

BLUEMED

Activity 3.7

Design technological solutions for KACs

Deliverable 3.7.2

Study for land planning of KACs

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DIPARTIMENTO DI
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HELLENIC REPUBLIC
MINISTRY OF CULTURE AND SPORTS
GENERAL DIRECTORATE OF ANTIQUITIES AND CULTURE HERITAGE
EPHORATE OF UNDERWATER ANTIQUITIES



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1. Introduction

This report aims at describing the guidelines for the Design and Management of the Knowledge Awareness Centers (KACs) to be developed in the pilot sites. In particular, according to ICZM and MSP protocols, possible solutions and locations for the establishment of KACs have been studied and analyzed, including requirements, human/technological resources, regional peculiarities, infrastructural factors, etc.

KAC concept is provided in Section 2. The scope is to develop very efficient facilities able to enhance the traditional museum exhibitions by combining the main information and communication activities of Visitor Centers and Info-Points with innovative digital technologies. The idea of KAC arises from the need to improve and disseminate knowledge about Underwater Cultural Heritage (UCH), raising awareness about the possibility that the underwater archaeological sites could be enjoyed by everyone, both divers and non-divers.

Section 3 reports the results of the study about the KACs implementation according to ICZM and MSP protocols. In particular, involved partners have contributed to underline how the design and implementation of KACs should be framed in accordance with ICZM, MSP and their national regulations. A state of the art in museum management is provided in Section 4 by outlining current best practices in management of Underwater Archaeology Museums, Visitor Centers and Info-Points within MPAs. Only “land-based museums” (not placed in underwater environment) that exhibit materials/artifacts coming from submerged archaeological sites have been considered. The scope is to highlight their work practices and management models to be useful within BLUEMED project in creating new strategies for promoting and manage the UCH in MED areas.

Finally, a study on KACs planning has been carried out in Section 5. It has been focused on the definition of guidelines for KAC’s management model, their sustainability, resources, site planning, roles and regulations.

2. Knowledge Awareness Center (KAC) concept

The cultural and naturalistic heritage that lies on the seabeds around the world is an important resource that arouses particular attention among tourists, both for the sense of mystery that surrounds them and the symbiosis between the artifacts and the sea life. Although the interest in the field of underwater cultural heritage (UCH) is growing, the difficulty in enjoyment underwater archeological assets is still remarkable; hence, there is need to use innovative solutions suitable to raise public awareness and knowledge towards this important topic.

Cultural Heritage represents a very important aspect of our past, showing the historical/cultural development of populations over the centuries. Tourists who travel to learn about unknown places and people, first go looking for museums to visit and/or Visitor Centers that can provide information. KAC's concept arises from the need to improve the exploitation modality of UCH and disseminate knowledge about it, making it accessible and suitable for all, raising awareness about the possibility that the underwater archaeological sites could be enjoyed by everyone, both divers and non-divers.

Today's technological progress provides several ways and options (mainly based on digital technologies) to enhance the traditional museum exhibitions and extend them with different contents and solutions. These new technological approaches arise a great interest among visitors and, at the same time, offer many opportunities to convey the information otherwise impossible to be presented through traditional exhibitions.

Different technological solutions that enable visitors to experiment new ways of communication and interactive visualization are nowadays available in many traditional museums (an overview is reported in deliverable D3.7.1 of the BLUEMED project). This aspect highlights how the integration of digital technologies into the exhibition space of traditional museums can improve knowledge and interest in cultural heritage.

Moving from these considerations, the KAC's concept is based on the design of an exhibition and information center where advanced digital technologies (Virtual Reality, Mixed/Augmented Reality, immersive visualization techniques, man-machine interaction tools and systems, each characterized by a different degree of “engagement”, “expansion”, “personalization” and “gaming”) merge with the traditional museum practice and the dissemination and communication activities of facilities such as Visitor Centers and Info-Points. Moreover, all the diving activities within the underwater archaeological site (bookings, departure/arrival of diving excursions, etc.) will be managed by the relative KAC. Tourists that choose to visit an underwater archaeological site will be able to enjoy the archaeological artifacts using the Virtual Diving systems deployed in the KAC and/or take part to guided tours organized in dedicated underwater trails by using the AR Diving system developed in the context of BLUEMED project.

KACs prove to be very efficient facilities in enhancing traditional museum exhibitions by combining the dissemination and communication activities of Info-Point and/or Visitor Centers with innovative digital technologies. The combination of traditional and innovative approaches in management practices will considerably diversify the KACs offer from any existing approach and will contribute to the success of the KACs themselves. This approach makes KACs a valuable solution to both local community/operators (i.e. diving, maritime and tourism industries) and incoming tourists. They are a key factor in defining a sustainable and responsible model for tourism development based on the management, protection and promotion of underwater natural and cultural sites.

3. KAC design in accordance with ICZM and MSP protocols

ICZM and MSP protocols aim to establish a framework for maritime spatial planning and integrated coastal management in EU Member States with a view to promote the sustainable growth of maritime and coastal activities and the sustainable use of coastal and marine resources.

To ensure the sustainability and environmental health of the sites that will host the BLUEMED KACs, maritime spatial planning of KACs and the coastal management of the related area will have to employ an approach that respects the limits of ecosystems.

To be more specific, for the plans of KACs and the programmes that will be hosted in them, the local authorities have to carry out a screening procedure to determine whether the plans or the programmes are likely to have significant environmental effects. If there are significant effects, a SEA is needed (Directive 2001/42/EC). The SEA Directive applies to a wide range of public plans and programmes (e.g. on land use, transport, energy, waste, etc.). Plans and programmes in the sense of the SEA Directive must be prepared or adopted by an authority (at national, regional or local level).

Except from developing a SEA plan for the implementation of KACs, variable limits and restrictions must be taken into consideration in order to protect the environment and to affect positively the other coastal activities.

Moving from these protocols some common guidelines useful for structural design and which may be put into account for KACs implementation, are proposed:

- a) facilities should be located out of protected areas (where possible) and with respect to the natural landscape;
- b) they will be open and public buildings and in this regard, they will require a huge amount of energy. So, they should follow a green design that employs the principles of sustainability. Additionally, their design should focus on energy-efficient HVAC systems that reduce the dependence on fossil fuels. These systems may use solar, geothermal, or wind energy or some combination of them to achieve the optimal energy consumption. Usually, alternative energy sources are not able to meet all of a facility's energy needs, but they can be used supplementary to traditional energy sources.

In BLUEMED project, sustainability KPIs checklists (see D3.5.1) have been developed to the measurement of the impact on natural, cultural and economic environment resulted from the establishment and operation of KACs. KACs will use KPIs to compare their performance in terms of meeting their strategic and operational goals. The proposed guide must be used

during the design phase of the KACs. KACs land planning must support the aim of KACs to achieve their strategic and operational goals and to facilitate the measurement process, for example by establishing useful measurement equipment and methodologies.

4. Best practices in management of Museums, Visitor Centers and Info-Points within MPAs

One of the most important topics regarding protection of cultural heritage in the 21st century concerns how to protect and manage cultural resources coming from underwater environment by ensuring access, use and enjoyment to people and communities who own such archaeological and historical resources.

UCH is interpreted for the public with the aim of encouraging access, educating visitors, and preserving the resource itself. These are fine goals which, in most cases, are met. However, the problem is that while *in situ* maritime resources are often promoted as underwater or open-air museums, they rarely are managed as such.

To better enjoy underwater artifacts whatever their origin and nature, new museological techniques and innovative approaches should effectively be applied in the design, development and management of underwater archaeological museums, underwater parks, and maritime heritage trails.

In this regard, one of the main goals in KAC design is managing UCH for the public benefit, including ensuring public access and maritime heritage knowledge. However, only recently heritage resource managers have begun to consider even the artifacts from submerged sites appropriate for similar management to that recovered in land-based archaeological sites. In addition, the growth of sport diving as a popular recreational activity has increased the potential volunteer base for underwater projects and the number of people interested in underwater archaeology.

Promoting maritime cultural resources, as heritage tourism attractions, is a relatively new method of management. In order to preserve known underwater resources and to

encourage the protection of newly discovered sites, resource managers must find ways of promoting the inherent value of such cultural heritage from submerged sites.

Scope of this report section is to analyze the state of the art in museum planning to provide an overview of current best practices. Only land-based museums (not placed in underwater environment) that exhibit materials/artifacts coming from submerged archaeological sites have been considered (best practices for managing MPAs, underwater archaeological parks, etc., have been reported in deliverables D3.2.2 and D3.2.1.).

Several existing land-based museums, mainly located in MED areas, have been taken into account. The aim is to highlight their work practices and management models to be useful within BLUEMED project in creating new strategies for promoting and manage the UCH.

It should also be emphasized that the selection of museums presented is far from covering the total range of successful practices related to the protection and promotion of the diversity of cultural expressions such as the land-based museums, but shows the most vivid examples.

4.1 EU Countries

a) Croatia, Museum of Apoxyomenos

General info about the museum

In regard of museums containing underwater archaeological heritage there is one specific example in Croatia: Museum of Apoxyomenos, opened in 2016, a unique type of underwater heritage museum in this area. This unique museum is dedicated exclusively to the statue of Apoxyomenos whose story begins at the very entrance in the blue room on the ground floor. The nine scenes of each room offer exquisite sensory experiences. By means of taste, smell, hearing, and vision, the visitors can fully and individually experience the Apoxyomenos, as well as the destination of the island of vitality, Lošinj, one of the most beautiful spots on the Mediterranean.

About the collections at the museum

The Apoksiomen Museum is an unusual museum built for only one exhibition: the statue of Apoxyomenos, a Greek bronze statue of 192 cm high, most likely in the 2nd or 1st BC. The statue was drawn out from the underwater area of Lošinj in 1999 and is one of the best bronze examples from the Hellenistic period.

After the discovery, a discussion about artifact exhibition place was conducted, where Mali Lošinj was considered as a potential location but also major cities, notably Zadar, Rijeka, and Zagreb. In the end, a decision was made to construct a museum in Mali Lošinj in accordance with Croatia's cultural policy of the 1990s, which favored the dispersive construction of museums outside the larger centers, near location of finding.

The primary argument in such selection is not the availability of statues for visitors, but the wider, fundamental role of culture in society, namely the integration of museums into development and the life of the local community. In this respect, complete success has been achieved, since the whole Mali Losinj has been identified with the found statue.

The Kvarner Palace was chosen as a museum location. Important circumstance is that a new building was not built for the museum; it was placed inside the existing building, on whose facade, under conservation conditions, no intervention was permitted.

The approach, therefore, was to simply insert the museum into an existing building as an iron capsule to highlight the other spatial and temporal dimensions of the statue. The capsule floats above the ground floor, which is completely free and represents the extension of the public space of Riva, as a kind of living room of the city, where it is possible to organize different events, from lectures to exhibitions, following the idea that the museums were to be recognized as the community space belonging to everyone who uses it.

Musealization and display of artifacts within the museum

The museum is located right on the waterfront, which is particularly busy in the summertime, filled with various attractions. For this reason, a filter should be set up,

whereby the visitor gradually separates himself from external attractions, which are simultaneously distracted.

The exhibition space itself is designed as a path. It represents a spatial materialization of scenarios and ceremonies of passing through the rooms and corridors that embody the architecture which is programmed with an accompanying exhibition and the display of the statue.

The statue leads the way through a series of spaces where the story of the statue, its invention, restoration, and media records is told. In the projection room visitors are shown a movie, from which they go down the stairs to the room of the periscope. In this area there are cameras that show the parts of the statue, as well as the opening through which the statue is seen. clips from the newspaper about Apoxyomen are exposed here, too.

Through the wooden passage, it comes to the statue in its separate room.

The journey through this narrative space ends in a room with stairs and mirrors, featuring a panoramic roof window, the only addition to the south facade of the building, where visitors gradually return to contemporaneity of Mali Lošinj area.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
9:00 am 05:00 pm	Monday	Adults: 75 HRK (ca 10€) Children age 12-18/Students/Senior citizens 65+: 40HRK (ca 5.3€) Children under age 12: Free Family ticket: 115 HRK (ca 15.3€)	http://www.muzejapoksiomena.hr/

Contact: Museum of Apoxyomenos, Riva lošinjskih kapetana 13, 51550 Mali Lošinj, Croatia, +38551 734260, info@muzejapoksiomena.hr

Museum localization and representative photos on displaying artifacts

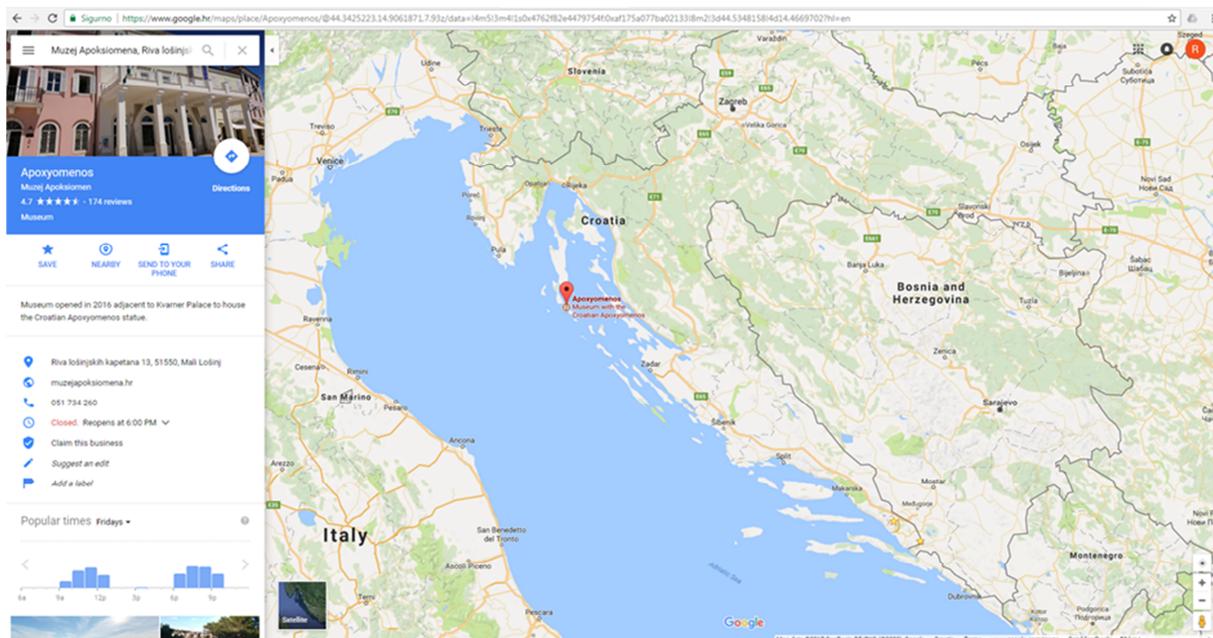


Figure 1. Localization of the Museum of Apoxyomenos (Lošinj, Croatia) – © Google Map 2017



Figure 2. Museum location - The Kvarner Palace (Lošinj, Croatia) © <http://www.muzejapoksiomena.hr/en/>



Figure 3. Statue of Apoxyomenos © <http://www.muzejapoksiomena.hr/en/>



Figure 4. Space where the story of the statue, its invention and restoration © <http://www.muzejapoksiomena.hr/en/>



Figure 5. Projection room where visitors are shown a movie © <http://www.muzejapoksiomena.hr/en/>

Sources:

Full story Museum of Apoxyomenos: (source: <http://pogledaj.to/arhitektura/muzej-apoksiomena-u-malom-losinju/>, Photography: Jure Živković)

b) Spain, National Museum of Underwater Archaeology (ARQVA)

General info about the museum

The National Museum of Underwater Archaeology (ARQVA) is located in Cartagena (Murcia, Spain). In 1980 it was created as the National Museum of Maritime Archaeology and National Centre for Submarine Archaeological Research and in 1982 it opened to the public. In 2008 it changed its name to National Museum of Underwater Archaeology (ARQVA), moved into a new building and opened a new permanent exhibition.

Currently, ARQVA is the institution responsible for raising public awareness of the Underwater Cultural Heritage of Spain, promoting its conservation, and thus enhancing its use and enjoyment. Its objectives are the study, evaluation, research, conservation, promotion and protection of Spain's Underwater Cultural Heritage. These tasks are carried out jointly with the various local governments of the Autonomous Regions and their research centers, and with the member states signatories of the UNESCO Convention.

About the collections at the museum

The Museum's collections come from underwater archaeological surveys and excavations made mainly in the coastal area of the Murcia Region since the 1970s. In recent years, these funds have been increased with donations and deposits from other regional, national and international sites.

In the first part of the permanent exhibition (Underwater Cultural Heritage), archaeological pieces are not exhibited. While in the second part of the exhibition (*Mare Hibericum* and *Oceanic Navigation*) the visitor can discover 2,500 years of maritime history through archaeological collections from the Phoenician times to the 19th century. The archaeological remains from two Phoenician sites must be highlighted. The shipwrecks of *Mazarrón 1* and *Mazarrón 2* are remarkable for being the oldest preserved wooden boat found in the Mediterranean. They date back to the 7th century BC and their cargo has been preserved as well, including materials such as ropes, lead ore ingots and ceramics. The cargo of the *Bajo de la Campana* Phoenician wreck consists of raw materials (an exceptional collection of elephant tusks with pheno-punic inscriptions, tin and copper ingots) and manufactured goods (amphorae, tripod mortars, tableware and luxury objects-stone altar, decorated ostrich eggshells, ointment perfumes, bronze furniture).

In addition, the museum displays a large collection of amphorae and ceramics (Phoenician, Punic Roman mainly and some Modern ones) and a remarkable collection of metal objects (especially lead ingots and anchors dating back to Roman times).

Finally, since 2014 the exhibition includes the cargo of the frigate *Nuestra Señora de las Mercedes*, sunk in 1804 by the English navy in time of peace, and recovered by the Spanish State in the courts of the United States to a treasure hunter company in 2012. The vast majority of its cargo are pieces of eight, silver coins known as eight *reales*. There are also some coins with other values, gold snuffboxes, copper and tin ingots, and other objects.

Musealization and display of artifacts within the museum

The first part of the permanent exhibition invites visitors to immerse themselves in a sea of history, in the world of Underwater Cultural Heritage. The methodology of underwater archaeology is presented to the public using multiple resources: an audio-visual wall consisting of 34 lineal meters of LED screens which recreate an underwater environment; plasma screens that play videos about specific topics (documentation, survey, types of sites, protection *in situ*, excavation, underwater documentation, conservation, laboratory and interpretation); interactive and manipulative buoys which like a buoy in the sea are a signal and support point that provide extra information on technical topics (geophysical survey, diving conditions, vacuum cleaner, material extraction with balloons, etc.); a replica of the Phoenician ship (*Mazarrón 2*) scale 1/1, its cargo, the grid and the protecting box; a laboratory table that invites visitors to discover analytical archaeology and archaeometry; and the Multimedia Library, that offers a virtual window into the world of International Underwater Archaeology.

In the second part of the exhibition, the results of these underwater archaeological researches are presented through archaeological collections displayed in large showcases. This discourse is completed with textual information, attractive graphics, recreated scenes, maps, and educational audiovisual materials that allow the public to interpret the objects in their historical context. There are also models, interactive and controllable displays, all of which encourage learning through experimentation and allow deepening in various thematic discourses: trade, navigational routes, live on board, rites and beliefs, etc.

This area also includes two specific spaces. A manipulative scenography dedicated to naval construction and navigation, where the visitor can see, feel and touch scale models of five sections of boats and their cargo, and various manipulative elements which allow public discover how boats were built in different periods, how products were stowed, how some of them smelled or how to make sailor knots.

In addition, there is a multi-interactive table in which several visitors can share a collective experience, interact and discover the diversity and richness of shipwrecks, harbors and anchorages of the Mediterranean.

Finally, in relation to the linguistic accessibility to the museum, note that the texts are bilingual (Spanish and English), there are information sheets of each area available in French, Italian and German and also audio guides (in Spanish and English, for adults and for families) and sign guides (with subtitles or in Spanish sign language).

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
<p>15 April - 15 October: Tuesday to Saturday, 10:00 am- 9:00 pm Sundays & public holidays, 10:00 am- 3:00 pm</p> <p>16 October - 14 April: Tuesday to Saturday, 10:00 am- 9:00 pm Sundays & public holidays, 10:00 am- 3:00 pm</p> <p>Ticket sales end 30 minutes before the exhibition close.</p>	<p>Every Monday December 24th, 25th, 31th January 1st, 6th May 1st 1 local public holiday</p>	<p>Adults: 3€ Group rate: 1.50 € Children under age 18: Free Students, unemployed: Free Senior citizens 65+: Free Retirees and pensioners: Free Handicapped people: Free Free entrance for all public: Saturdays (from 15:00), Sundays May 18th, October 12th December 6th</p>	<p>http://www.mecd.gob.es/mnarqua/en</p>

Museum localization and representative photos on displaying artifacts



Figure 6. Localization of the National Museum of Underwater Archaeology (Cartagena, Spain). © Google Map 2017.



Figure 7. Localization of the National Museum of Underwater Archaeology (Cartagena, Spain). © Google Map 2017.



Figure 8. New building of the National Museum of Underwater Archaeology (Cartagena, Spain). © Archive ARQVA.



Figure 9. Underwater Cultural Heritage at National Museum of Underwater Archaeology (Cartagena, Spain) © Archive ARQVA



Figure 10. Mare Ibericum and naval construction wall at National Museum of Underwater Archaeology (Cartagena, Spain). © Archive ARQVA



Figure 11. Some Phoenicians objects from 7th- 6th centuries BCE: wooden remains of the ship of Mazarrón 2 and some objects from Bajo de la Campana cargo (elephant tusks with Pheno-punic inscriptions, pedestal of dolomite stone) at National Museum of Underwater Archaeology (Cartagena, Spain). © Archive ARQVA.



Figure 12. Objects exhibited of the frigate Nuestra Señora de las Mercedes (19th century) at National Museum of Underwater Archaeology (Cartagena, Spain). © Archive ARQVA.

Sources:

<http://www.mecd.gob.es/mnarqua/en/home.html>

<http://www.mecd.gob.es/mnarqua/en/museo.html>

<http://www.mecd.gob.es/mnarqua/en/colecciones.html>

c) Turkey - The Bodrum Museum of Underwater Archaeology (Bodrum)

General info about the museum

The Bodrum Museum of Underwater Archaeology, which received a special commendation in 1995 as European Museum of the Year, is located in the southern Aegean coast of Turkey and was established in the Bodrum Castle in 1964 by the Turkish Ministry of Culture.



Today it's recognized as one of the world's greatest Underwater Archaeology Museums, visited by more than 300,000 visitors a year.

Although the castle is under the auspices of the Turkish Ministry of Culture, all the museum exhibitions are overseen by the Institute of Nautical Archaeology, an American non-profit organization with bases both in Bodrum and Texas, United States of America.

The Bodrum museum in Turkey is a striking example of how the protection of underwater cultural heritage contributes to urban development; in fact, through the valorization of items from underwater (especially wrecks) tourism has increased. The castle is now the second most visited museum in Turkey, and has won numerous awards with its display of finds from underwater excavations along the Turkish coast.

About the collections at the museum

With 14 exhibition departments, it is regarded as one of the more interesting museums for anyone who shows an interest in Maritime Archaeology, where very first artifacts were collected from the ocean floor by divers and put on exhibit. Departments host several collections of ancient artifacts mainly including items retrieved from local shipwrecks with the world's biggest Eastern Mediterranean Amphora collection. Here below, the 14 departments which host different collections and of which it's worth taking a look at some of the highlights: a) Amphoras Exhibition (Turkish Bath Exhibition); b) Hall and Rooms (Carian Princess Hall, Coins and Jewellery Hall, Glasswreck Hall, Glass Hall, The Dungeon, Secret Museum); c) Towers (Commandant's Tower, English Tower, German Tower); d) Shipwrecks (Tektaş Shipwreck, LateRoman Shipwreck, Uluburun Shipwrecks).

One of the most significant areas is the *Glass Hall*, with its ongoing exhibition of glass and glassware where specimens dated from the 14th century BC to the 11th century AD are on display in low-level lighting, which provides the perfect mantel for all of the specimens. The hall also contains an *Aquarium*, providing a detailed model view of an underwater excavation and showing a large scale 4th century shipwreck. The wreck that happened in Yassiada is on full display for all visitors to learn and read about. The whole point of the

underwater display is to show visitors what kind of details or excavations have gone on to put these items on display. There are multiple glass objects in the region that were found by divers that can be seen in a 1:20 scale display for all visitors.

However, in terms of the biggest talking point, there is the UluBurun Shipwreck museum section where a collection of several shipwrecks is exhibited with particular regard to the world's oldest known shipwreck, discovered at Uluburun in 1982 at 52 meters below sea level. It's not just the wreck which makes this exhibit interesting though; the museum also showcases all of the treasure and logs that it carried, meaning that it makes for fascinating viewing. The cargo mostly consisted of copper ingots and also more than 150 colored plates along with round glass ingots.

On the subject of the wrecks, others are also available to view at the museums and take their names from the area that they were found, such as the Marmaris-Serces harbor shipwreck, the Tektas Burnu Classical Greek shipwreck, the Bodrum-Yassiada shipwreck, etc.

Musealization and display of artifacts within the museum

Concerning amphorae and jars, as the main objects kept in the museum, they are placed in different halls with clear illustrations all over the walls. These illustrations, made on simple panels or directly painted on the walls, display scenes of the past and geographic maps, and in some cases brief description, dating and general information about the items and the discovery area.

Also, detailed models view of underwater excavations, showing a large-scale shipwreck, are shown in some exhibition areas. These models capture public attention as they reproduce a real model of shipwreck where visitors can know the likely distribution of the artifacts inside the cargo.

Other archaeological artifacts are displayed in museum halls in simple display cases and tables, accompanied by brief descriptions on panels.

There are currently no digital and multimedia content; the museum offers only traditional standards for the exhibitions.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
9:00 am 4:30 pm	Monday	20 YTL (ca. 4.30 €)	http://www.bodrum-museum.com/

Museum localization and representative photos on displaying artifacts

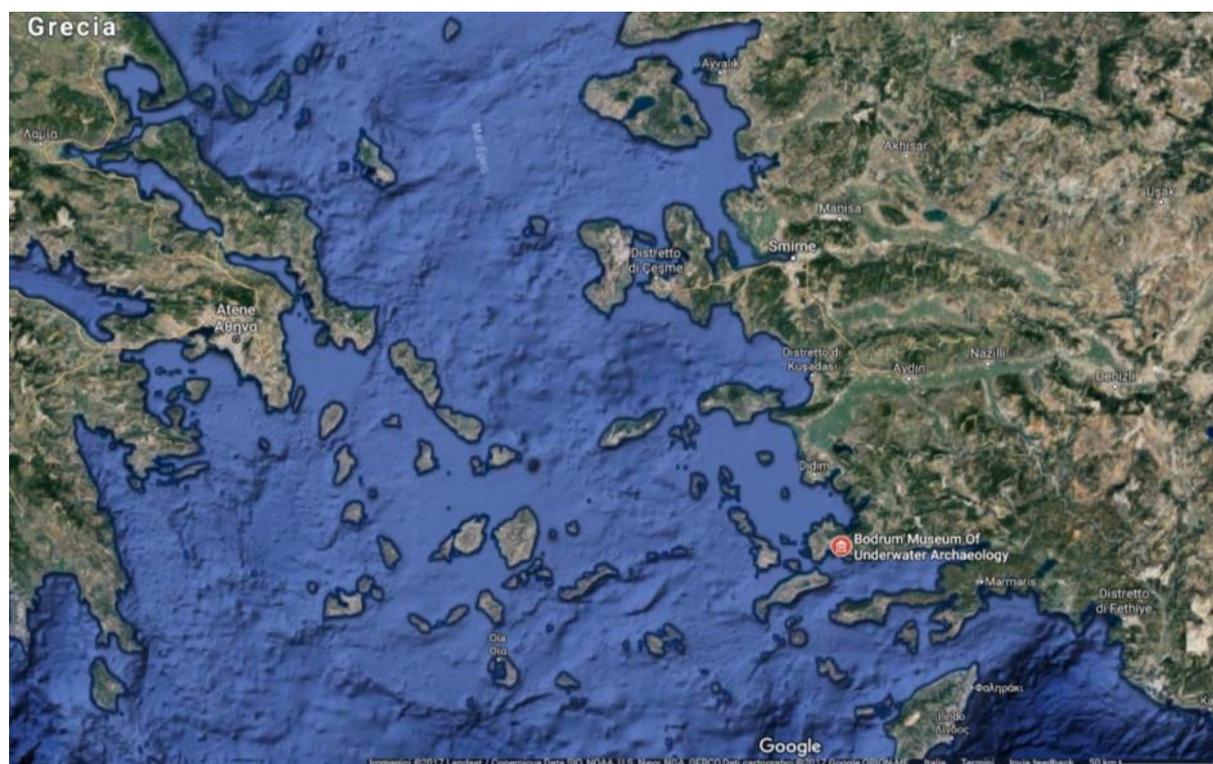


Figure 13. Localization of the Bodrum Museum of Underwater Archaeology (Turkey) – © Google Map 2017

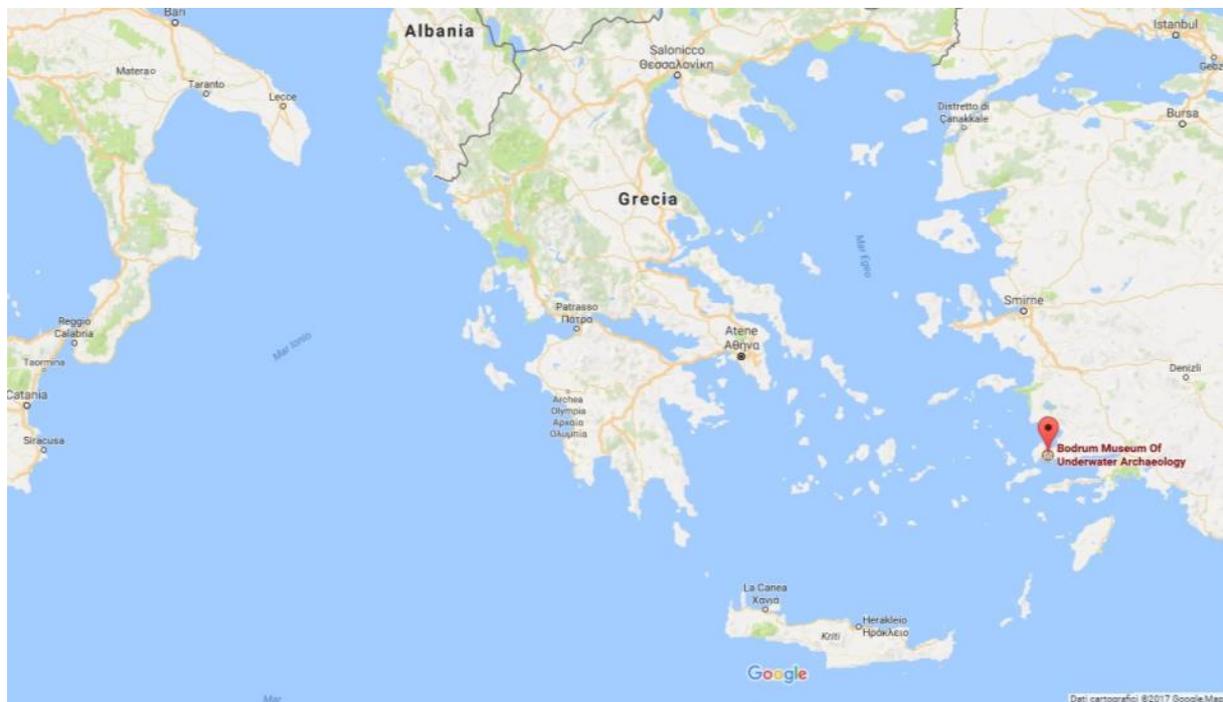


Figure 14. Localization of the Bodrum Museum of Underwater Archaeology (Turkey) – © Google Map 2017



Figure 15. Seabed reconstruction at Bodrum Museum of Underwater Archaeology © <http://www.bodrum-museum.com/>



Figure 16. Seabed reconstruction at Bodrum Underwater Museum of Archaeology © <http://www.bodrum-museum.com/>

Sources:

<http://www.bodrum-museum.com/>

<http://bodrumturkeytravel.com/>

<https://www.timetravelturtle.com/bodrum-museum-underwater-archaeology/>

<http://www.unesco.org/new/en/culture/themes/underwater%20%90cultural%20%90heritage/museums%20%90and%20%90tourism/land%20%90based%20%90museums>

L. Zan, S. Bonini Baraldi, M. Lusiani, D. Shoup, P. Ferri, F. Onofri, 2016. Managing Cultural Heritage: An International Research Perspective. Routledge Ed.

d) Denmark, The M/S Maritime Museum of Denmark (Helsingør)

General info about the museum

The M/S Maritime Museum of Denmark, operated by a private foundation since 1915, was for the first 97 years located at Kronborg Castle in Helsingør, Denmark. In 2013, the museum moved into new underground premises designed by Bjarke Ingels Group around a former

dry dock where, between 1882 and 1985, one of Denmark's most significant and progressive modern shipyards were located.

About the collections at the museum

Its collections cover Danish trade and shipping from 1400 to the present day, telling the story of Denmark as one of the world's leading maritime nations, in an evocative and dramatic way, within an innovative architectural setting, shaped like an enormous ship traversed by glass and aluminum-clad bridges and stairs. The old dry dock, 150 meters (490 ft) long, 25 meters (82 ft) wide and 9 meters (30 ft) deep, proved to be an ideal location but it was first necessary to reinforce the old dock walls before constructing the museum on its periphery. The dock itself will remain an empty space crossed by ramps and bridges providing access to the museum and the exhibition areas. The overall intention is to give the museum the feel of a ship's deck. The competition jury welcomed the proposal, believing it would create a world-class maritime museum for Denmark. Financed by 11 foundations, construction work began in September 2008 and the museum finally was opened on 5 October 2013. In 2014 the M/S Maritime Museum in Elsinore was listed on the prestigious list of recommendations "52 places to go in 2014".

The story of Denmark as one of the world's leading maritime nations is told through eight different themes along with film projections and soundscapes. Among other things, visitors can come face to face with a torpedo, get an old sailor tattoo and see the world's largest model of a container ship. Also, model ships, paintings, photographs and related artifacts illustrate the Napoleonic Wars as well as Danish trade with China and India. Special exhibitions are devoted to navigation, the Danish lifeboat service, lighthouses, shipbuilding, and the sailor's life since the 16th century. The museum also has several thousand paintings, a collection of over 33,000 photographs illustrating virtually all Danish ships since 1880, and a library of 20,000 volumes.

Musealization and display of artifacts within the museum

The M/S Maritime Museum of Denmark (Helsingør) represent a really interesting and modern museum, where people are able to live a unique experience, rich in innovation.

For example, in the exhibition 'Navigation and World Views' the visitor will sail through a treasure trove of navigational instruments of times past, while surrounded by sea, coasts, stars, and myths. The history of navigation is characterized by a duality of knowledge and technology. In Navigation and World Views you follow the continued change of the instruments from simple plummet leads to the satellites – our present day, man-made stars. At the same time, you meet the people who drove the development forward and the people who used the instrument on a daily basis. You will meet the ones that escaped their deaths and those who did not. The fates and the instruments are embraced by films placing the visitor in the middle of the elements. You will experience storm, calm, ice and summer. You will sail by historical coastlines and meet the monsters of the deep. A special and different world is opening.

The exhibition 'Ships of All Times' is located at the end of the dock, where the interior of the museum meets the raw exterior of the dock, symbolically reflecting the graceful power of the ships.; it represents a treasure trove of model ships and ship portraits. Traversing centuries and vessels, visitors encounter the ships and their cargoes.

The exhibition 'In the Shadow of War' focuses on the fear and dread experienced by Danish seamen sailing as passive participants on the warships of World War I and World War II. The exhibition is shaped like a ship that has hit a mine or been hit by a torpedo. The explosion is frozen, with plates of metal forming a background for the films and exhibits. Model ships seen from twisted angles tell the dramatic stories of seamen and ships being bombed, hit by mines and torpedoed during 11 years of war and violence. The seamen themselves tell their own stories with voices and letters depicting their experience of the period and its horrors.

"The World in your Shopping Basket" exhibition represents a very innovation in the museum where modern ships, specialised and custom made to sail with different cargoes, are shown.

The exhibition includes models of three modern Danish trading vessels: a tanker, a bulk carrier and a container ship. The biggest exhibit at the museum is a 20-foot long container. The container symbolises the revolution shipping underwent 40 years ago, when thanks to the container shipping became cheaper than ever before. This exhibition is accompanied by large film projections which underline the importance of shipping, showing how ships connect the world from the producer in Asia to the consumer in Denmark. In this area, visitors are attracted by Interactive Games and a Live World Map. On a live map of the world visitors can see how many ships sail for Danish shipping companies and where they sail. You can also test your skills as a shipping executive sailing raw material between the continents of the globe. Other permanent exhibitions can be visited in the museum, with themes closely related to marine life. Theme by theme, the exhibition guides you through a world of film, literature, fashion and toys that all reflect and perpetuate our myths and ideas about the sailor.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
October -June: Tuesday – Sunday 11am - 5pm July – August: Daily 10 am - 6 pm September: Daily 11 am - 5 pm	December 22nd, 23rd, 24th, 25th, 26th, 31st & January 1st.	Adults: 110 DKK (14.78€) Children under age 18: Free Senior citizens 65+/Students: 90 DKK (12.09€) Family ticket: 200 DKK (26.87€)	http://mfs.dk/en/

Museum localization and representative photos on displaying artifacts

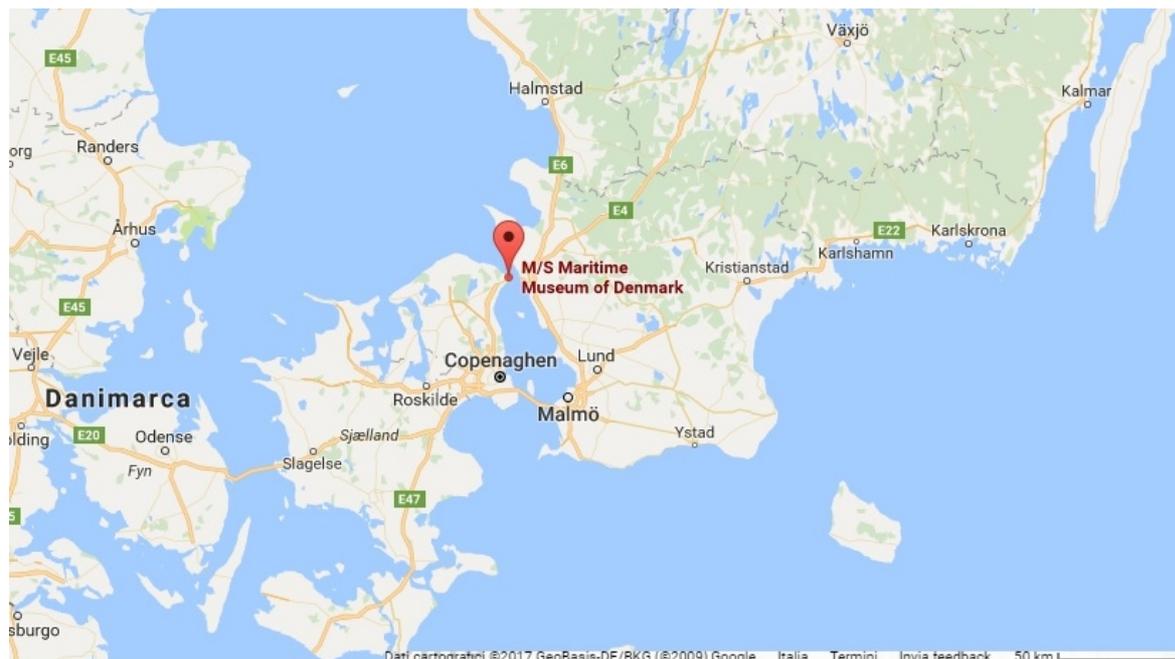


Figure 17. Localization of the M/S Maritime Museum of Denmark (Helsingør) – © Google Map 2017



Figure 18. Localization of the M/S Maritime Museum of Denmark (Helsingør) – © Google Map 2017



Figure 19. Some exhibitions within the M/S Maritime Museum of Denmark (Helsingør) © <http://mfs.dk/en/>

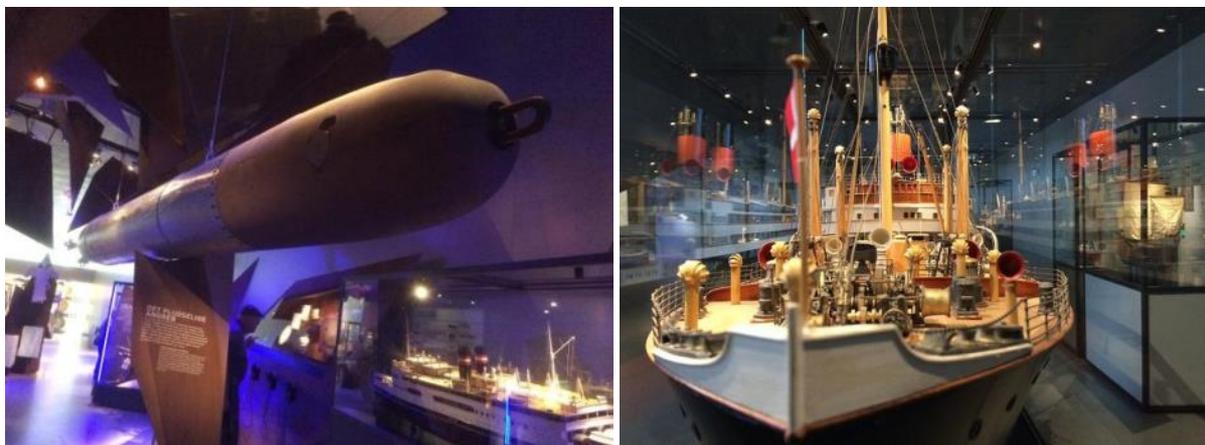


Figure 20. Some exhibitions within the M/S Maritime Museum of Denmark (Helsingør) © <http://mfs.dk/en/>

Sources:

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e) Denmark, the Viking Ship Museum (Roskilde)

General info about the museum

The Viking Ship Museum, built in 1969, is the Denmark's national museum for ships, seafaring and boatbuilding of the prehistoric and medieval period. The museum's exhibitions are modern historical narratives about the Vikings and their ships. Traditional dissemination forms within the exhibitions, both regarding texts and images, are combined with sound, lightings, digital installations, engaging activities and artistic expressions keeping the maritime culture alive for all users. The Viking Ship Museum also conducts research and educates researchers in the fields of maritime history, marine archaeology and experimental archaeology. Various academic conferences are held here and there is a research library in association with the museum.

The audience are not brought back in time, but the cultural history is brought into present day.

The Viking Ship Museum focuses on the Vikings' maritime craftsmanship and their impressive ships that bear witness to war, trade and sea voyages.

About the collections at the museum

One of the most significant areas is the Viking Ship Hall, beautifully placed on Roskilde Harbor. A giant window and sweeping views over the fjord creates a background that connects the ships to the water, once again. The permanent exhibition consists into the five Skuldelev ships that around the year 1070, were deliberately sunk at Skuldelev in Roskilde Fjord in order to block the most important fairway and to protect Roskilde from an enemy attack from the sea. These ships, later known as the Skuldelev ships, were excavated in 1962. They turned out to be five different types of ships ranging from cargo ships to ships of war, and tell the history of the ships as well as the history of the Nordic maritime adventure during the Viking Age: shipbuilding, seamanship, trade, defense and warfare, and the ability to journey far and wide and explore new horizons.

The boat collection at the museum now comprise more than 40 vessels and the associated ship building yard is constantly building new ships by original methods as part an experimental archaeology learning process. It is possible to follow or engage in the ship building process. The shipyard is located on a small isle known as Museumsøen (Museum Island), connected to the main museum exhibition buildings by a drawbridge.

Every summer, a handful of boats are launched for sea voyages to improve knowledge about the seafaring techniques of the Vikings.

Musealization and display of artifacts within the museum

The Viking Ship Museum in Roskilde is focused on ships, seafaring and boatbuilding culture in ancient and medieval times. Its Viking Ship Hall is designed as a large showcase to display five Viking ships found at Skuldelev. Besides the five original ships the hall also houses special temporary exhibitions, copies of a trading vessel and of a warship equipped with barrels, trading goods and weapons. At the boat yard, the boat building tradition and culture of the Viking age are illustrated through working boat builders and exhibitions showing the historical background.

The Viking ship Museum is for children of all ages where Vikings educational workshops for children are organized. During activities they can also see the 1,000-year-old original Viking ships in the Viking Ship Hall and find their exact reconstruction in the Museum Harbor.

Among traditional exhibitions, some special exhibitions also look outside the world of the Vikings and convey the story of maritime culture in a bigger and more global perspective. The museum wish to create storytelling filled with sense-based impressions. Experiences that create curiosity, let loose the imagination excite with new knowledge and change our perception of the past. In the exhibition 'Dive in – join the maritime archaeologist at work' the sea floor's treasure trove of artifacts and the stories they can tell us about cultural heritage from previous generations is recreated and brought to life, using interactive installations and film.

With this exhibition, it’s possible to virtually conduct in underwater contexts where the work takes place. The public get an insight into the professional observations, questions and methods maritime archaeologists work with and the digital and interactive installations give the museum guests the chance to handle different artifacts and get a sense of the atmosphere on the sea floor”.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
Daily: 10:00 am – 16:00 pm Summer and holiday: 10:00 am - 17:00 pm	December 24th, 25th, 31st	Adults: from 85 to 130 DKK (11.42 - 17.47€) Children under age 18: Free Students: from 70 to 100 DKK (9.41- 13.44€) Group: from 75 to 110 DKK (10.08- 14.78€)	https://www.vikingeskibsmuseet.dk/en/

Museum localization and representative photos on displaying artifacts

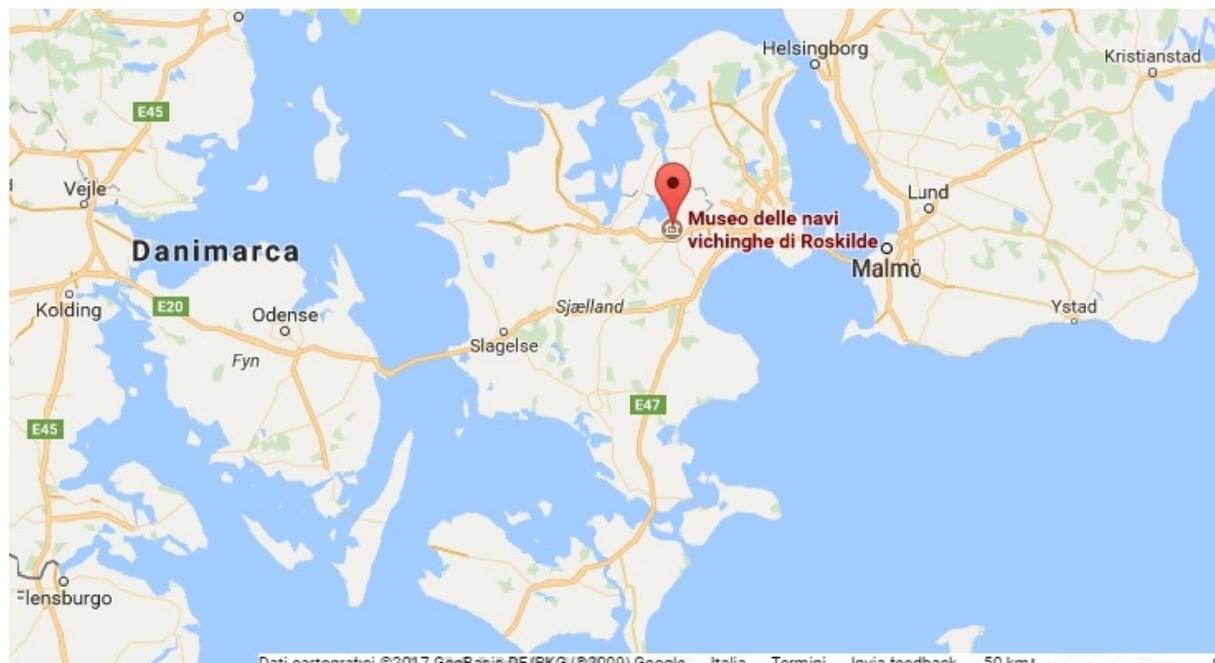


Figure 21. Localization of the Viking Ship Museum (Denmark, Roskilde) – © Google Map 2017

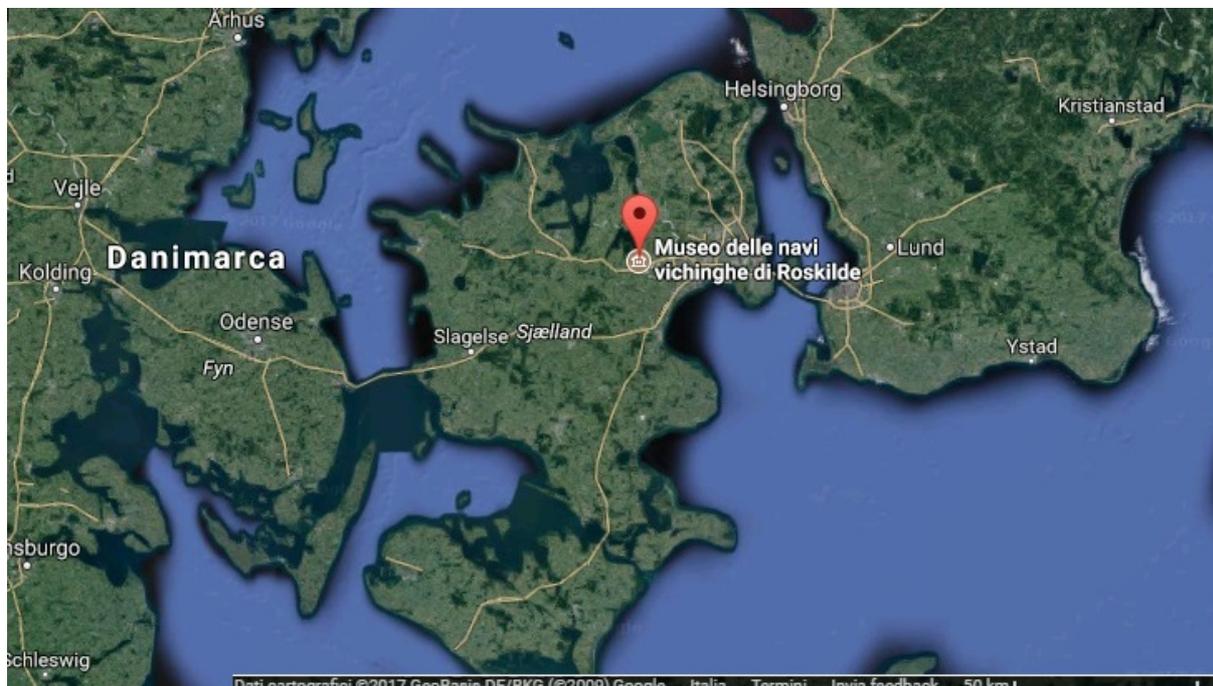


Figure 22. Localization of the Viking Ship Museum (Denmark, Roskilde) – © Google Map 2017





Figure 23. Some ships in the Viking Ship Museum (Denmark, Roskilde), ©
https://commons.wikimedia.org/wiki/File:Viking_Ship_Museum_Roskilde.JPG

Sources:

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<http://www.unesco.org/new/en/culture/themes/underwater%20cultural%20heritage/museums%20and%20tourism/land%20based%20museums>

https://commons.wikimedia.org/wiki/File:Viking_Ship_Museum_Roskilde.JPG

f) United Kingdom, The Mary Rose Museum (Portsmouth)

General info about the museum

The Mary Rose Museum is located in Portsmouth Historic Dockyard. There's a common misconception that the Mary Rose sank on its maiden voyage. In fact, it was a successful warship, in the service of Henry VIII for 34 years, almost the entire duration of his reign, and fought in three wars. Discovered in 1971, the wreck was studied and recovered in 1982, and is now displayed in a museum at the harbor of Portsmouth, UK. Initially, the wreck was exhibited in a temporary conservation hall, but a new museum was subsequently built and opened in 2013.

About the collections at the museum

The museum is dedicated to the 16th century Tudor navy warship Mary Rose as well as the historical context in which it was active. The museum displays, in a dedicated ship hall, the ship itself with its crew and the thousands of artifacts that have been recovered from the wreck site since the 1970s.

Musealization and display of artifacts within the museum

The Mary Rose Museum is unlike any other museum experience, giving people the chance to immerse themselves in the environment of a Tudor warship. Many of the Tudor objects on display are completely unique, and people are given the chance to handle and interact with a number of exhibits. Real artifacts combined with exhibits will enable the extraordinary treasures to be placed in context within the ship, explaining how and where they would have been used at the moment she sank. In addition to the experience within a real warship also considered the museum's centerpiece, visitors can explore a myriad of objects and artifacts from underwater environment. They are mainly displayed in glass cabinets and showcases with descriptions and illustrations on panels or in digital form on monitors.

Visiting the Mary Rose Museum is recently become more simple and innovative. An App useful both as guide for visitor and to updates on the day's events were developed. The Mary Rose Museum App features an Audio Tour, as well as maps and a Large Print guide to the Museum. Foreign Language Audio Tours are now available in French, German, Spanish, Italian, Polish and Japanese. The App uses Geo-Fenced Push Notifications, and will send messages during visit.

The Mary Rose Museum offers an "Audio Insights tour". This isn't a guided tour around the Mary Rose Museum; rather a guide to some of the more interesting objects in the collection, and how they can tell us more about Tudor life.

As you go around the museum, keep an eye out for numbers relating to the objects that appear in the thumbnails below. These thumbnails lead to mp3 files, which you can either

play 'live', or download to a mp3 player. This audio tour is also available on the Mary Rose Museum App.

Special events throughout the year, with exhibits, talks for every audience are organized.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
November – March: 10:00 am-5:00 pm April – October – 10:00 am – 5:30pm	December 24th, 25th, 26th	Adults: 18 £ Children: 13 £ Student: 16.20 £ Senior: 16.20 £ Groups: from 37.60 to 49.60 £ 1£ = 1.12€	http://www.maryrose.org

Museum localization and representative photos on displaying artifacts



Figure 24. Some exhibitions within the Mary Rose Museum (Portsmouth) © <http://www.maryrose.org/>



Figure 25. Some exhibitions within the Mary Rose Museum (Portsmouth) © <http://www.maryrose.org/>

Sources:

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<http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/access/museums/>

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g) Italy - The Regional Archaeological Museum 'Baglio Anselmi' (Marsala)

General info about the museum

A former wine farm, the building has been turned into a museum in 1986, in order to host the Punic Ship remains, found in 1969 by Honor Frost off the Isola Grande coasts, and other underwater artifacts referring to the ancient Phoenician cities of Mothia and Lilibaenum: a vast collection of amphorae and anchors.

About the collections at the museum

The Punic Wreck is the main attraction of this museum, as witness of the First Punic War (264 - 241 BC) in which Carthaginians and Romans fought for conquering Sicily. It probably

sunk during the 'Egadi Islands Battle' that took place off the Trapani coast, the last episode of the war, proclaiming the victory of the Roman Republic the 10th March 241.

What was recovered from the seabed is a part of the ship's stern and the right-side part of the keel, some ropes, a dagger and some Cannabis remains.

A wide amphorae collection is also available in the museum, branded with signs from the Greek islands of Rhodos, Naxos, Kos and from the Apulian coasts.

Musealization and display of artifacts within the museum

The Punic Ship, very big and impressive, has been partially reconstructed over an iron frame, and the gaps between the ancient wooden elements have been complemented by some newly carved elements, in order to recreate the whole left part of the stern. Some amphorae of the cargo have been displayed over the ship reconstruction, endowed with a brief description of the ship content and the wreck recovery.

The numerous amphorae recovered from the seabed are aligned in a wide wooden staircase, while all the other archaeological artifacts are displayed in simple display cases, accompanied by brief descriptions or plastic panels. There are currently no digital and multimedia content available, since the museum offers only traditional communication standards.

Museum localization and representative photos on displaying artifacts



Figure 26. Localization of the Archaeological Museum 'Baglio Anselmi' of Marsala (Trapani, Italy). © Google Map 2017.



Figure 27. Localization of the Archaeological Museum 'Baglio Anselmi' of Marsala (Trapani, Italy). © Google Map 2017.



Figure 28 - 29. The Phoenician Ship of Marsala: wooden remains and part of the cargo from the 3rd century BC.



Figure 30 - 31. Phoenician amphorae and other artifacts from the 3rd century BC exhibited in the Archaeological Museum 'Baglio Anselmi' of Marsala.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
Tuesdays and Sundays: 9:00 am to 1:30 pm Ticket sales end at 12:30 am.	Mondays	4.00 €	http://www.regione.sicilia.it/beniculturali/dirbenicult/database/page_musei/pagina_musei.asp?ID=32
Wednesday to Saturday: 9:00 am to 6:30 pm Ticket sales end at 5:30 pm.			

Sources:

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<http://www.mondosicilia.it/marsala/museo-archeologico-baglio-anselmi-marsala-tp>

http://www.regione.sicilia.it/beniculturali/dirbenicult/database/page_musei/pagina_musei.asp?ID=32

h) Italy - The Museum of the Ancient Ships (Pisa)

General info about the museum

In 1998, near the railway station Pisa San Rossore, the National Italian Railway Company started an excavation site in order to enlarge the station. This excavation immediately revealed some wooden artifacts of extraordinary importance, and the Italian Ministry of Culture relieved the excavation site in order to carry out a systematic archaeological research.

Three meters below the ground level, 30 ships from the Roman age were found, and some thousands of pottery, glass, metal and organic artifacts and fragments were recovered. The importance of this discovery was so big that this place was called the 'maritime Pompeii'.

The excavation site ended after 18 years, in 2016, and the need to display the already restored materials urged a solution. The Medici Navy Yard, built by Cosimo de' Medici in the second half of XVI century, looked the perfect place to set the new Museum of the Ancient Ships.

This facility is formed by a series of masonry warehouses facing the Arno river, and decorated on the river façade with emblems, masks and inscriptions celebrating the Navy victories of the St. Stephan Knights. Each warehouse is a museum hall, and the Museum exhibit is still in progress. The halls opened to the public are only two, n. IV and V.

At the end of the exhibit, next year, the entrance will be in the courtyard, and the visit will continue along a wide corridor that will represent the narrative line across the halls.

The big Hall V will host most of the restored ships: warships, trade ships, big sea ships and small river ships.

About the collections at the museum

The archaeological excavation allowed the recovery of 30 ships of the Roman age, 13 of which intact, from the III century b.C. to the VII A.D., including their cargo and all the sailormen personal belongings.

These ships were found in a meander of the ancient bed of the Serchio river, and it looks like that all of them, along the centuries, encountered disastrous river flooding in that point.

The 'Ship R', a hellenistic ship from the II century B.C., was probably the first ship encountering a flooding in this area; probably coming from Spain, it crashed against the river side and its cargo was dispersed in a vast area. The ship was carrying food supplies: among other things, some prosciuttos were found, conserved in jars.

A second, big flooding, caused probably by the excavation of an irrigation channel in the archaeological excavation area, determined the wreck of 'Ships B, C, E and G'.

The 'Ship B' was a medium-sized cargo ship carrying food supplies and sand from Campania. Under the cargo, dispersed after the ship wreck, a sailorman body was found, still hugging his dog.

The 'Ship C' "Alkedo", is the most important ship recovered from this excavation, and probably the better preserved classical ship ever found. The 22 meters long rowboat, from the Augustan Age, has been reconstructed in its natural size and colour: white with red and black decorations, including the prow eye 'protecting' the ship against the bad weather and the name 'Alkedo' (the Seagull), engraved in one of the oarsmen benches.

Later on (III century A.D.), a series of flooding move the river bed up north, causing the wreck of the 'Ship A', big cargo ship carrying flat-bottomed Gallic and Italic amphorae.

The 'Ship F' (from Adrien emperor's Age) is a small river ship, very fast, pirogue-styled, whose prow is a single-piece wooden element. The hull is shaped for a one-side pilotage (gondola-style).

The 'Ship I' is a flat-bottomed ferry from the V century A.D., entirely carved in oak wood and upholstered on the external side with iron bands nailed to the hull in order to protect it against the low sea beds.

The 'Ship D' exhibit is in progress. It's a huge river ship from VI century A.D. used for sand transportation, and its navigation was helped by two horses carrying it from the river sides.

Musealization and display of artifacts within the museum

The museum exhibit, covering 4.800 square meters, should be ready for the opening in summer 2018.

The exhibit will display eight thematic itineraries and 74 sections, illustrating the importance of the shipping activities in the history and economy of Pisa, the formation of the excavation context, the technologies applied to the archaeological research and restoration activities, the Ancient Ships exhibit, the trade routes in the Classical world, the craftsmanship in the Roman Age, the life onboard.

The Hall IV currently hosts a small 'antiquarium', displaying some of the artifacts recovered and already restored in glass cases, endowed with short descriptions. Among other things, the so called 'sailorman's suitcase', a wooden case containing coins and medecins, is one of the most interesting artifacts. Some models of the excavation site show the evolution of the area before III century B.C. and during the several flooding phases affecting this river meander, until the VII century A.D., when this area was eventually abandoned.

The Hall V hosts some of the already restored ships, and several other artifacts.

The exhibit standard is a traditional one, where showcases display the small artifacts, and the big ships lie on their supports, endowed with illustrative panels. No interactive panels or digital communication media have been so far prepared, in spite of the huge documental material available during 18 years of excavation and restoration (still ongoing).

Museum localization and representative photos on displaying artifacts



Figure 32. Localization of the Museum of the Ancient Ships in Pisa. © Google Map 2017.

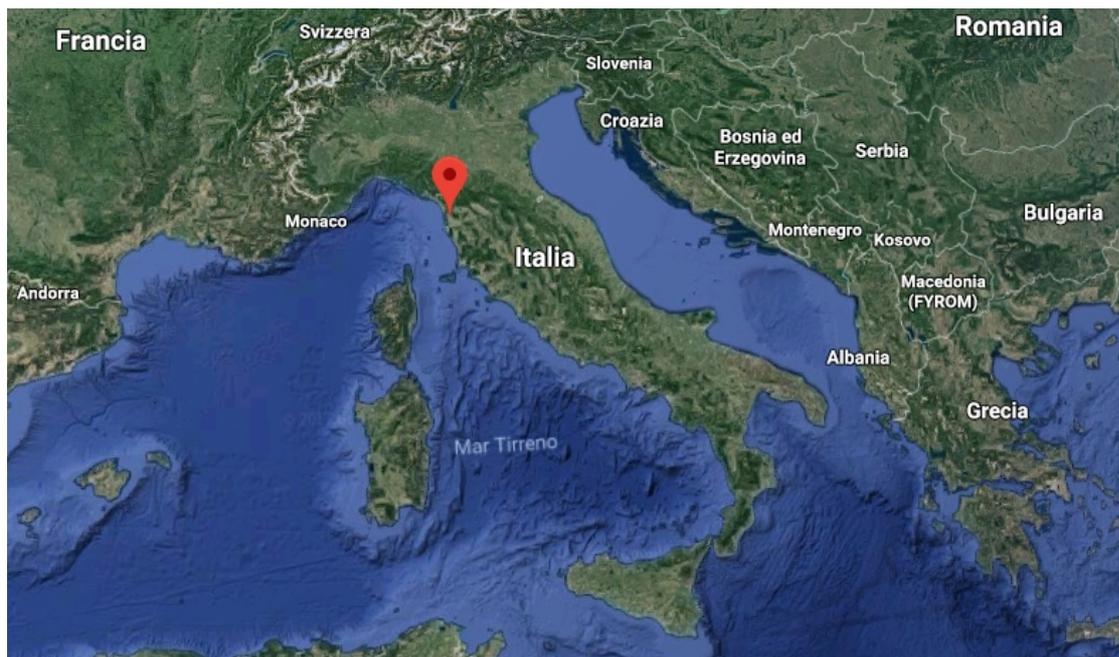


Figure 33. Localization of the Museum of the Ancient Ships in Pisa. © Google Map 2017.



Figure 34 - 35. 'Ships B and E' exhibit, completed and opened to the public.



Figure 36 - 37. Wreck exhibit of a ship as it was found from the archaeologists, including some archaeological tools, and 'Ship C – Alkedo', during the exhibit works in September 2017.

Additional info about the museum

The visit is possible since 3rd December 2016 to the 'exhibition work in progress site' of the new Museum and to the restoration labs of the ships and artifacts. Groups of maximum 25 people are allowed. An archeologist will guide the groups.

Visiting hours	Closing	Entrance fee	Website
Friday to Sunday: 11:00 am to 4:00 pm Booking compulsory.	Monday to thursday	Adults: 12 € Children age 6-14: 5 € Children under age 6: Free	http://www.navidipisa.it/

Sources:

<http://www.navidipisa.it/le-navi-antiche-di-pisa/>

<http://www.navidipisa.it/le-navi-antiche-di-pisa/#1476956215654-d5a7b589-e431>

i) Greece, exhibition “Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas”, at Pasha’s building (Pylos)

General Info about the exhibition

The Pasha’s building is situated on the external compound of the Ottoman Fortress of Pylos (Niokastro), where the settlement of the castle was. It is a rectangular, two-storied stone building dated to 17th and 18th century AD. The building has nowadays a renovated wooden roof. The building was named after Ibrahim Pasha, who captured the castle in 1816 and remained under his control until 1828, when the French general Maison liberated it.

During the Second World War, according to historical sources, Italians and Germans used the castle as a prison. In 1953 the Greek police donated the fortress to the Archaeological Service. All the buildings were demolished, except the Pasha’s building, which was the largest and well preserved.

The Ephorate of Underwater Antiquities used the Pasha’s building for a couple of years as a storage place. Until 2008, during the restoration of Niokastro, the Pasha’s building was housing the carpenter’s, the black smith’s and the painter’s laboratories. After the renovation in 2010, the Pasha’s building hosted the exhibition “Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas”. Pasha’s building is the first museum of underwater archaeological finds in Greece. Also, its eastern part has turned into an outdoor area, suitable for educational programs.

The exhibition was inaugurated in August of 2012 by the Prime Minister of Greece of that time Antonios Samaras. Pasha’s building is the forerunner of the National Museum of Underwater Antiquities of Greece.

About the collection at the Museum

Goal of this exhibition is for the visitor to obtain a representative image of the wealth of the underwater antiquities, by means of a selection of wrecks found around Peloponnese. These wrecks are:

- Reef Dimitris (Sinialo) in Zakynthos. The wooden ship of the 16th century sunk off Zakynthos port, with a cargo of nuts (hazelnuts).
- Cove Giagana. The shipwreck mostly contains parts of large closed type vessels, dated in the Early Helladic Period (2.750 – 2.000 B.C.). The dating of this shipwreck is highly important, because it is dated in the Prehistoric Period and it is one of the least known shipwrecks of this period.
- 'Mentor'-Kythera. It is the well – known shipwreck of the bric “Mentor”, which Lord Elgin used in order to transfer the stolen marbles from the Parthenon to England. The bric sunk off Kythera Island in 1802.
- Wreck of the Columns, Sapienza-Methoni. The ‘shipwreck of columns’ lies at a depth of 10 meters, close to the Cape Spitha. The columns are scattered in an area of 30 m² and are 10 meters away from the edge of the Cape. Parts of the columns are aligned and situated at the seabed, while other parts are scattered in a wider area around.
- Wreck of the Sarcophagi, Sapienza-Methoni. A second shipwreck has been located north of the island Sapienza relatively close to the shipwreck of columns. The shipwreck is lying at a depth of 15 meters. Its cargo contains a number of stone sarcophagi including their covers. The sarcophagi are intact except for one, which probably ruined when the ship sunk. The sarcophagi measures 2.20 x 0.80 meters. The sarcophagi bear reliefs; their decoration is simple containing floral motifs, boukranion etc. The covers are curved with simple, shaped decoration at the edges. The shipwreck is dated to the 3rd century AD.
- Ag.Nikolaos Volimon- Zakynthos. The cargo of this ship was found at a sandy and rocky seabed, at a depth of 35 meters. It is mostly composed by a pile of roman amphorae (about 10 items). The shipwreck is dated in the roman times (1st century B.C. – 1st century A.D.).
- Cape Xi-Lixouri Kefalonia. The archaeological finds of this shipwreck are the following: 6 marble statues, 3 marble bases of pillars and 2 marble capitals. These impressive finds are dated in the Hellenistic period. They are thought to be plunders, taken from a Greek temple and were loaded on a ship, which was heading to Italy but it sunk.

Musealization and display of artifacts within the museum

The room of the exhibition has the form of the bottom of the sea, so the visitor has the impression of travelling/swimming around the archaeological findings. The lighting is soft, so the tour is more of an “underwater dive”.

The floor is covered with glass, while there is photographic material from the seabed. The artifacts are placed in a construction of a hull of a ship, specially made for this museum. The arrangement of the exhibits is done according to their geographical position at the seabed, in relation to the map of Peloponnese, placed on the centre of the glass floor.

At this beautifully arranged room, the visitor can walk literally on this large map, where the aforementioned shipwrecks are marked on it. Each one of these shipwrecks has a different colour. The visitor learns about “Mentor” shipwreck, Lord Elgin’s bric, which sunk during its trip back to England and also sees a pistol and other objects, found at the shipwreck.

Furthermore, the visitor learns about the cleaning methods of the archaeological findings and the role that fish play at this procedure. Moving on, there are information about the wrecks Columns and Sarcophagi, while one can see the perfectly preserved hazelnuts from the shipwreck of a wooden ship of the 16th century.

At the end of the tour, there is a video showing the work of the Greek Ephorate of Underwater Antiquities. The visitor has the opportunity to watch divers-archaeologists and the rest of the staff in action, that is at underwater archaeological researches, while there are also scenes from underwater finds from different shipwrecks.

Through this tour the visitor comes in contact with the difficult procedure of the underwater excavation and with the archaeological wealth as well, which lies in the Greek seas and in this case in the seas of Peloponnese. Leaving this exhibition, the visitor has the feeling that travelled at the bottom of the sea, where time has stopped.

Museum localization and representative photos on displaying artifacts

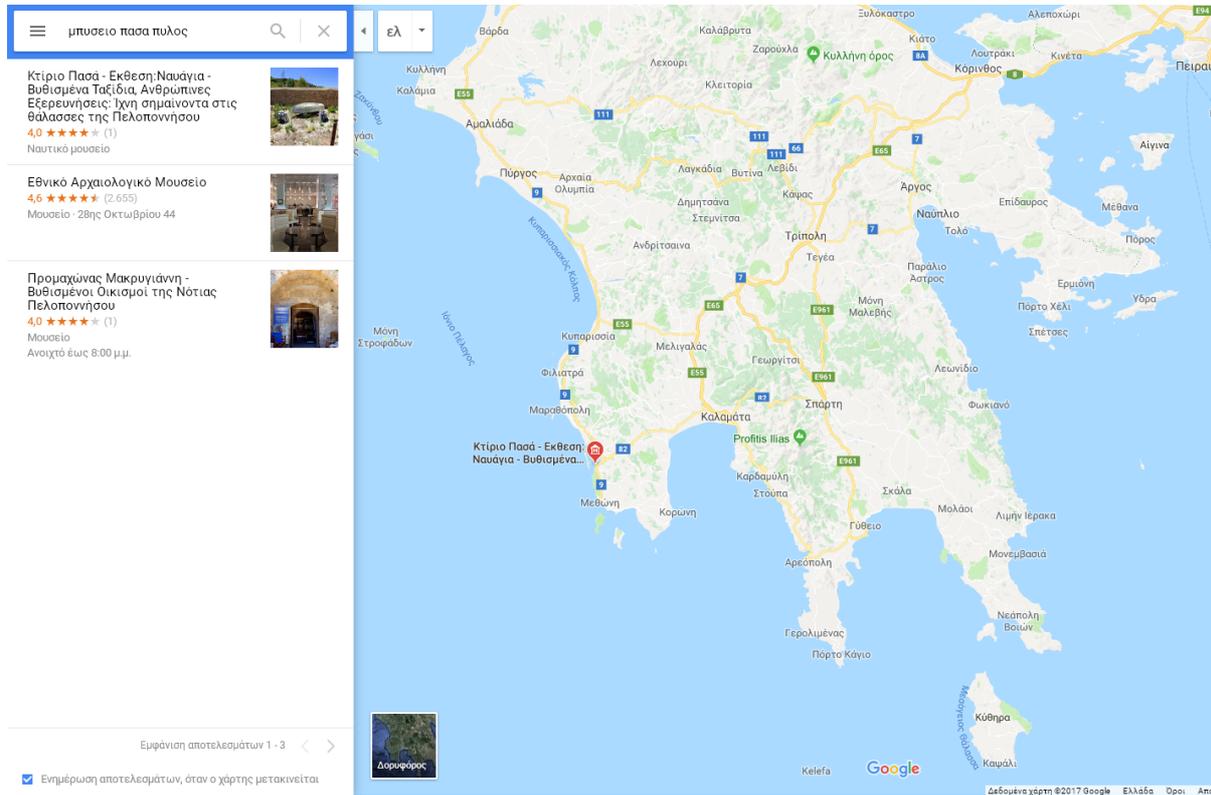


Figure 38. Localization of Pasha's building, Exhibition "Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas".



Figure 39. Pasha's building, Fortress of Pylos (Niokastro).



Figure 40. Pasha's building, Exhibition "Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas".



Figure 41. Pasha's building, Exhibition "Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas".



Figure 42. Pasha's building, Exhibition "Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas".

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http://odysseus.culture.gr/h/1/eh155.jsp?obj_id=3345

<http://leonidasbeis.gr/portfolio/%CE%BC%CE%BF%CF%85%CF%83%CE%B5%CE%AF%CE%BF-%CF%80%CF%8D%CE%BB%CE%BF%CF%85/>

j) Greece, exhibition of the sunken cities of South Peloponnese at Makryiannis bastion (Pylos)

General Info about the exhibition

At the Fortress of Pylos (Niokastro) at Makryiannis bastion there is an exhibition with the sunken cities of South Peloponnese. The exhibition "Sunken Cities of South Peloponnese" is organised by the Greek Ephorate of Underwater Antiquities, in order to promote the Underwater Cultural Heritage of our Country.

Musealization and display of artifacts within the museum

Combined with the Exhibition "Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas" at Pasha's Building it promotes the work of the Ephorate (researches at

shipwrecks, sunken cities, ancient port facilities), but at the same time it introduces the visitors to the mysteries of the sea and makes them part of the underwater archaeological research.

The sunken cities of South Peloponnese which are presented are the following:

- At the end of the room, there is the prehistoric settlement of Methoni. Jar burial is exhibited, where a baby is buried inside the pot.
- At the left, there are two storage jars after their conservation, coming from the prehistoric settlement of Pavlopetri of South Lakonia.
- There is also a city of the Hellenistic period, ancient Asopos, nowadays called Plitra of Lakonia.

Museum localization and representative photos on displaying artifacts

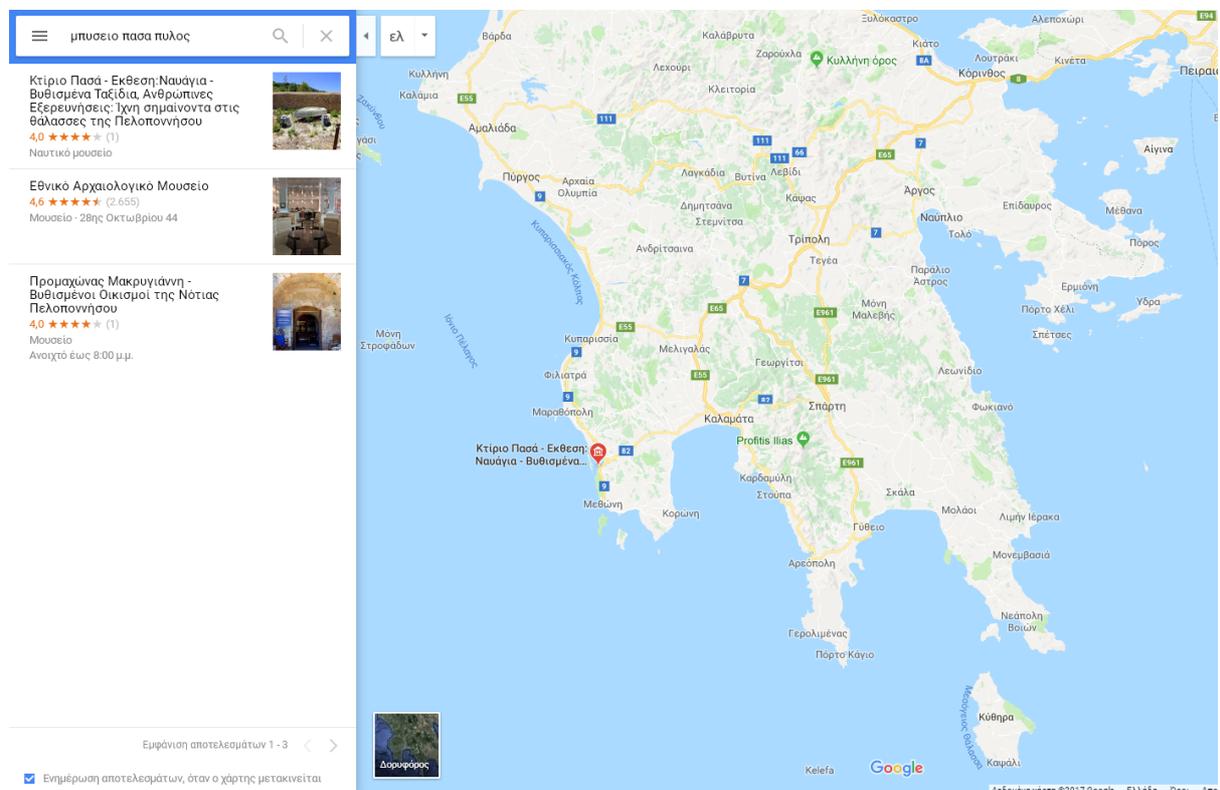


Figure 43. Localization of Makriyannis bastion (Pylos)



Figure 44. Fortress of Pylos, Makryiannis Bastion.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
Tuesday - Sunday 08.00 - 20.00	Monday	Tickets: Full: €6, Reduced: €3	http://www.fortified-places.com/pylos/

Sources:

http://odysseus.culture.gr/h/4/gh41.jsp?obj_id=21604

k) Greece, exhibition of the René Paux Collection at Tsikliras's building at the harbour of Pylos

General Info about the exhibition

The Tsikliras's building, one of the most impressive buildings of picturesque Pylos, houses since previous year the collection of paintings and objects on the first floor, gathered by the

French philhellene journalist René Puaux (1878-1937). The restoration of the building was a lengthy procedure outlasting three mayors, demonstrating the required time for such projects to be completed. The building was bought during the mayor mandate of Thanasis Philipopoulos, the restoration of the building started during the mayor mandate of Dimitris Krakedos while the restoration of the building ended during the mayor mandate of Giorgos Chronopoulos.

The Tsiklitiras building houses also the library of Thodoris Vlachodimitris. Unfortunately, it is not open to the public due to lack of personnel. In the future, the library will include an exhibition regarding the Olympic winner Kostas Tsiklitiras.

The building was donated to the Ministry of Culture and Sports by the municipality of Pylos in 2012.

Musealization and display of artifacts within the museum

The objects on display in the Exhibition include engravings, lithographs and porcelains, dedicated to subjects, people and events of the Greek War of Independence, together with a number of other exhibits (mainly weapons) that do not form part of the collection but are related to it. The objects displayed are divided into 11 groups based on themes, and include portraits of Greek heroes and heroines of the War of Independence, and of philhellenes who took part in the struggle, scenes of events of the Greek Revolution, such as the Battle of Navarino and the Siege of Mesolongi, and Greek landscapes of Antiquity.

It is very important that the building gazes Navarino Bay, where the famous battleship took place in 1827 between the European Forces and the Turks. The visitor has the ability to watch the exhibition and at the same time to imagine the battleship that took place, right across the Bay.

Museum localization and representative photos on displaying artifacts

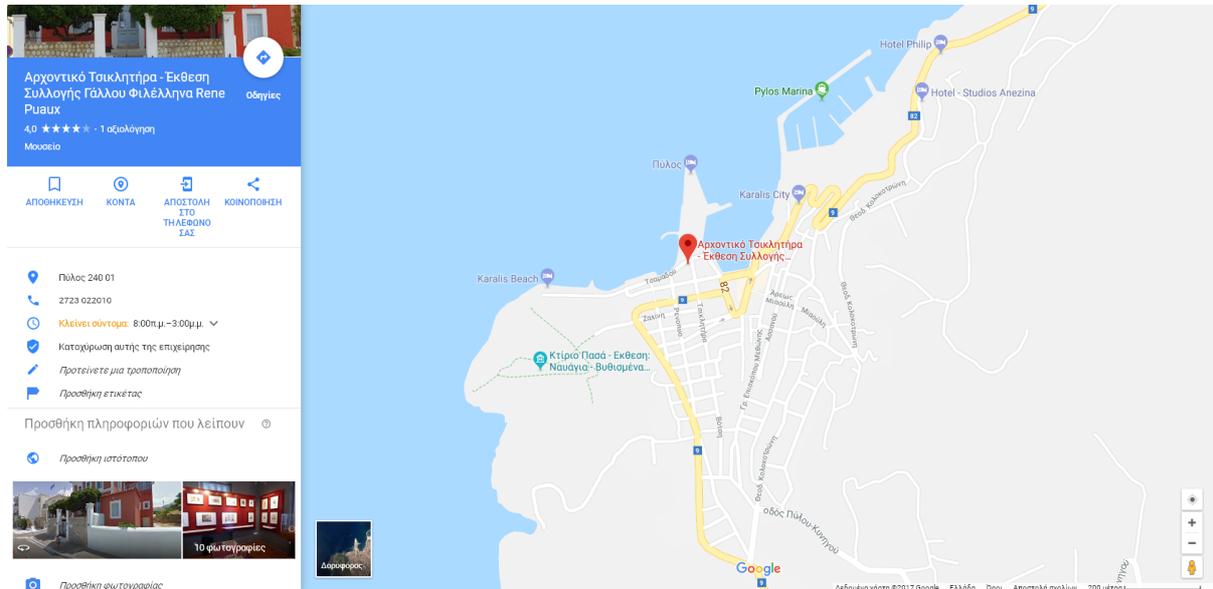


Figure 45. Localization of Tsiklitiras’s building, Exhibition of the René Puaux Collection.



Figure 46. Tsiklitiras's building, Pylos

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
Tuesday - Sunday 08.00 - 20.00	Monday	Tickets: Full: €6, Reduced: €3	http://odysseus.culture.gr/h/1/eh151.jsp?obj_id=20864

Sources:

http://odysseus.culture.gr/h/1/eh151.jsp?obj_id=20864

I) Sweden – The Vasa Museum (Djurgården)

General info about the museum

The Vasa Museum is a maritime museum located on the island of Djurgården, displaying the only intact 17th century ship that has ever been salvaged, the 64-gun warship Vasa that sank on her maiden voyage in 1628. From the end of 1961 to 1988, Vasa was housed in a temporary structure called Wasavarvet; just in 1981, the Swedish government decided that a permanent museum was to be constructed. The new building construction began on and around the dry dock of the old naval yard and was officially opened on 15 June 1990. Today the Vasa Museum is the most visited museum in Scandinavia, with over one million visitors a year.

About the collections at the museum

The main hall at the museum displays the ship itself; the Vasa is the only preserved seventeenth-century ship in the world: a unique art treasure. More than 95 percent of the ship is original, and it is decorated with hundreds of carved sculptures. For nearly half a century the ship has been slowly, deliberately and painstakingly restored to a state approaching its original glory. The three masts on the roof outside the specially built museum show the height of the ship's original masts.

Along with the main hall, there are ten different exhibitions telling about life on board the ship and early 17th-century Sweden and showing archaeological findings recovered in underwater environment during the archaeological surveys. Among the objects are equipment and decorative elements from the ship as well as personal belongings of the crew, different types of weapons, tools and coins. There are also the remains of the about 25 people who died in the catastrophe.

Musealization and display of artifacts within the museum

The new museum is dominated by a large copper roof with stylized masts that represent the actual height of Vasa when she was fully rigged. Parts of the building are covered in wooden

panels painted in dark red, blue, black, ochre yellow and dark green. The interior is similarly decorated, with large sections of bare, unpainted concrete, including the entire ceiling. Inside the museum the ship can be seen from six levels, from her keel to the very top of the sterncastle. Artifacts are mainly displayed in glass cabinets and showcases with descriptions and illustrations on panels or in digital form on monitors

A movie about the Vasa is shown in 13 different languages. The film introduces Vasa's exciting history. It tells about the building of the ship at the Ship Yard, the sinking, and about life in Stockholm during the 17th century and the salvage. The film is 17 minutes long.

Artifacts are also presented to the public using multiple resources such as the audioguides. The audioguide consists of 15 soundtracks, which users can easily download to own portable music player or cellphone.

Museum localization and representative photos on displaying artifacts

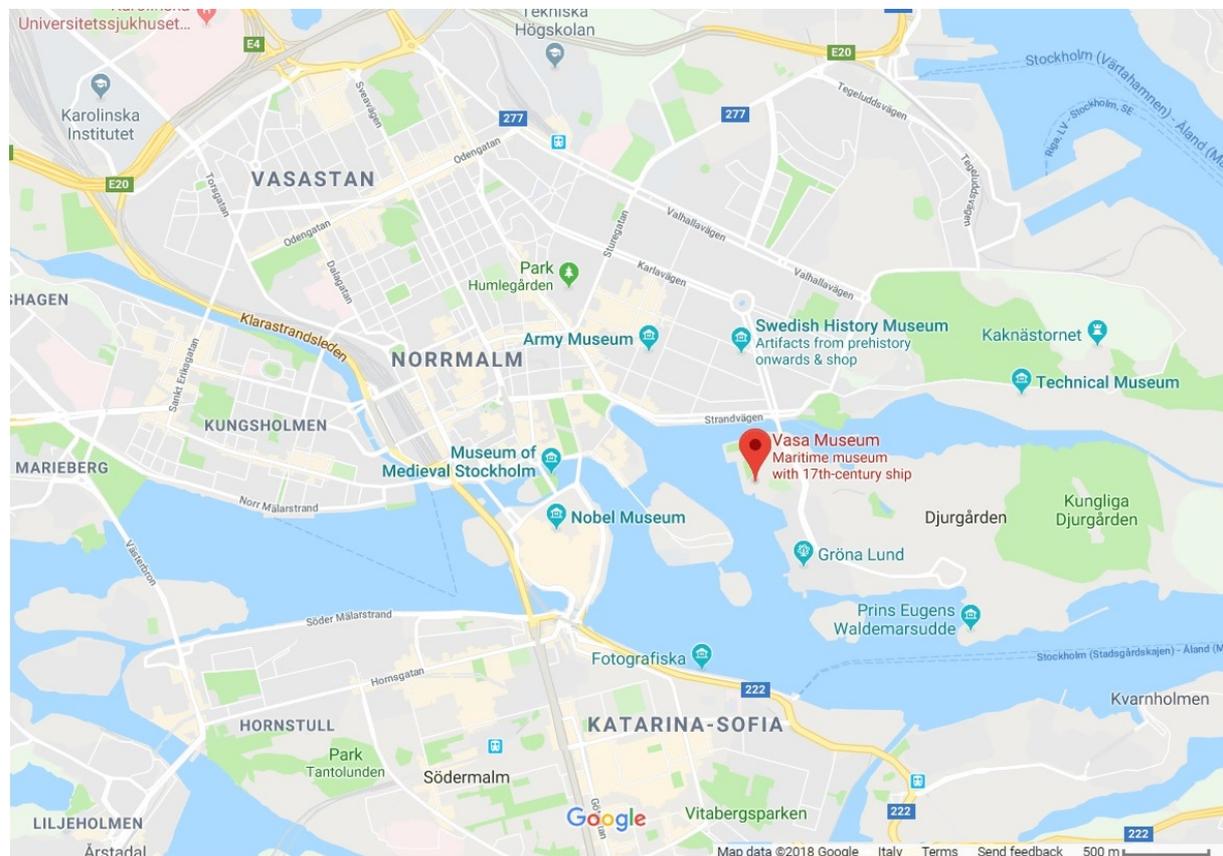


Figure 47. Localization of Vasa Museum, Sweden (Djurgården) © Google Map 2017.

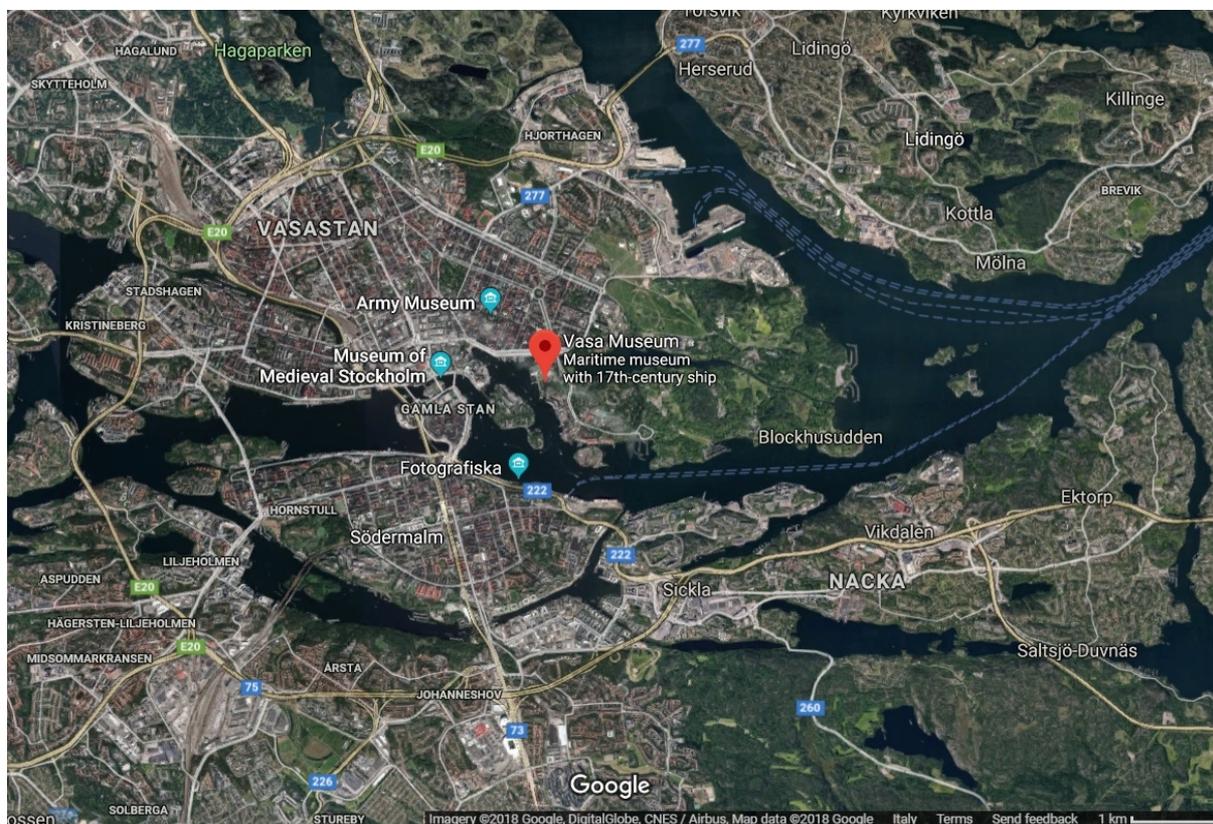


Figure 48. Localization of Vasa Museum, Sweden (Djurgården) © Google Map 2017.

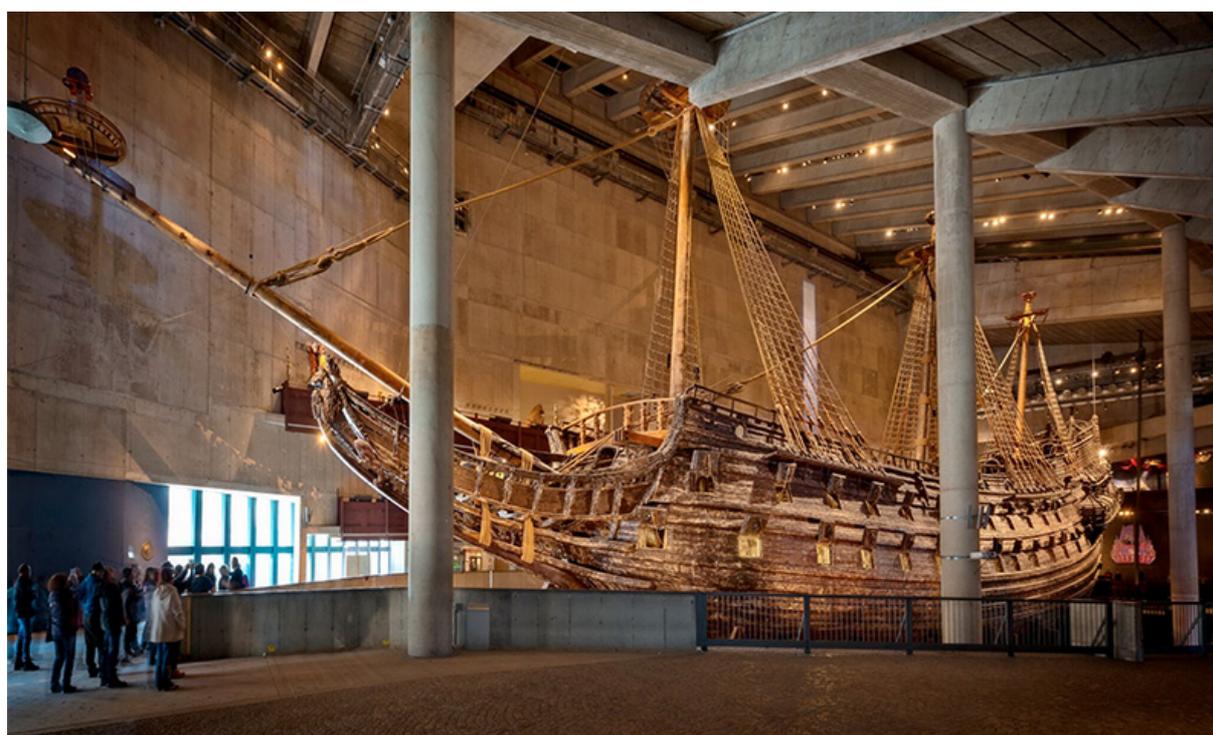


Figure 49. Vasa Museum, Sweden © <https://viewstockholm.com/news-vasa-museum-2017/>



Figure 50. Digital contents at Vasa Museum, Sweden © <http://www.vasamuseet.se>

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
1 September - 31 May: Daily 10-17 (Wednesdays 10-20) New Years Eve open 10-15 1 June - 31 August: Daily 8.30-18	1 January and 23-25 December	Tickets: Full: 130 SEK (about 13€) Students: 110 SEK (about 11€) Children and young people 0-18 years: free of charge	http://www.vasamuseet.se

Sources:

https://en.wikipedia.org/wiki/Vasa_Museum

<http://www.vasamuseet.se>

<https://www.visitstockholm.com/see--do/attractions/the-vasa-museum/>

4.2 Extra-EU Countries

Museums showing underwater cultural heritage are quite numerous and located worldwide. In most cases, they are following the common trend of combining innovative technologies with traditional solutions within the exhibitions. This is not always true; some land-based museums continue to display artifacts following traditional standards.

According to the document - *The Benefit of the Protection of Underwater Cultural Heritage for Sustainable Growth, Tourism and Urban* - a relatively comprehensive list of such museums is provided (www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/museums-and-tourism/land-based-museums). The document underlines as geographical distribution of such museums varies considerably as some regions have a longer tradition of underwater archaeology than others.

This section presents some examples of existing land-based museums exhibiting maritime artifacts, in addition to those already described in the above paragraphs and mainly referred to MED areas (i.e. from 3.1 to 3.5). Also, best practices of such museums were briefly described along with their management and musealization practices. Even in this case, management models vary extensively but in all cases, they are intended to protect and enhance cultural heritage, although in different ways. In particular, a selection of museums with visitor numbers ranging from 40,000 to 1 million persons per year has been used as case studies.

m) Sri Lanka (Asia), National Maritime Museum (Galle)

General info about the museum

The National Maritime Museum in Galle, Sri Lanka is situated within Galle Fort. Located in a 1671 Dutch Warehouse above the Old Gate of Galle Fort, it was first opened to the public in 1992. Whilst the building housing the museum survived the impact of the tsunami on December 2004, the adjoining UNESCO Maritime Archaeology Unit was completely destroyed and all the exhibitions were flood damaged and the majority of maritime archaeological artifacts were lost. Under Sri Lanka – Netherlands Cultural Co-operation Program, the Royal Government of Netherlands provided financial assistance for reconstruction of the Maritime Museum. After 3 years' period of reconstruction, the Maritime Museum was re-opened to the public.

About the collections at the museum

Nowadays the Maritime Museum in Galle showcases a collection of boat models, maps, artillery and artifacts that are found during underwater expeditions. In particular, the area is divided into 2 galleries. The first gallery depicts the types of watercrafts used in passenger transport and maritime trading in Southern Sri Lanka, the traditional life style of fishing communities and some fishing techniques displayed through attractive models and replicas. The second Gallery is focused on marine eco systems and their flora and fauna.

Musealization and display of artifacts within the museum

Nautical relics and artifacts from underwater are displayed according to traditional standards of musealization. In particular, objects are placed inside showcases and tables. They are accompanied by illustrated panels where objects together with historical information are given. Apart from nautical relics, the museum is also home to many models of fishing boats and techniques, which can be seen through the array of dioramas that are on display. Furthermore, they also display the means by which local anglers made their living in addition to their rituals.

Among exhibitions halls, there are currently no digital and multimedia content.

The Maritime Museum is also used as a centre of education for various groups of visitors and researchers of Southern region.

Additional info about the museum

Visiting hours	Closing	Entrance fee	Website
Daily: 9.00 a.m. - 5.00 p.m.	Sunday, Monday and all public holidays	Adults: from 20 to 300 LKR Children: from 10 to 150 LKR Group: from 5 to 20 LKR (1 Sri Lanka Rupia = 0.0055 Euro)	http://www.museum.gov.lk/web/index.php?option=com_regionalmuseum&task=regionalmuseum&id=8&lang=en

Museum localization and representative photos on displaying artifacts



Figure 51. Localization of the National Maritime Museum (Sri Lanka, Galle) – © Google Map 2017



Figure 52. Localization of the National Maritime Museum (Sri Lanka, Galle) – © Google Map 2017



Figure 53. Some exhibitions within the National Maritime Museum (Galle) © [https://en.wikipedia.org/wiki/National_Maritime_Museum_\(Galle\)](https://en.wikipedia.org/wiki/National_Maritime_Museum_(Galle))

Sources:

[https://en.wikipedia.org/wiki/National_Maritime_Museum_\(Galle\)](https://en.wikipedia.org/wiki/National_Maritime_Museum_(Galle))

http://www.museum.gov.lk/web/index.php?option=com_regionalm&task=regionalmuseum&id=8&lang=en

<http://tourismdirectory.lk/the-national-maritime-museum>

<http://travel-tips.s3-website-eu-west-1.amazonaws.com/Sri-Lanka-Galle-Maritime-Museum.htm>

Table 1. Synthesis of data collected within the land-based museums in MED areas and others

Land-based Museums	Localization	Main Artifacts/Objects	Musealization, Display, digital content
Bodrum Museum of Underwater Archaeology	Bodrum, Turkey (Europe)	Artifacts from wrecks (amphora, jars, glass and copper ingots)	Glass showcases, tables, simple descriptive and illustrative panels, illustrations painted on walls. No digital and multimedia contents.
M/S Maritime Museum of Denmark	Helsingør, Denmark (Europe)	Artifacts from wrecks, ships ranging from cargo, to ships of war, paintings and books.	Film, literature, fashion and toys reflect and perpetuate our myths and ideas about the sailor. No digital and multimedia contents.
Viking Ship Museum	Roskilde, Denmark (Europe)	Real Viking ships ranging from cargo to ships of war. Copies of a trading vessel and of a warship equipped with barrels, trading goods and weapons	Special exhibitions to convey the story of maritime culture in a bigger and more global perspective through digital and interactive installations and movies.
Mary Rose Museum	Portsmouth, United Kingdom (Europe)	Warship and object from the Mary Rose wreck itself	Glass cabinets and showcases, descriptions and illustrations on panels or in digital form on monitors, App useful as guide for visitor, audio tour
Museum of Apoxyomenos	Mali Lošinj, Croatia (Europe)	Greek bronze statue	Projection room, graphical walls and interactive tables.
National Museum of Underwater Archaeology (ARQVA)	Cartagena, Murcia, Spain (Europe)	Artifacts from wrecks and underwater excavations (shipwrecks, ropes, lead, ingots, ceramics, amphorae, elephant tusks, tripod mortars, bronze furniture, ostrich eggshells, anchors, etc.	Audio-visual wall, plasma screens, multimedia tables, interactive and manipulative buoys, multimedia library, showcases, graphical exhibitions, maps, etc.
The Regional Archaeological Museum 'Baglio Anselmi'	Marsala, Sicily, Italy (Europe)	Objects and artifacts from wrecks of the First Punic War, amphorae, etc.	Wooden staircase, plastic panels, display cases, only traditional communication standards
The Museum of the Ancient Ships	Pisa, Tuscany, Italy (Europe)	Artifacts from wrecks and underwater excavations (from 30 ships of the Roman age)	Showcases, illustrative panels, no digital contents
Exhibition "Sunken journeys, man's explorations: Important traces of the Peloponnesian Seas", at Pasha's building	Pylos, Niokastro, Greece (Europe)	Artifacts from wrecks and underwater excavations (columns, sarcophagi, amphorae, capitals, etc.)	Glass cabinets and showcases, descriptions and illustrations on panels and maps, glass floor, audio-visual screens
Exhibition of the sunken cities of South Peloponnese at Makryiannis bastion	Pylos, Niokastro, Greece (Europe)	Artifacts from underwater excavations, especially jars	Traditional standards of exhibition, showcases, descriptions and illustrations on panels
Exhibition of the René Puaux Collection at Tsikliras's building at the harbour of Pylos	Pylos, Greece (Europe)	Engravings, lithographs and porcelains	Glass showcases, tables, simple descriptive and illustrative panels. No digital and multimedia contents.

The Vasa Museum	Djurgården, Sweden (Europe)	Ships, Artifacts and sculptures from wrecks and underwater excavations (mainly of wood)	Glass cabinets and showcases, descriptions and illustrations on panels, audio-visual screens and audioguides, movie
National Maritime Museum	Galle, Sri Lanka (Asia)	Collection of boat models, maps, artillery and artifacts from underwater expeditions	Showcases, descriptions and illustrations on panels, dioramas. No digital and multimedia contents.

5. KAC Planning

Design a KAC requires a clear and compelling vision of what you are trying to achieve, in order to satisfy the needs of visitors by proposing an alternative offer with respect to traditional museum exhibitions. Based on these premises, in order to ensure that KACs are supported by whatever community in a significant way, they must have the highest levels of management and leadership skills to meet the expectations for quality services and engagement that the public demands.

This section aims to create the guidelines to define the KAC's vision, the visitor experience and the organizational plan for this new institution. The role of KACs in the conservation and valorization of UCH, as well as their management strategies, and some proposal and advices for the adoption of a proper management model are also described.

5.1 Guidelines for KAC's Management Model

Management models of facilities putting effort into the dissemination and protection of Cultural Heritage represent a link between the national (most often - public) heritage institutions, cultural heritage consumers (tourists) and local community, where the concept of management is really intended as the process of protection of abundant and individual Cultural Heritage elements, related to the enlargement of the society and its changing needs (Jureniene et al. 2014). Many different models and concepts concerning how to properly manage Cultural Heritage has been developed in scientific literature and in the heritage management practice. Today, particular attention is given to the UNESCO practices (UNESCO, 2000) and to the three most common heritage management models adopted by many countries of the world: the ANZECC (ANZECC, 2001), AHC (AHC, 2000) and NWHF

(NWHF 2004). According to the study reported in (Jureniene et al. 2014), although main development stages, aims, priority, etc. of the cited management models differ from each other, all of them emphasize the importance of the interaction between tourists and heritage to create very different structures in a particular place. As a result, it's very difficult to form a management model that is suitable for all heritage areas. On the other hand, the same globalization and rapidly changing consumer (content marketing), gradually formed some certain standard heritage management elements (e.g. heritagging, stakeholder management, heritage marketing, cooperation, heritage branding etc.), which must be discussed and refined for all heritage areas, aimed at a sustainable development and economic success.

Against this background, moving from the common definition and from the existence of various practices, strategies and management models (Lord & Lord, 2002; Jureniene et al. 2014), the Management Model for KACs must ensure compliance with certain principles, parameters and good practices. The mission will be aimed at a sustainable development and success of a specific sector in the field of cultural heritage: the underwater cultural heritage. Through the definition of a suitable management model, KACs will have to tell both the history through the collections/exhibitions/virtual tours and to emphasize their role as innovative facilities able to change the interpretation modalities and the exposure to the public of artifacts coming from marine environments.

In addition, a sustainable management plan for protection, documentation and exhibition of underwater artifacts is required in KAC in order to connect the UCH to its original context, and also to provide an on-site interpretation and educational experience for visitors. The definition of the KAC management model needs to examine every facet for a proper planning, by taking into account all the political, economic and social perspectives. So, the best advice is to start with a strong planning effort where it will be necessary to develop a strategic design with clear vision of the main goals; only later a more specific scope of the project can take shape. In order to undertake a master plan for the management, it will be

crucial involving stakeholders such as museum professionals, archaeologists, local people, touristic Info-Points, MPAs and other related people or institutions working in the cultural heritage field. This collaborative effort should include different stages: identification of problems or difficulties; prioritization; suggestions and application process.

A simplified Management Model suitable for KAC implementation is provided, reflecting some of the UNESCO practices (and other Models for Cultural Heritage Management, already above mentioned) and adapted to the field of Underwater Cultural Heritage. Moving from this simplified Model, the main stages with tasks, responsibilities, difficulties, suggestions will be analyzed (Figure 50).

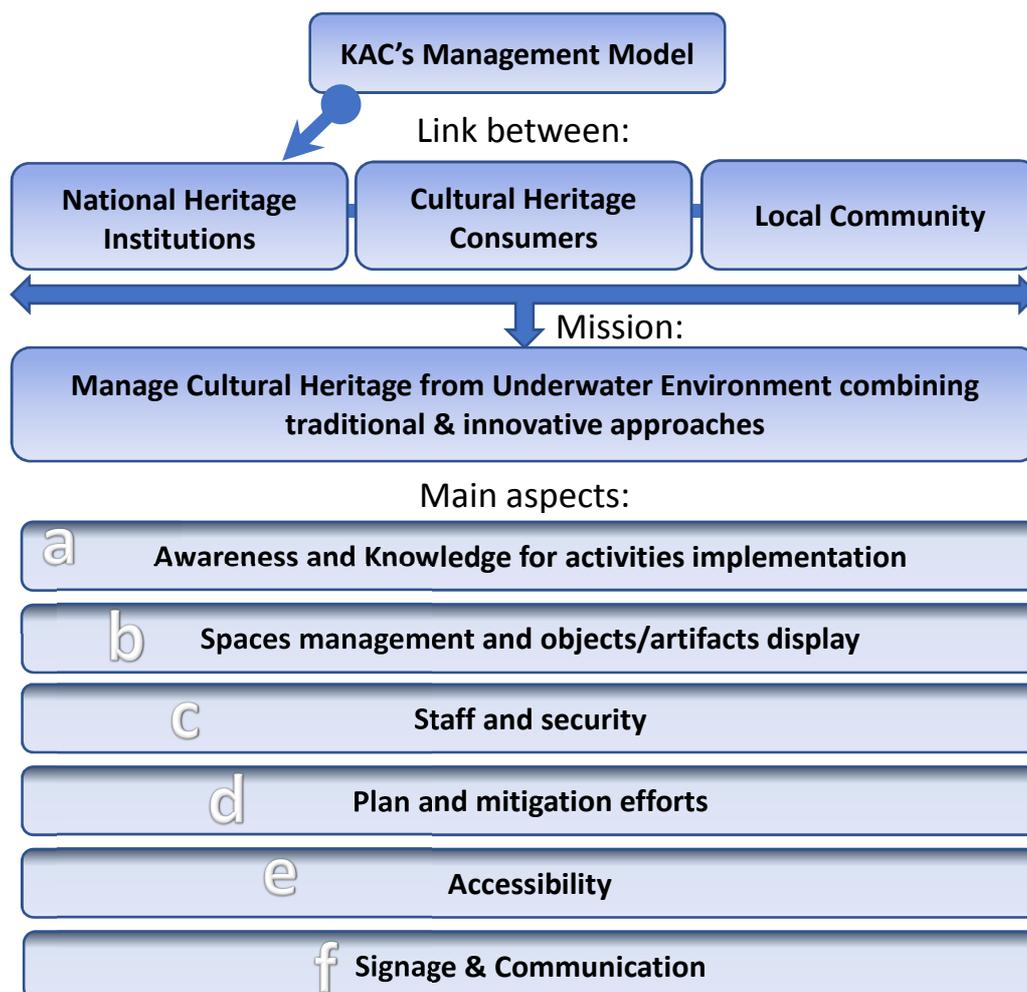


Figure 54. Simplified Management Model

It includes three groups of actors: National Heritage institutions, Cultural Heritage Consumers (tourists, users, etc.) and Local Community which mission is really aimed to the protection and dissemination of the underwater cultural heritage by combining traditional and innovative strategies, according to KAC's concept and best practices in museums (see paragraphs 2, 4). Points from A to F highlight some essential aspects for a proper management of a KAC.

a) Awareness and Knowledge for activities implementation within KACs

According to (Ertürk, 2006) lack of public awareness could be the first and major problem in the management of a museum; moving from this document, a similar concept could be shifted in the KAC management whose mission envisages to raise public awareness about underwater cultural heritage. Although nowadays underwater archaeology is a fairly well-known discipline, its connection within exhibitions and itinerary such as those that will be planned and managed in a KAC is still weak. So, in order to create greater awareness among people and communities, it could start by improving and promoting the knowledge about underwater archaeology. One of the fastest ways is to allow people opportunities to become familiar with the underwater cultural heritage field, by promoting events, workshops and working in partnership with Ministry or other public or private organizations. For example, public education at the school level should begin to give notions about such discipline; it could be a collaborative initiative among The Ministry of Education and The Ministry of Culture and Tourism in all of the countries involved in the KACs implementation. Additionally, short-term seminars and courses, guide-books etc. should be prepared both for the public, as well as decision-makers working in the cultural heritage field.

Also, The Ministry of Culture and Tourism should work closely with travel agencies, as well as the decision-makers in the tourism sector, in order to develop common objectives for better management, as well as to raise public awareness and to provide a financial income for the communities and whole territory. If people become aware of underwater cultural heritage

values and understand why and what to protect and disseminate, the quality and management of projects and activities into a KAC follows spontaneously on (Ertürk, 2006).

b) Spaces management and items/artifacts display within KACs

Another priority at the design stage should be the spaces management. Therefore, during KACs design, areas should be planned taking into account the number and the type of the items to be exhibited, the multimedia and interactive tools and also considering their possible increase over time. Also, spaces for temporary exhibition and new itineraries, Info-Points, and educational rooms should also be taken into consideration during the planning process for the KACs buildings. Adequate environmental controls devices will have to ensure proper preservation of the KACs' collections and tools.

As far as the displays are concerned, they should reflect the cultural sequence and contexts of the underwater archaeological site and artifacts, substantiated by storyboards with supporting images, photographs, models, dioramas and various multimedia presentations and equipment. They should also encourage visitors to become involved with the marine archaeological site and provide sufficient connection between the ruins and the finds, even though interactive tools. Technological solutions useful for KAC's implementation are widely described in D 3.7.1.

Audio-guides, videos, and brochures can also act as effective mediators between users and cultural heritage, by enhancing the visitor's understanding of the archaeological site and the enjoyment of the experience. Informed visitors are far more likely to avoid damaging sites as well as finds, for they can quickly develop a protective attitude about a place that means something to them.

c) Staff and security

Concerning the staffing, it should include trained personnel, whose duties must be clearly defined, embodying in a few figures all the skills necessary to manage a KAC. Only experts should be employed in KACs and activities such as school visits, guided-tours and storytelling

should be organized for users of all ages (children, adults and families). The need for a strong specialization is accompanied by the need to have staff with interdisciplinary training and capacity, not only to allow for better teamwork, but also to encourage mobility - internal and external - useful and appropriate for both the KAC and the individual professional. The KACs should be constantly monitored by security cameras and/or by security guards. Therefore, a strong attention has to be paid to surveillance and reception staffs, whose role as the first mediators between the public and the KAC entails not only a different qualification and constant updating of professional figures, but also different organizational models. The duties and responsibilities to be undertaken by staff may include both answering visitors' enquiries inside the KACs and the management of accesses to the "real" underwater archaeological sites and trails, by solving logistical difficulties/hurdle/problems and planning excursions with local diving centers. These tasks will be performed by trained staff with diverse expertise and specific capability, differing from traditional museums.

d) Plan and mitigation efforts

A disaster plan along with a mitigation effort should be undertaken against possible natural risks, catastrophic events and human impacts. In particular, mitigation is a process that implements approved methods that help avoid or reduce adverse impacts on the value of facilities like the KACs. As a result, management practice must ensure the protection of such resources engaged in the management and dissemination of underwater cultural heritage. For a KAC to respond safely and quickly in the event of an emergency, a plan must already be in place. Generally, in relation to the scale and type of materials/objects/tools held by a KAC, some additional thought and planning in adapting these resources is required. A good communication, training, collaboration and development of strategic partnerships within various departments in large institutions, as well as with local first responders, neighbouring institutions, preservation providers and other nationally and internationally organizations are essential in establishing a framework for the support and assistance in the aftermath of an emergency. Emergency preparation can be divided into two main phases: Risk Assessment and Emergency Response Planning. Conducting a risk assessment of the facility

and objects/tools points out areas of highest vulnerability and provides direction for mitigation measures. Results and data from the risk assessment will also inform the disaster plan by identifying high priority tools/exhibitions and establishing a baseline inventory in the event of a disaster.

e) Accessibility in KACs

KACs must best serve the public by making their programs and facilities as broadly accessible as possible. This means creating opportunities that go beyond the basic requirements, and thinking expansively about how to be widely-inclusive, welcoming, and collaborative. Accessibility in a KAC must be intended as:

- easy access to facilities although they are built far from the center of cities or from populated areas; the KAC should be easy to reach by private or public transport. The route from the nearest stop to the main entrance should be well marked. The entrance door should be in stark contrast to its surroundings;
- accessibility to all areas to enable people, even with disability, to use them in the more usual way, without any particular difficulties; from the main entrance door, a contrasting and tactile guidance system should lead to the info-point desk and from there to the potential lifts, stairs or corridors leading to exhibition halls;
- an additional essential element for accessibility is the adequate presentation of information. Information should be available for each exhibition hall about the exact location and arrangement and type of exhibitions. This might take the form of an overview or of written or acoustic information.

f) Signage & Communication in KACs

Signage represents an essential element of design to prepare the KACs and it is important to understand how users interact with such signs. The aim of signage is to clearly and uniquely display information, create ease of wayfinding, and attract a largest audience. In this regard, several surveys were carried out in museums (galleries and exhibits) in order to gather

knowledge from experts in the field, about the signage design and implementation process. During these surveys, data concerning elements of design, communication, digital versus traditional print and future signage innovations were collected (Weiss, 2010). The results of this research are now used to assist creators and implementers of museums signage in uniquely displaying information to a large audience and developing the most successful method to allow visitors to easily explore and take part to exhibit spaces (Weiss, 2010). The feeling a sign provokes is much more important than the actual sign itself. For this reason, the signage design process is of primary importance and it will have to be adapted as a function of the context in which it will be applied (Calori, 2007).

In the specific case of KACs, signage must be in tune with what message they wish to convey to visitors, with attention to details, colours, materials, and most importantly good typography that will have to be simple to read, making the communication easy, interesting and pleasant. Communication within the KACs will have to be consistent and uniform, obtained through a coordinated communication system both in traditional and in digital signage. In today's technological culture, it is not surprising that there is a noticeable shift from printed signs to an increasing amount of digital produced information. This does not imply the total abolition of traditional signage but their integration with digital systems (Weiss, 2010). Digital interactive solutions are beneficial because they engage users with graphics and touchable items, allowing them to explore in autonomy. Additionally, they will allow visitors to "decode" such information that is not immediately comprehensible. For example, the text communication could be done through additional signs, captions, maps, graphs, videos and information boards. This growing trend towards digital signage can be due to the enormous cost minimization associated to the absence of printing and to the ease and quickness of updating and distributing information. Nowadays, several ways to display digital signals exist. Some of them, most commonly used in exhibitions, consist of: a) Text - Scrolling text. Either scrolling text, or text dynamically updated via external Newsfeed source; b) Images - Scrolling images, usually in the format of digital advertisement posters; c) Video, usually in the format of commercial TV advertisements.

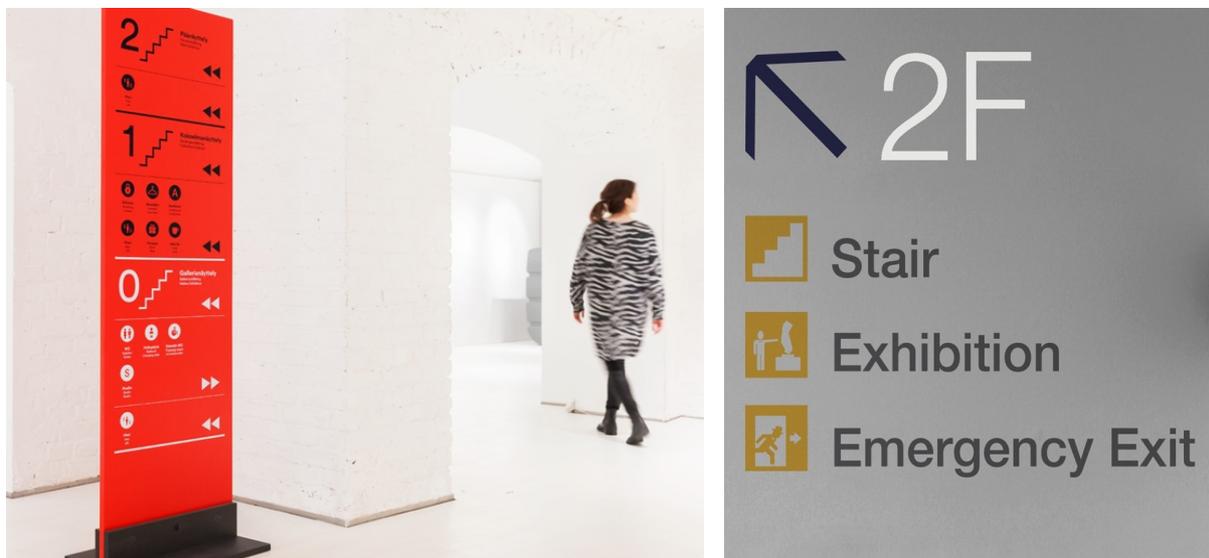


Figure 55. Examples of traditional signals.

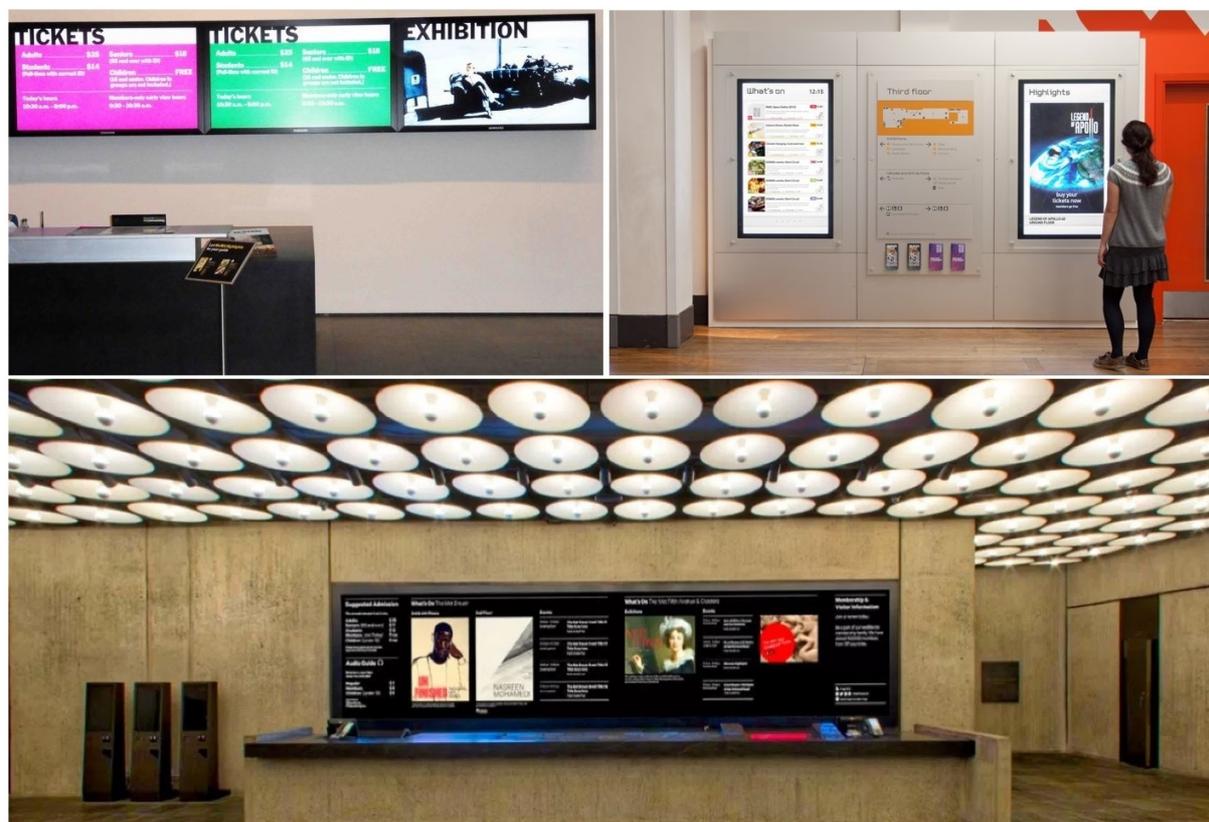


Figure 56. Examples of digital signals.

5.2 Sustainability and resources

A management model is also a tool to determine and establish the appropriate strategy, objectives, actions and implementation to enhance cultural heritage in an effective and sustainable way. In this regard, sustainability in KACs means using, developing and protecting resources at a rate and in a manner, that enables people to meet their current needs and also provides that future generations can meet their own needs.

Sustainability requires simultaneously to taking into account of: a) environmental, b) economic and c) social features.

Concerning the environmental feature, it is the background in which an organisation operates (in this case a KAC), its assets and liabilities, the needs of the community and stakeholders.

The economy represents the set of exchanges and resources of a community while the society is the most general term for the body of institutions and relationships within which a relatively large group of people live. It is also the most abstract term for the condition in which such institutions and relationships are formed.

For KACs, sustainability principles should be, directly or indirectly, a part of their mission as public institutions, by considering conservation/dissemination of underwater cultural heritage as the core of their values.

5.3 Site planning

One of the main characteristic of the BLUEMED KACs is that they will be public buildings. Public buildings, in general, have an important role to play in the long-term development policy of a region. They are designed to stand and operate for decades and this is a main factor that makes their site selection very critical, as the public buildings, and especially the ones that provide public and open knowledge, should affect positively the regional and national particularities and to express them satisfactorily.

At the same time, the location of KACs is the element that can favor or bring down their operation, since it can affect the number of customers, the access to staff, the income, the cost, the labor force, the taxation and almost everything else activity of the center.

5.3.1. Site survey and site selection

During the survey for the selection of the site where the KAC will have to be built, crucial parameters to be taken into account were identified:

- the installation site of KACs must have easy access to large number of visitors;
- a connection to public transport and a large parking area are mandatory to facilitate the accessibility of the KACs;
- the sites have to be selected due to their cultural and natural heritage and they have to be well known touristic destinations. The selected site for the installation of KACs should be in a specific region that has a stable economic base. This will be helpful to provide income for the operation and sustainability of the KACs, which, are going to return the economic benefit in the local community based on a win-win relationship;
- the existence and the operation of other adjoining touristic businesses, such as shops, restaurants and Info-Points, will assist the operation of the KACs, as they would work complementary in order to satisfy the variable needs of the visitors;
- the absence of other nearby competitors that provide similar experiences to the visitors as the established KACs is important to guarantee their successful operation;
- the availability of workforce, in order to staff the KACs, is an important parameter to take into consideration;
- the selected area must be safe and secure to guarantee not only the visitors' protection but also the security of the exhibition equipment.

To be more specific, during the selection for the appropriate site for the establishment of KACs, the following categories of parameters must be investigated and taken into account:

1. Geographical data

The term geographical data involves the geographic location, the land morphology, the climate and the nearby infrastructure as well as the rich sources of the region.

2. Location characteristics

When selecting the site for the establishment of KACs, the sustainability of the area, such as the space sufficiency, the presence of parking spaces or the existence of electrical installations, must be taken into consideration.

3. Access to transport

KACs must be easily accessible and approachable. The measurement of KACs distance from highways, railways, ports, airports is mandatory in order to define the optimal site.

4. Demographics

The analysis of population data such as its size, distribution, growth trends or reduction are crucial not only for the selection of the site but also for its planning. Characteristics as the average age, the visitors' age groups, and their educational, racial and religious elements are important factors to take into consideration for the selection of the appropriate site.

5. Financial data

The analysis of the economic base of the population, the sources of income, the income distribution and the unemployment rate of the region have a decisive impact on the sustainability of KACs.

6. Safety

The regional indicators of crime and the security of visitors and facilities determine the selection of a site.

7. Financial Incentives

The existence of affiliated businesses in the area, the cheaper land, the possible tax exemptions or employment aid schemes for public organizations as the BLUEMED KACs

that enhance the local economy and promote sustainable tourism, support the choice of one location against another.

8. Job offer

The ability to find the right workforce in number and qualifications to cover the variable operating needs of KACs depends on the selection of the right site to establish a public building.

9. Environmental characteristics

Climate control is a core issue in KACs environment. Temperature and humidity in the area directly influence the visitors' experience. If conditions are right, visitors never give them a thought. If conditions are too hot, too cold, or too humid, visitors will feel uncomfortable. Their concentration will be affected, they may shorten their visit, and they are less likely to return.

5.3.2. Outdoor landscape planning

Focusing on the planning of the outdoor, landscape area of KACs, accessibility and enhancing unobstructed, pedestrian mobility must be the priorities of designing. The main objective of the outdoor KACs landscape planning is to widen the mobility opportunities and facilitates the elderly, the disabled or pregnant women and the inability of children to negotiate steep and long stairs and people who can use a range of different wheelchairs. Such planning prerequisites, however, are not always mandatory, as in the case of temporary KACs where certain requirements cannot always be satisfied.

Uneven surfaces, strong gradients or cross falls, as well as steps in levels and staircases, present the primary barriers to independent mobility for persons within these categories. These barriers are not always obvious to visitors who do not have these requirements. It is also important to be understood that these barriers are present not only in internal, in which case are usually taken into consideration, but also in external environments, where these particularities are often neglected, in a range of varying configurations.

In response to these mobility deficits, various assistive implements, from walking sticks and walking frames, to wheelchairs and scooters have been developed to enhance the independent mobility of the individual. This assistive equipment has specific limitations that further limit the adaptability of the individual. Their mobility then becomes a functional relationship between the environment and the equipment design and on this relationship the landscape planning of the KACs must be based on.

The level of accessibility is determined by the ability of designers, planners and managers to cope with the specific needs of the individual to access all components of the complex and to participate fully in the exhibitions provided in the KACs. Codes such as Disabilities Act Directives are aimed at meeting these requirements, and the compliance with such codes is mandatory for the establishment and construction of BLUEMED KACs.

5.4 Roles and functions into KACs

Although management systems, staffing and facilities, could differ from one country to another, all the KACs that will be realized in MED areas within the BLUEMED project, will serve a similar purpose: the knowledge and dissemination of the underwater cultural heritage along with the organization of departure/arrival of diving excursions in pilot sites.

Therefore, all KACs shall have the following functions:

- to preserve, study and document underwater cultural heritage;
- to exhibit and interpret underwater artifacts on-site and to raise public awareness by interactive exhibitions, educational activities, immersive visualization systems etc.;
- to provide a continuous service at least for the whole summer season;
- to provide an economic income for the region by creating job opportunities, both in the KACs, as well as by becoming tourist attractions;
- to provide publicity for a region with the activities held in the KACs.

KAC management must become a priority on the agenda of decision-makers. A clear master plan that sets out the role of KACs management can ensure successful in underwater cultural

heritage protection and, consequently, turn the current passive positions of traditional archaeological museums into active ones. So, KACs will look after the world's underwater cultural heritage and interpret it to the public on the basis of specific laws, and involving all the institutions working in the cultural heritage field.

5.5 Users into KACs

KACs will be centers of knowledge and the mission to offer an innovative educational experience is the key objective in serving visitors. Understanding who will visit frequently the KACs, and what they will want to see and learn about, is fundamental to the success of the KAC itself. What do the users actually want? What exactly are KACs to offer people something different than ever before?

Accustomed to high standards of display and communication through exposure to television, magazines, commercial exhibitions and shops, the public now demands similar standards even in exhibitions related to cultural heritage field.

They want to be entertained and informed in a manner to which they have become accustomed, and they expect access to information to be made easy for them.

A preliminary study about possible visitors and users will be useful in KACs implementation in order to focus on the objects/artifacts it want mostly to display and the stories, events that will be made available.

A KAC should provide a range of high quality, stimulating experiences for visitors which have access to exhibitions and tools, providing opportunities for enjoyment and learning. This also means that KACs will part of the service industry working in partnership with all stakeholders to achieve user satisfaction at a time when expectations on service quality generally are rising. KACs should be able to engage the visitor in a communication and experience process and increasingly need to respond to the diversity of audience demographics, to provide visual, interactive, and text-based learning formats, by offering different tools suitable for all ages (such as audio guides, computer interactives, multi-layered text labels, etc.).

Engaging visitors in an interactive experience is much more likely to result in a positive experience and visitors come back for more. KACs will be revolutionary facilities linking technology to diving and to underwater cultural heritage. They will be a unique, informative place where divers and "not divers" can access to innovative content and obtain a thorough idea of what a dive cultural destination.

For "divers" users will also be possible to live a unique experience through specific underwater trails.

1. Conclusion

Subject of deliverable D3.7.2 has been the description of the guidelines for the Design and Management of the Knowledge Awareness Centers (KACs) and the study of possible solution and locations for the establishment of KACs, including requirements, human/technological resources, regional peculiarities, infrastructural factors, etc.

A state of the art in museum planning has been provided by outlining current best practices in management of Museums that exhibit items/objects from underwater environments. The main purpose was to highlight their work practices and management models to be useful within BLUEMED project in creating new strategies for promoting and manage the UCH in MED areas.

In accordance with the ICZM and MSP protocols, a careful study on KACs planning was carry out focusing on KACs management models, sustainability and resources, site planning, roles and regulations, etc. Finally, a management model to be applied for the establishment and consolidation of KACs in the pilot sites of BLUEMED project was defined.

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