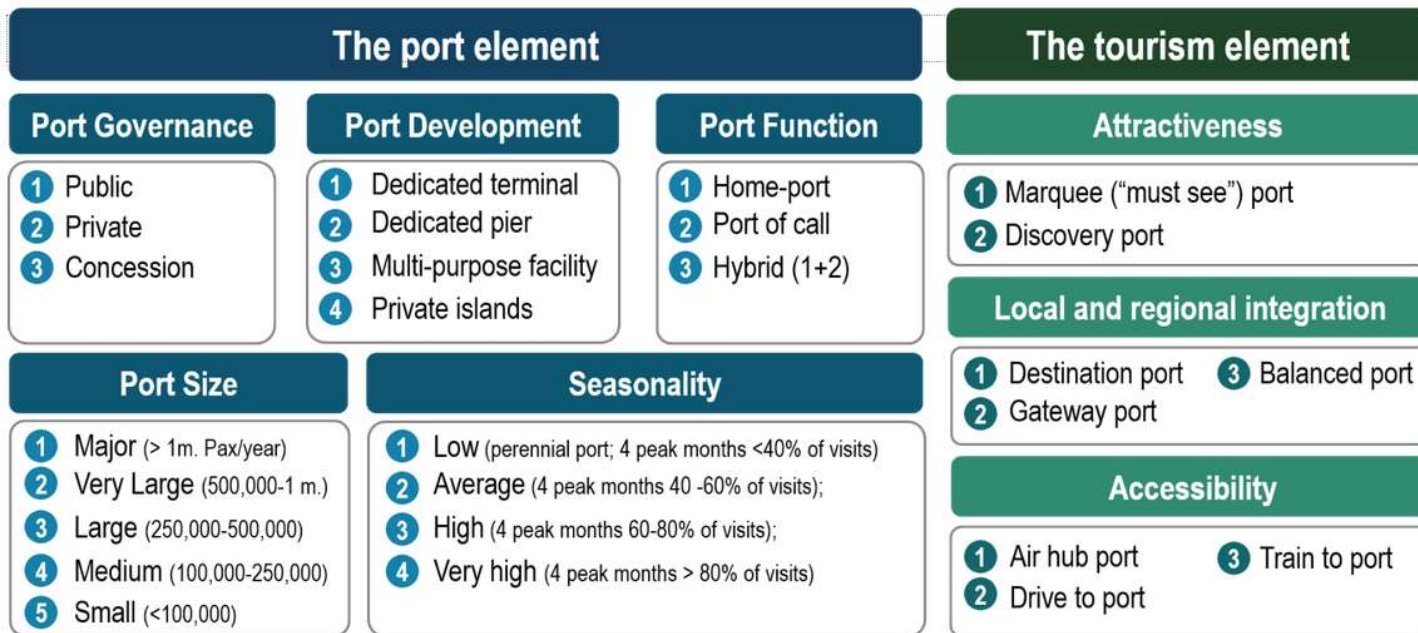
## Introduction

- The port is vital for assuring schedule reliability and allowing a continuous passenger (dis)embarkation and transfer to onward journeys and day excursions.
- This highlights the considerable financial contribution of cruising to port cities or nearby touristic destinations.
- 20th century - the global cruise port system has been characterized by a high level of regional concentration as well as a clustering of port visits.
- 21st century - this concentration has diminished rapidly, as expansive global itinerary building in cruise lines and a growing interest in advancing cruise activities by many cruise ports has increased the number of ports hosting notable levels of cruise activities.



Global Cruise Passengers Carried and Growth Rates, 1990-2021

# Typology of Cruise Ports



- Ports offering services to cruise lines vary in many respects as the aim of cruise shipping is different from that of cargo shipping. Cruise lines focus on the provision of amenities to cruise passengers, rather than just transportation services. The presence of these two elements, transport, and tourism, results in multiple criteria for a typology of cruise ports. The first group of criteria is similar to those observed in cargo port markets.
  - The second group reflects the peculiarities of the cruise market, including the catalytic influence of the tourism element.



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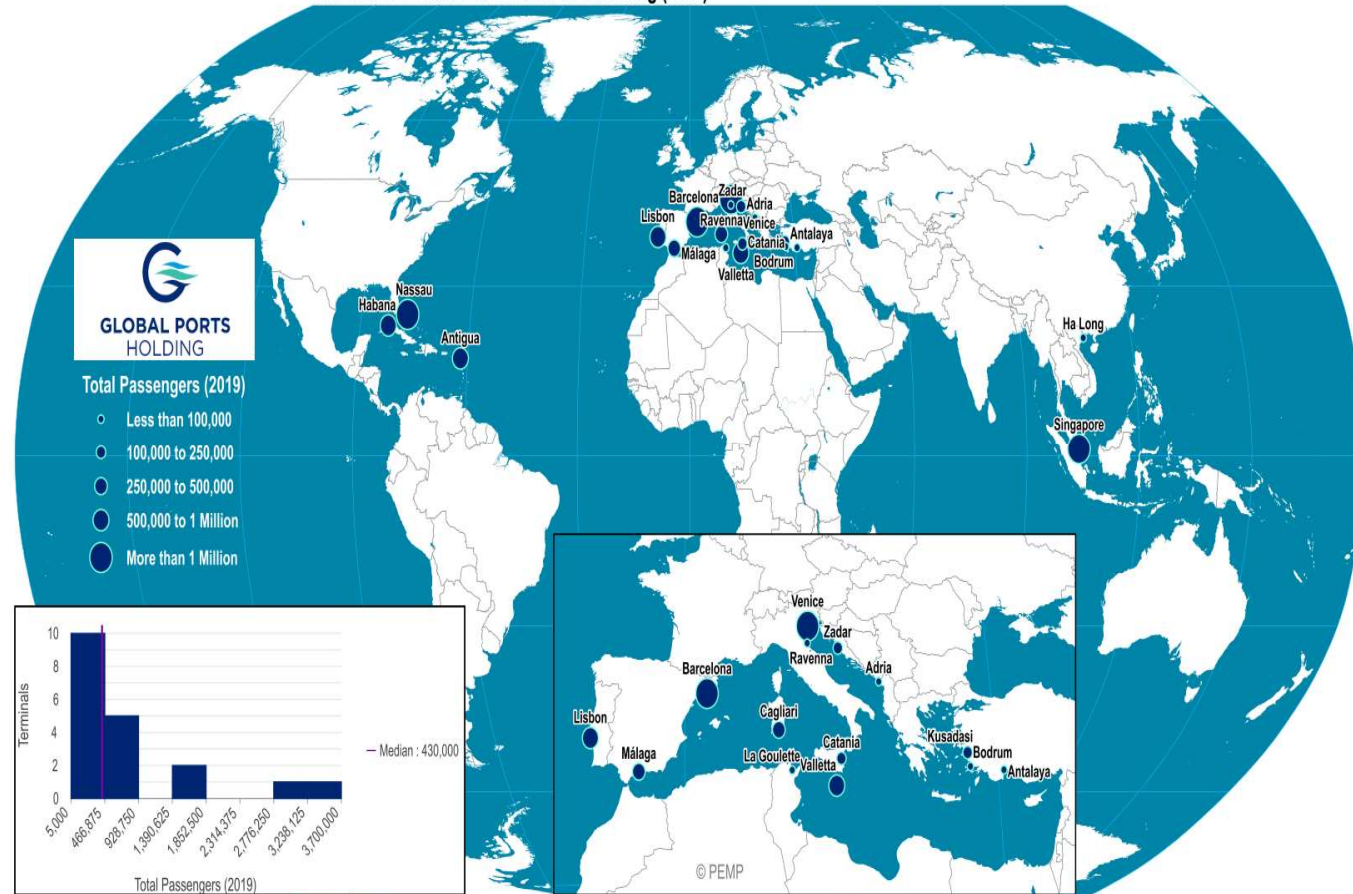
## The port element

- Depending on their role in cruise itineraries, cruise ports fall into the following categories:
  - **Home ports** (*turnaround ports or hub ports*) are the ports where passengers begin or end their cruises. Most commonly, they are both the commencing and the ending point of a designed itinerary. About 80% of all cruises end up in their port of origin, meaning that cruises are usually set up as loops. There are a growing number of homeports where passengers can begin or end their journey.
  - **Ports of call** (*transit ports*) are an intermediate stop on route to another destination. Cruise ships call for a few hours before continuing their itinerary, offering their guests the opportunity to visit the port-city and nearby touristic attractions.
  - **Hybrid ports** blend the two categories as they are the starting and ending point for some cruise itineraries but also act as an intermediate point for other cruise itineraries.
  - Cruise lines expect specific levels of **services and space** as more than ten square feet are needed to serve each passenger check-in in less than 15 minutes and disembarkation in less than 20 minutes. Architects and builders are developing specialized terminals with many aesthetic characteristics.

# Global Ports Holding

- The uninterrupted growth of cruising has resulted in the opening of a window of opportunity to several firms, including cruise lines and, specialized cruise terminal operators such as **Global Ports Holding**.
- The leasing of cruise terminals to third parties and the development of new terminals have become common. In some ports, cruise lines are directly involved in the financing, building, and operations of terminals). In other ports, local cruise terminal operators (frequently being port agents) are joined by other companies that have developed interests in taking control over cruise ports and specialized purpose vehicles (SPVs) built by terminal operating companies. This led to the emergence of international operators.

The Cruise Portfolio of Global Ports Holding (GPH)

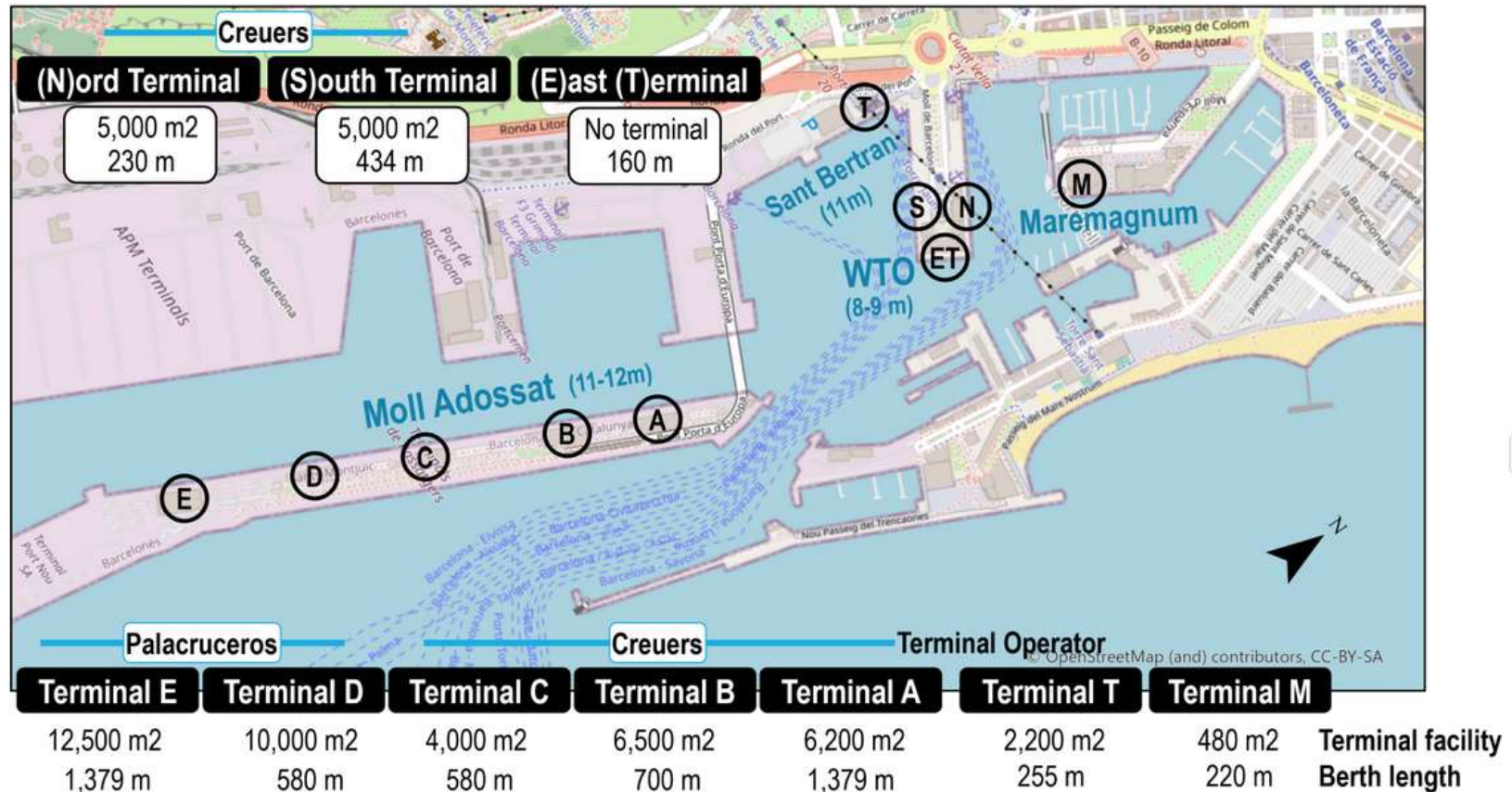


Source: GPH.

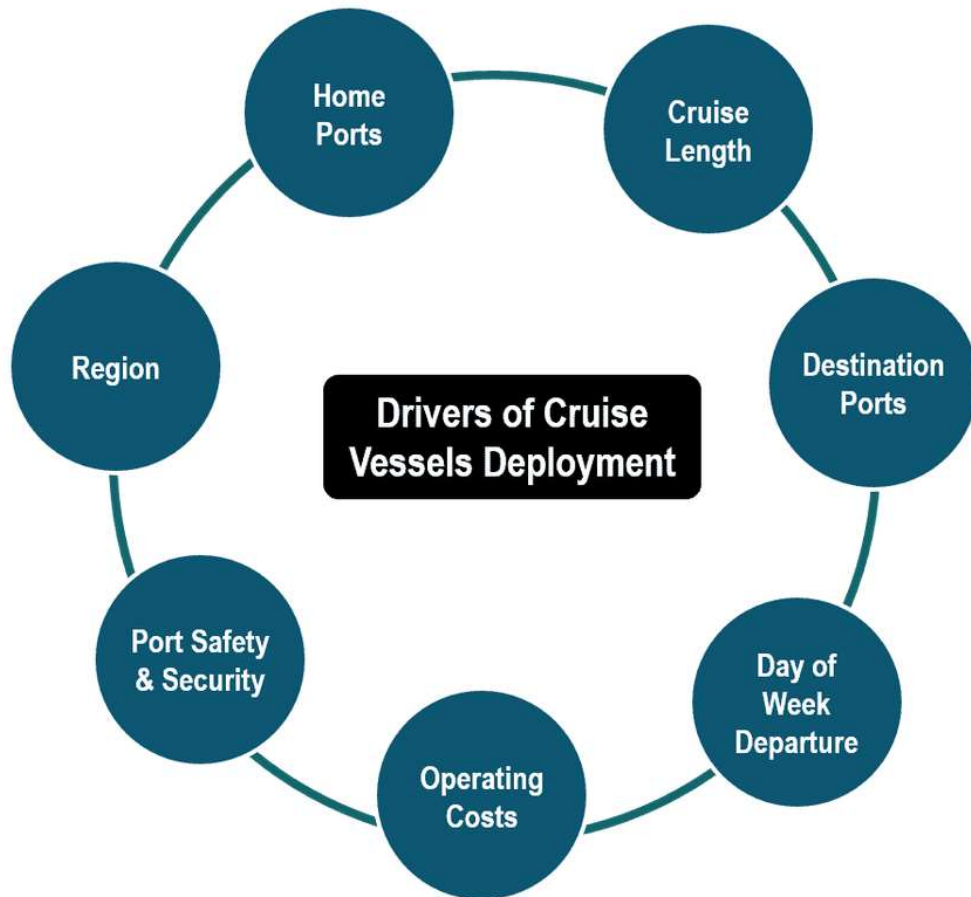
Dr. Jean-Paul Rodrigue, Dept. of Global Studies & Geography, Hofstra University.

## Example - Port of Barcelona

- The terminalization of cruise ports implies advanced, autonomously operating cruise terminals of considerable size (e.g., **Port of Barcelona**), accompanied by the presence of cruise terminal operators that assume responsibility for operating, and in some cases constructing and developing these terminals.



## Cruise ship deployment



## Scale of cruise port calls

Tonnage (GT)	Length (m)	Beam (m)	Draft (m)	# Passengers	# Crew	% of fleet (2019)
7,500 – 12,500	142	20.0	5.2	<489	<160	7.3%
12,500 – 27,500	183	25.4	7.2	489 – 922	160 – 318	7.7%
27,500 – 45,000	206	28.1	7.2	923 – 1,581	319 – 424	12.3%
45,000 – 65,000	251	32.2	8.1	1582 – 2,153	425 – 696	22.7%
65,000 – 85,000	281	32.2	8.1	2,154 – 2,683	697 – 943	30.5%
85,000 – 125,000	294	36.0	8.5	2,684 – 3,596	944 – 1,191	17.3%
125,000 – 175,000	339	39.7	8.8	3,597 – 4,371	1,192 – 1591	1.8%
> 175,000	362	47.0	9.3	>4,371	>1591	0.5%

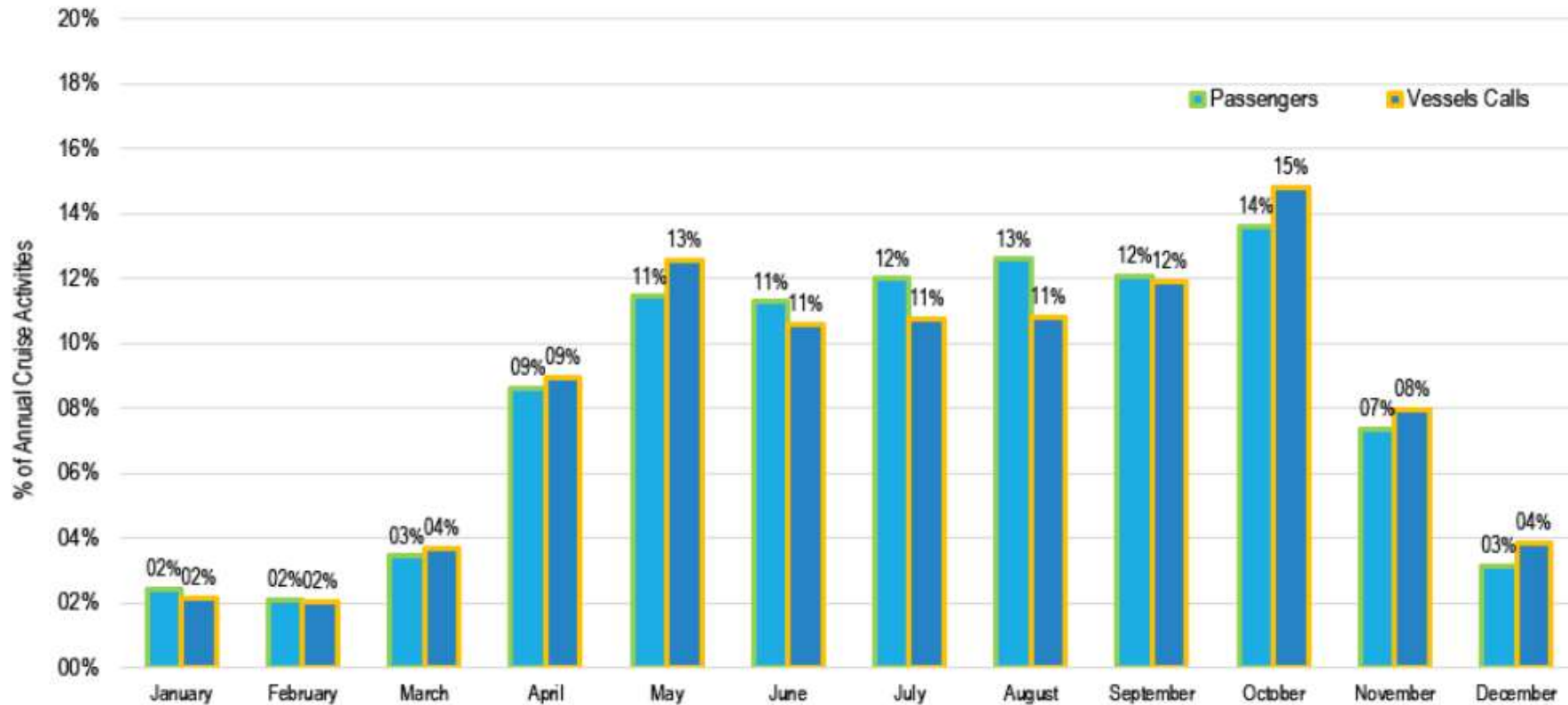
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## Types of cruise itineraries



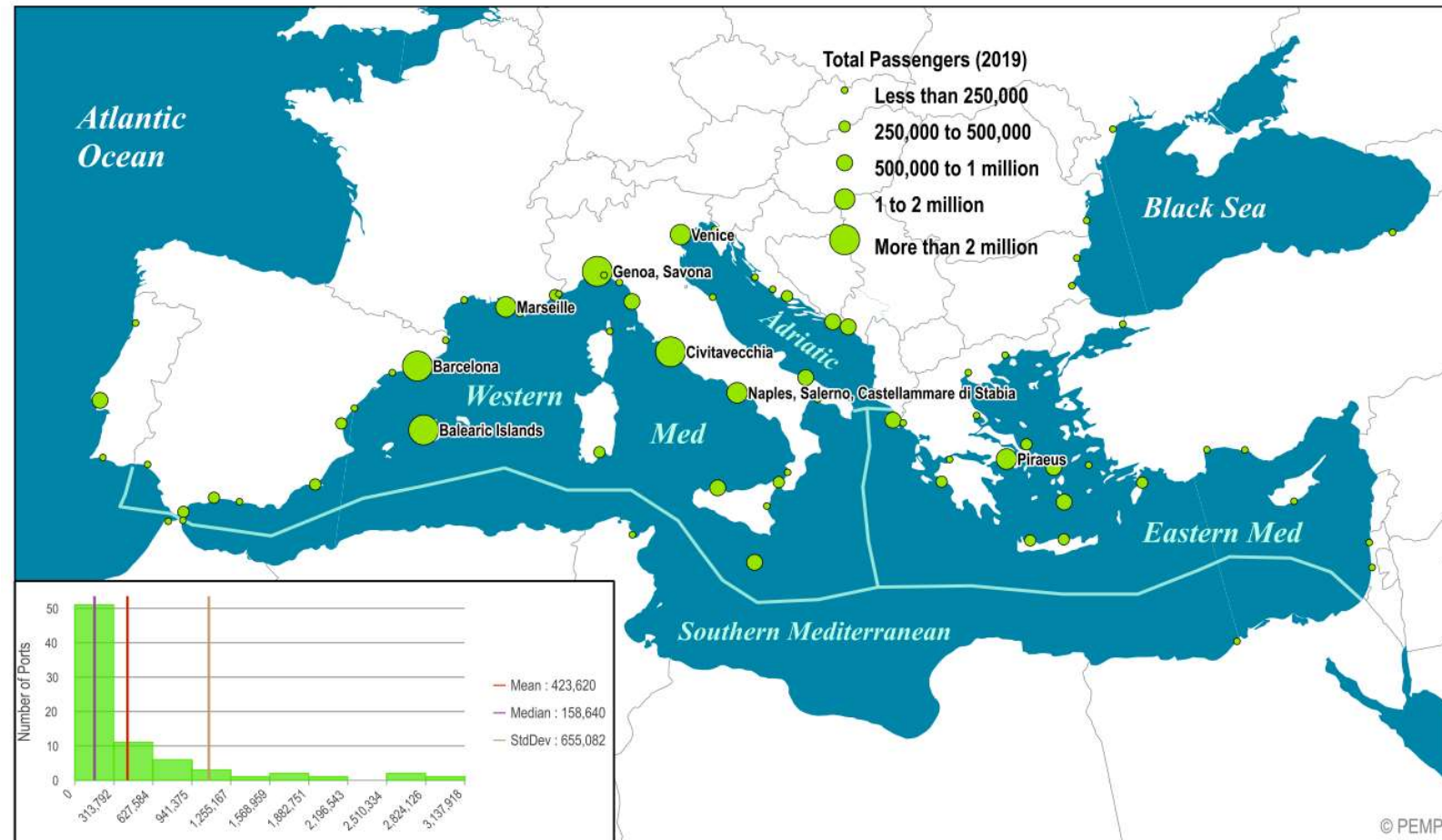


# Seasonality of Cruise Port Activities in the Mediterranean Sea (2019)



### Cruise Passengers Visits, Mediterranean, 2019

# Cruise passengers movements in MED cruise ports (2019)



## Types and activities of cruise ships

### INFINITY-CLASS VESSELS | OCEAN VICTORY, Delivery 2021



OCEAN EXPLORER/ODYSSEY  
Delivery 2021/2022



SYLVIA EARLE  
Delivery 2021



OCEAN DISCOVERER  
Delivery 2023



OCEAN ALBATROS  
Delivery 2022

### OTHER VESSELS



M/V GREG MORTIMER



M/V SEA SPIRIT



M/V OCEAN DIAMOND



M/V OCEAN ENDEAVOUR



M/V OCEAN ADVENTURER



M/V OCEAN ATLANTIC



M/V QUEST



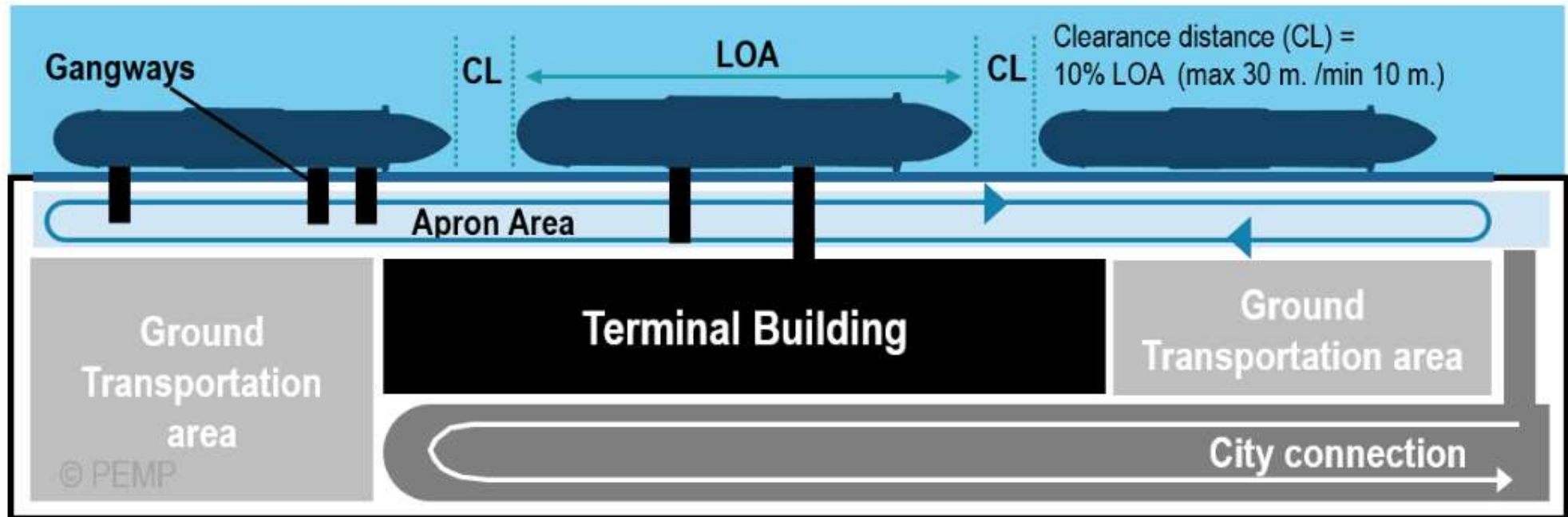
M/V OCEAN NOVA

Largest cruise ship  
worldwide as of  
February 2022, by  
gross tonnage is:  
**Wonder of the Seas**  
**(Royal Caribbean)**

## Cruise port services

	Entrance & berth facilities	Cruise ship & services	Passenger services
Generic Facilities	<ul style="list-style-type: none"> <li>• Manoeuvrability</li> <li>• Draught</li> <li>• Berth dimensions</li> <li>• Anchorages</li> </ul>	<ul style="list-style-type: none"> <li>• Dedicated cruise ship piers</li> <li>• Berth reservation process</li> <li>• Tugboats</li> <li>• Pilotage</li> <li>• Fuel services</li> <li>• Fresh water services</li> <li>• Food and beverages</li> </ul>	<ul style="list-style-type: none"> <li>• Separation of pier uses in port</li> <li>• Pedestrian paths</li> <li>• Tourist information</li> <li>• Cleanliness</li> <li>• Immigration quickness</li> <li>• Port aesthetics</li> <li>• Ship to coach quickness</li> <li>• Sufficient availability of coaches/ taxis</li> </ul>
Home Port	<ul style="list-style-type: none"> <li>• Bollards</li> <li>• Fenders</li> </ul> <p>© PEMP</p>	<ul style="list-style-type: none"> <li>• Waste reception facilities</li> <li>• Quality of shipping agents</li> <li>• Speed of ship clearance</li> <li>• Stakeholder cooperation</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of passenger terminal</li> <li>• Parking facilities (short &amp; long term)</li> <li>• Shops</li> <li>• Passenger throughput range</li> <li>• Security procedures</li> <li>• Availability of baggage storage</li> </ul>

## Cruise terminal configuration



## Apron area of the cruise terminal

Fixed gangway



Fixed telescoping gangway



Mobile adjustable gangway





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## Embarkation and Disembarkation Processes

- **Entrance space** is a gathering space for passengers arriving at the terminal, a shelter from the weather, a place to seek information, and a place to queue for the next step in the process.
- **Bag drop space** where bags are brought for the security check and organizing prior to loading onto the ship.
- **Luggage security controls** (X-ray scanners) that allow thorough luggage monitoring, and detecting objects that are not allowed to be taken on board.
- **Queuing space** that includes multiple lanes for passengers to process through security controls boarding the ship.
- **Passenger security controls** (passenger X-ray lanes), with operating schedules adapted to the size of traffic, peak hours, and other local and cruise-ship requirements.
- **Ticketing** where passengers pick up their tickets before the check-in if not available through prior arrangements.



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## Embarkation and Disembarkation Processes

- **Ticket area queue** where passengers queue before checking in so that people can move quickly from ticketing to boarding.
- **Check-in area** with counters where cruise-line staff process passengers for the designated cruise trip. The use of new technologies like mobile applications or bar-coded wristbands in the check-in process is already bringing changes in the layout of this area.
- **Waiting areas** for checked-in ticketed passengers to wait until boarding can begin. This space is large enough to allow for ample seating and circulation area, as well as space for cruise information and other pre-travel material the cruise lines have.
- **Boarding corridors** where passengers move toward the ship.
- **Staff offices** for cruise operator staff, cruise line staff, and port security.
- **Other spaces**, such as spaces where passengers can have their pictures taken, VIP lounges separated from the general embarkation experience, and even wedding and other special group spaces.





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## Case study: Kotor cruise port

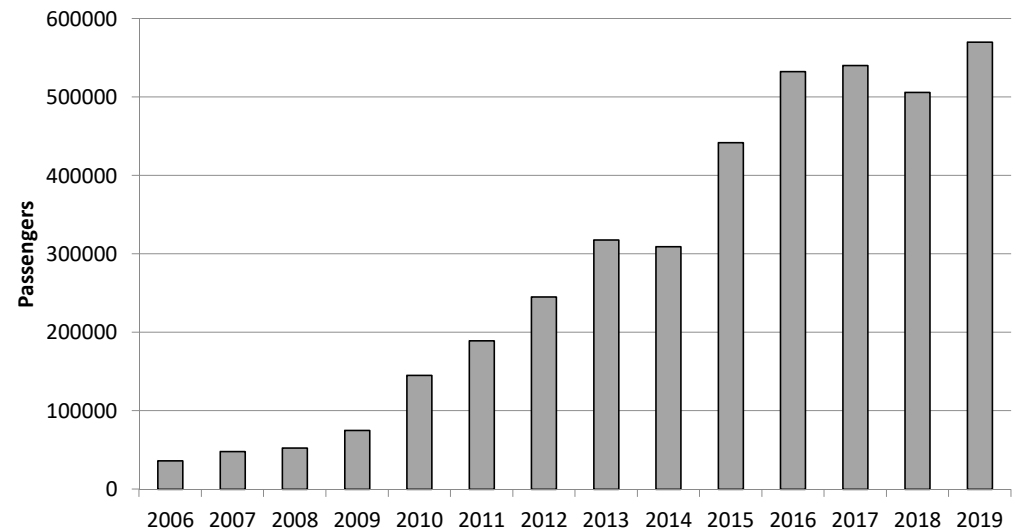
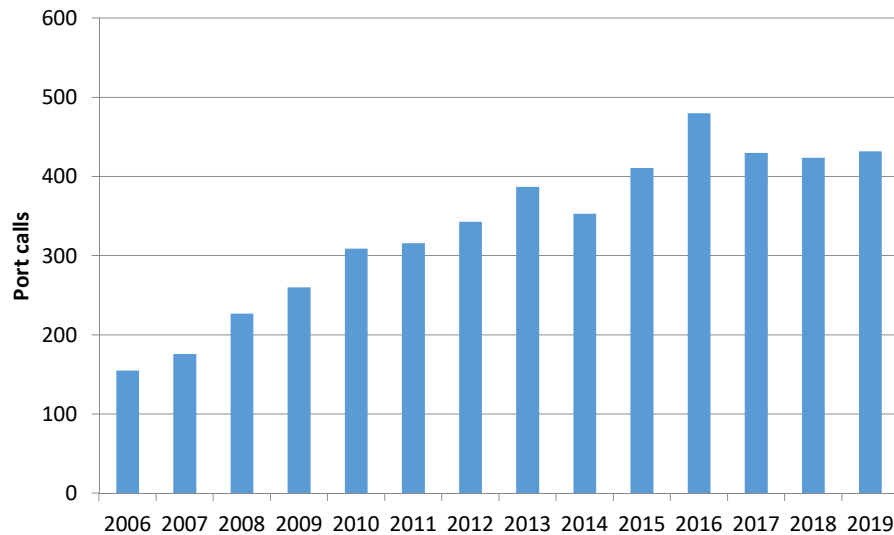


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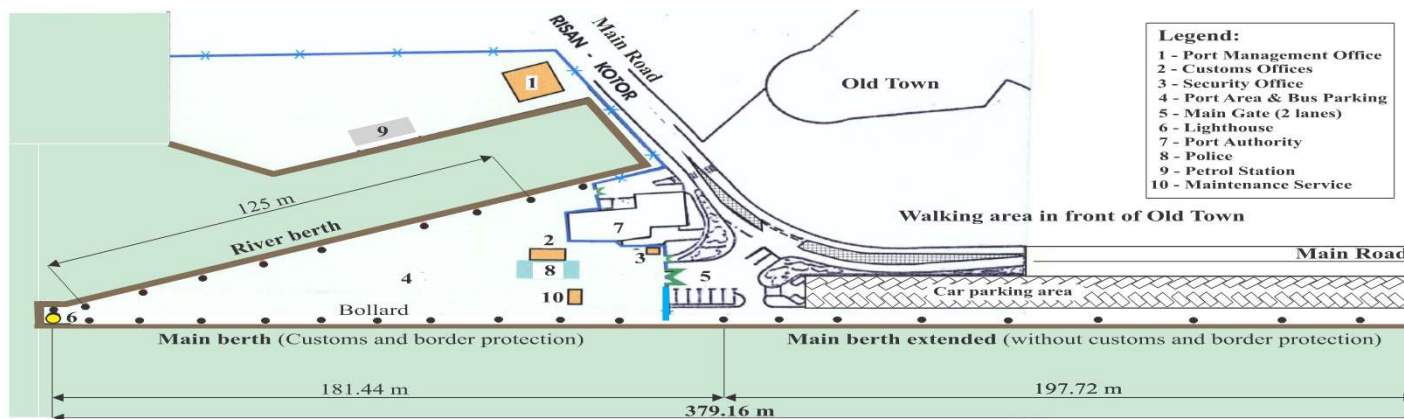
## Case study: Kotor cruise port

- Throughput overview



## Infrastructure and services

- The layout of the Kotor cruise port (left) and the position of two anchorages (right) implies that the proximity of the old town is obvious.
- There is a main berth with customs and border control with a total length of 181.44 m and the available draft is 8 m, while there is also its extension of 197.72 m with the available draft of 6.5 m.
- This port has a river berth capable of servicing cruise ships up to 125 m length and 4.5 m draft. Because some ships have draft limitations, they have an option to anchor and use the tendering services. The first and second anchorages are located 0.28 and 1.1 nautical miles from the main berth, respectively. When passengers need to disembark from the ship, lifeboat tenders are used to provide a link from cruise ships to the shore.





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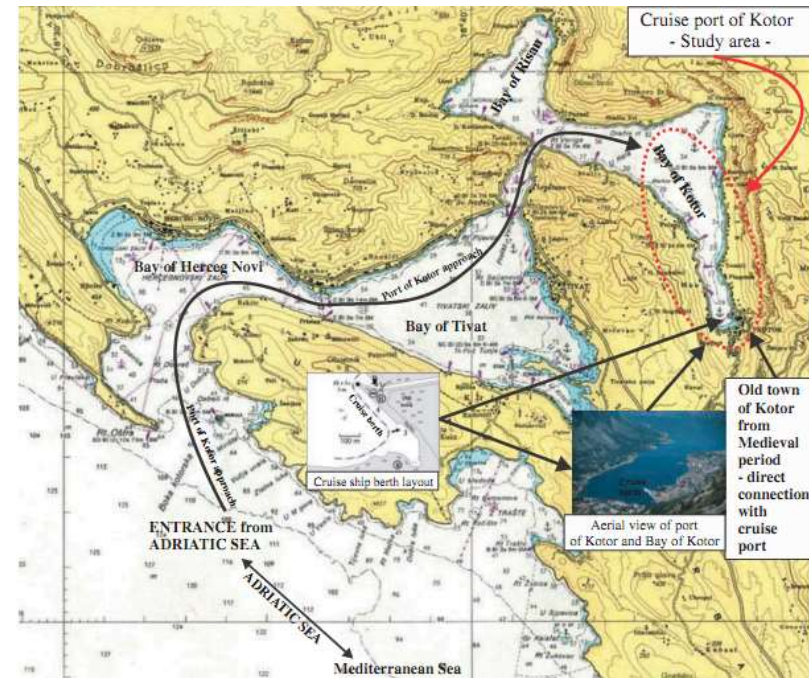
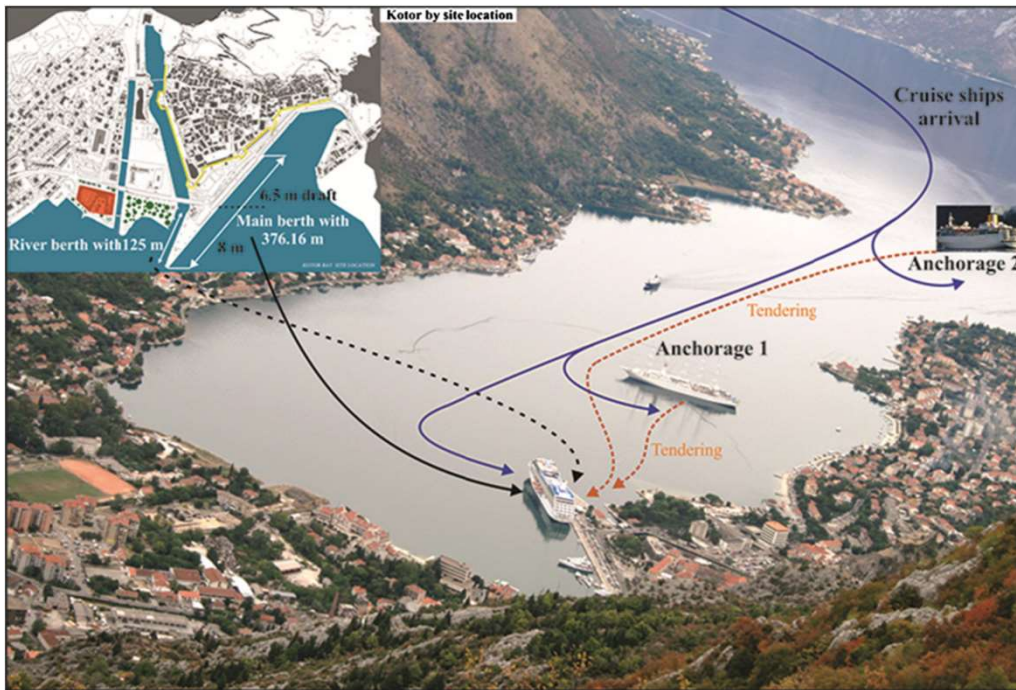


## Operational policies

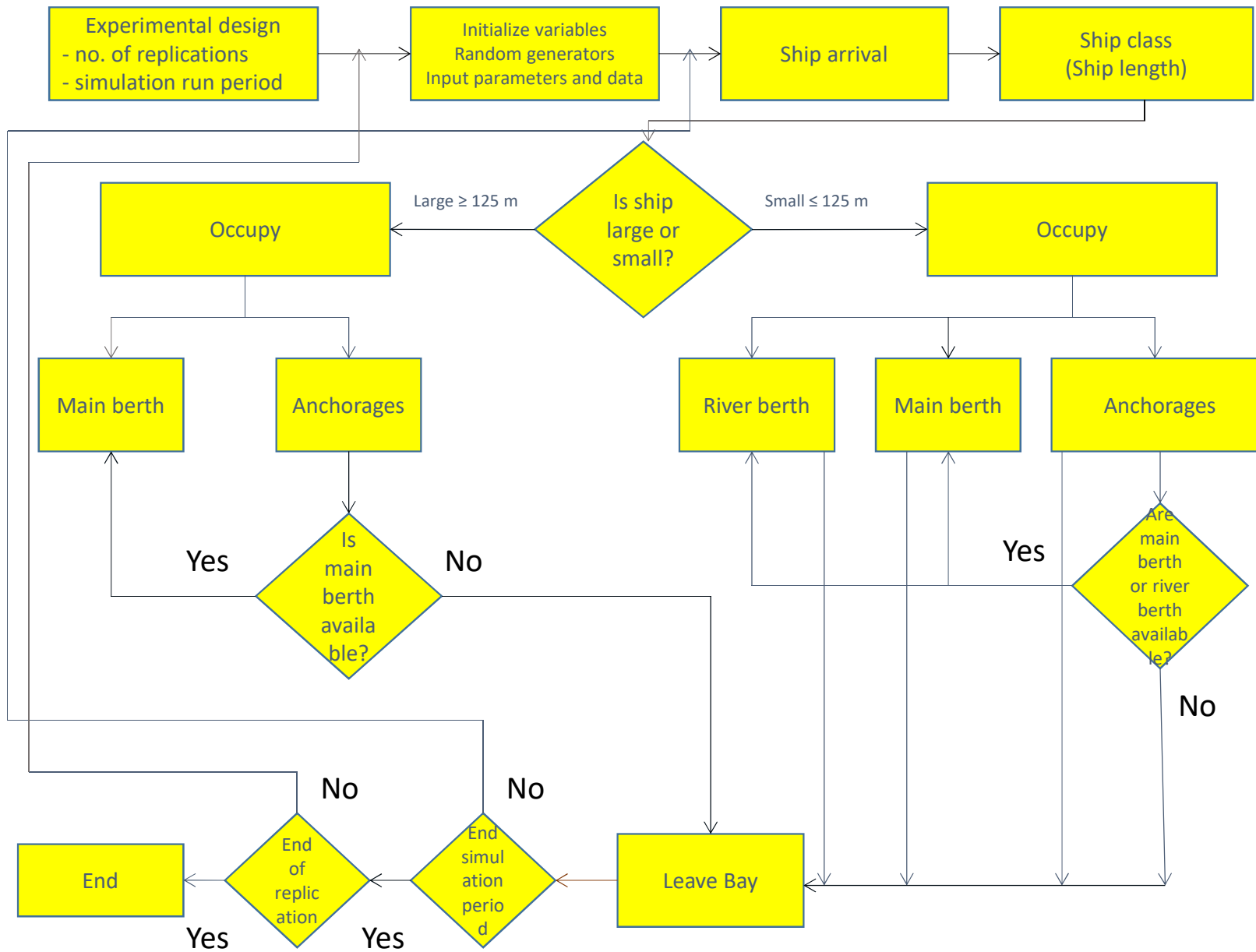
- The company that provides port services in the port of Kotor is the Port of Kotor A.D (PKAD). The PKAD has considered four different operational policies:
  - **Cruise ships being berthed at single or multiple main berth;**
  - **Cruise ships being berthed at single or multiple river berth;**
  - **Cruise ships going directly to the anchorage or going to the anchorage first and then moving to the single main berth or river berth;**
  - **Cruise ships on the cycle cruise inside the bay.**
- The first operational policy considers the cruise ships that are berthed at main berth because of the operator's contract with the PKAD or priority reasons.
- The second policy considers small cruise ships that need to be berthed at the river berth.
- The third policy considers operators or agents that want their ships going directly to the anchorage or going to the anchorage first and then moving to the main or river berth, if the berths become available in the meantime.
- The fourth policy considers ships on the cycle cruise because of the attractiveness of the area.

# Approaching and departing to/from cruise ports

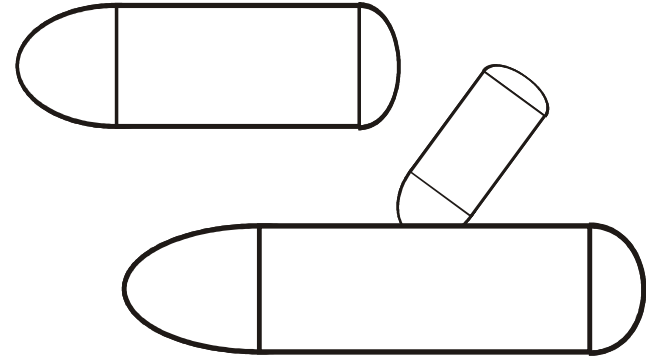
- Example



**SIMULATION EXPERIMENT!**



**Anchorage 2**



**Anchorage 1**



**New ship at anchorage!**



**Ship's tendering!  
Passengers disembarking!**

**Large ship at main berth!**

Yacht marina  
Draft 5 m

Length 197.72 m;  
Draft 6.5 m

Length 181.44 m;  
Draft 8 m

**Main berth**

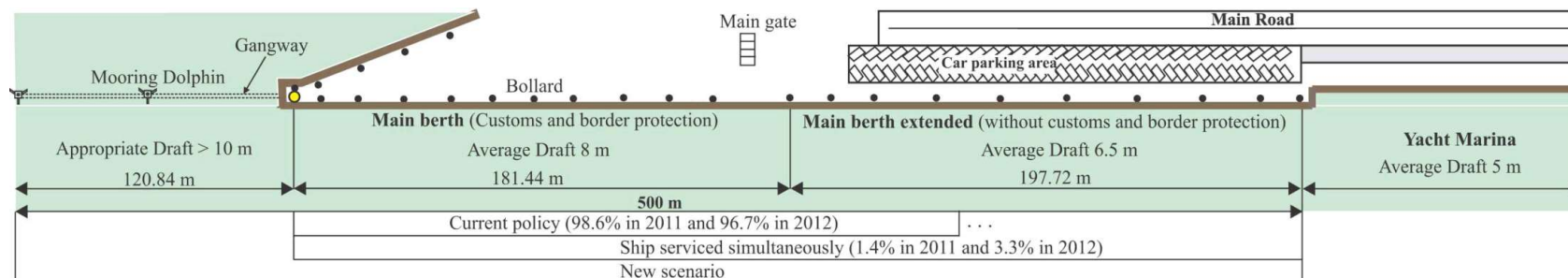
**River berth**

Length 125 m;  
Draft 4.5 m

**Small ship at river berth!**

## Potential for berth extension

- We assume a main berth extension from 380 to 500 m (total quay length) to allow for servicing of two large ships simultaneously. Thus, the guaranteed water depth of 8 m extends approximately 300 m along the quay (left side of figure), enabling the port to handle larger ships. The additional 200 m of quay length provides service to ships with the maximum allowable draft of 6.5 m (right side of figure).
- The proposed quay length of 500 m is the only possible scenario, because of the required space for a ship making a turn in the harbor basin.
- The new scenario assumption consists of two possibilities. In the first, we assume that the existing berth extends to 500 m on the left side of the quay with mooring dolphins without a gangway. The second implies the extension using **mooring dolphins but with a gangway or a construction of a floating dock, such as steel pontoon barges**. This facility presented in figure consists of a system of two mooring/breasting dolphins.





Berths are not available!  
Wait at anchorage!

New ship at multiple berth!

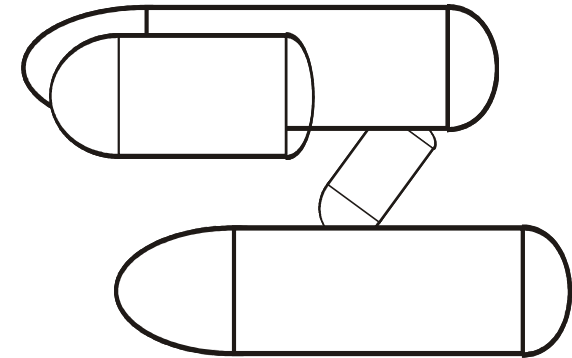
Small ship at river berth!

Large ship at main berth!

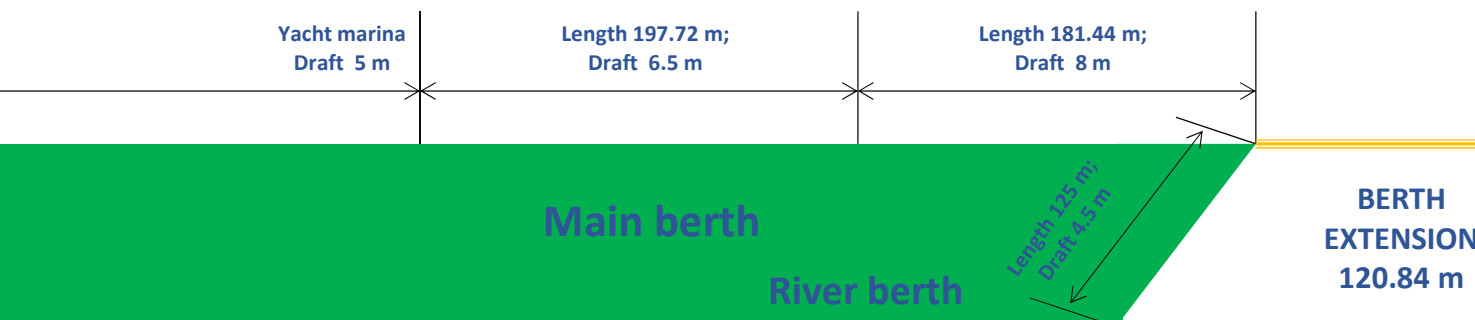
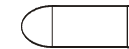
Ship's tendering!  
Passengers' embarking/disembarking!

## New scenario at Kotor cruise port

Anchorage 2



Anchorage 1





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**Thank you for your attention!**

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