SWAN

“Enhancing regional transportation through Sustainable Water Aerodrome Network”

Del.4.1.2 - Commercial seaplane Flight survey and Test

(Commercial Valorisation of Swan Water Aerodromes)

PORT AUTHORITYOF CORFU

Project Details:

Programme: **(Interreg V-A) EL-IT - Greece-Italy**

Priority Axis: **Cross Border and Sustainable Transport System.**

Objective: **Promoting transport and removing bottlenecks in key network infrastructure.**

Project Title: **Enhancing regional transportation through Sustainable Water Aerodrome Network.**

Project Acronym: **SWAN**

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Lead Partner: **Port Authority of Corfu.**

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WP: 4 - Flight Activities and procedures, survey and testing

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Responsible Partner: Port Authority of Corfu.

Involved Partners: ALL

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Introduction

This report is elaborated in the context of Work Package (WP) 4 - Flight Activities and procedures, survey and testing.
WP4 aims to

- perform testing flights and surveys for the verification of the infrastructural requirements and the validation of their performances.
- **Identify and assess the multimodal transportation capabilities and commercial capacity and exploitation opportunities of SWAN network.**
- Elaborate a Plan for the sustainable valorisation and governance of the water aerodromes.

Municipality of Nardo (PB5) will be in charge of all the flight activities (will take part in all the developed water aerodromes of SWAN project), initially by using small seaplanes for the preliminary surveys and then by using a commercial seaplane aircraft to test the infrastructures, the procedures and the routes. During and after the final implementation of the infrastructures, an extensive flight test will be performed to enable and secure the certification of the water aerodromes. All the flights which will take place in all the developed water aerodromes will be conducted under the supervision of professional and highly qualified pilots.

The Lead Beneficiary of the project, **Port Authority of Corfu**, will be responsible for the elaboration of the two studies regarding the Multimodal transportation capabilities and Commercial Valorisation of SWAN network (Del.4.1.2) and the elaboration of a Sustainable Governance and Management Plan of the SWAN's water aerodromes (del.4.1.1).

This study assesses the Multimodal transportation capabilities and Commercial Valorisation of SWAN network as well as its commercial capacity and exploitation opportunities. Thus, the study is composed by the following sections:

1. Background
2. The Swan Network
3. Promotional Activities for the Valorisation of Swan Network
4. Operational Model of SWAN Network
5. Social-Environmental Impact of the SWAN Network

1. Background

1.1 State of Play of Multimodal transportation in Adriatic-Ionian Sea

EU figures show freight transport is projected to grow 40% by 2030 and surpass 80% by 2050. This – especially road freight growth – is a major source of concern with regards to the well-being of European citizens as the negative consequences of said growth are increased pollution, congestion, noise, accidents, and climate change.

To counter the above, the EU is actively supporting Combined Transport by means of the Combined Transport (CT) Directive (Council Directive 92/106/EEC). This aims at enhancing Combined Transport by removing procedures and restrictions for Combined Transport operations.

A number of other EU policies support the directive including the Weights and Dimensions Directive (Directive (EU) 2015/719 amending Council Directive 96/53/EC) which allows Member States to permit the movement of heavier intermodal load unit by road within the frame of Combined Transport, and financial support for projects relating to combined transport.

Sea plane transport networks in particular are receiving increasing attention both in the European Union and worldwide as these:

- ✓ can provide real multimodal capabilities, connecting any coastal site, from downtown port cities to remote areas and to areas with international airports.
- ✓ have limited requirements for infrastructures, usually a simple and economic floating pontoon.
- ✓ have a low environmental impact; both from the infrastructures and the sea planes.

The limited requirements from the infrastructural point of view and its low environmental impact makes seaplane transportation one of the best alternatives for multimodal & integrated transport systems.

However, the lack of dedicated regulations (such as the harmonisation of maritime and aviation rules) and the consequent limited availability provided by the Port Authorities of Italy and Greece (including also most of the Ports of Adriatic-Ionian Region) to accept seaplanes inside their facilities, has confined sea-planes

operations to secondary areas, dramatically reducing the effectiveness of this mean of transportation.

One of the identified gaps is the lack of fast transportation within the region. The current clear understanding of the need to develop direct connections within Ports, created the synergy among the Port Authorities of Corfu (managing Paxoi & Diapontia Islands) and Taranto, that has been extended to other Port-Municipalities in the Adriatic-Ionian region (Gallipoli & Nardo).

An important identified need is the use of seaplanes in order to connect main Ports, enhancing intermodality (direct Airport to Port connections) and also providing direct access to the city centers, where usually Ports are located.

Some work has still to be done at the regulatory level, particularly in the harmonisation of maritime and aviation rules that is why -as cross cutting activity– the project aims at improving the existing legal Framework in order to develop new levels of coordination & cooperation.

1.2 Water Aerodromes in Europe / Overseas

Seaplanes operate successfully around the world and are a well-established mode of transportation in North America. Indicatively, water aerodromes are found in 12 regions across Canada and hundreds in the USA. In 2016, seaplanes reappeared in Norway with the establishment of the company Scandinavian Seaplanes. Seaplanes are an established mode of transport in Australia where new routes have recently being established and more are under consideration. Furthermore, seaplanes are experiencing a resurgence in India where Indian airline SpiceJet has created a seaplanes service and has been granted approval for 18 seaplane routes. Although traditionally reserved mostly for resort and isolated destinations, seaplanes are making a resurgence in several different passenger services including regular VIP passenger services.

One example of established regular seaplane passenger travel in Europe is found in the Balearic Islands of Spain where flights between the harbours of Palma, Minorca, Ibiza, and Formentera operate 365 days a year. A prime example of utilizing seaplane operations for successful VIP and leisure tourism is the case of the scenic Lake Como in northern Italy on the border with Switzerland.

In Europe, seaplane bases operate successfully in the following European countries among others: Austria, Belgium, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Holland, Iceland, Ireland, Italy, Malta, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Vidan et al mention Croatian law being revised to accommodate the “rapid increase in seaplane traffic” experienced in the Republic of Croatia up to the time of publication in 2016. The researchers also reported that the rise of seaplane traffic has been growing constantly in the decade prior within the EU and will see “an even higher annual growth rate of the seaplane traffic in the near future” according to the International Air Transport Association (IATA).

All markers portray that the seaplane sector is experiencing a revival and is currently in the midst of rapid development in Europe with the Adriatic and Ionian Sea looking to develop the most.

2. The Swan Network

This section presents briefly the infrastructures of the Swan Network as these are foreseen in the context of the Swan project.

2.1 Water Aerodrome in the Ionian Sea (Corfu, Paxos, and Diapontian Islands)

2.1.1 General Infrastructures requirements for Water Aerodromes in Greece

For the operation of the waterways in Greece, the appropriate infrastructure is required in port and building facilities, including the prefabricated fixed, mobile or portable huts, as well as the required equipment as described in Article 16 of Law 4568 / 18. The construction of the required new facilities for the service of seaplanes, passengers, cargo and mail must be in accordance with the applicable specifications, regulations and current legislation.
The design of the required facilities must take into account the type of waterway, which is determined by the operation and activities that take place on it. Waiting areas before check-in, luggage check-in and collection, passport and identification checking areas, passenger and luggage security clearance areas, as well as passenger waiting and boarding areas sanitary facilities must be taken into account.
More specifically, according to Paragraph 2 of Article 3 of Law 4568/18, the minimum requirements of building installations ensuring a sufficient level of passenger service are defined as follows:
a) Building or other infrastructure to ensure sufficient space for installation and proper operation of passenger and luggage control safety equipment, b) while waiting for passengers, a 1.2 sq.m space is required per passenger served, c) mandatory presence of sanitary facilities for both sexes and persons with mobility problems depending on the number of passengers. If these spaces are not located in the passenger waiting area, they are to be located close to it. At waterways which are entry-exit gates, there is to be a separation for passengers inside and outside Schengen, with the minimum required space for uniformed staff and service officers.

Buoys

The use for buoys is to limit the area for manoeuvre. A minimum number of buoys will be used to define the manoeuvring area (three or more buoys depending on the manoeuvring area).

Testing and maintenance of the equipment immediately after the completion of the construction

The manufacturer of the water airport of Corfu is the one who will take over the testing of the devices and maintenance coverage of the equipment for at least 6 months from installation.

User Training

The manufacturer of the water airport of Corfu during the implementation of the construction will provide training to the users of the equipment. Noted that the teaching day will not exceed five hours.

In this case, users to be trained will be appointed by the Region of Ionian Islands, while the teacher / sponsor of the construction of the water airport will be required before the implementation of the training program, to establish the training program and the issues that it will cover the profile of the group of trainees that should be approached and the required training hours. The training course will be held on the site where the equipment will be installed.

Pilot Operation of the Equipment

The Contractor of the construction of the water airport Corfu upon the completion of work will be required to support the operation of the equipment and its users under real operating conditions for at least 1 month (pilot mode). During this period, the Contractor will be in constant collaboration with the supervising personnel from the Region of the Ionian Islands and will provide support through at least one (1) qualified technician. Specifically, the Contractor will be required to provide the following services:

Instant telephone Support Help-desk

Direct support to all users of the water airports by phone during working hours 9:00 to 17:00. The Contractor will provide the following services:

- Telephone support regarding the use of equipment
- Telephone support to address problems during use.

Technical Support Services

The Contractor for the duration of the pilot operation in case any problems arise that cannot be resolved via telephone support will be required to provide qualified

personnel at the equipment installation site in order to provide immediate assistance to users of the institution on its operation.

The equipment support will include:

- Troubleshooting - user support
- Collect feedback from users
- Correction / errors management
- Support of the operation of the equipment offered
- On the job training.

From the collection of observations and pending matters from the Contractor, the need for specific interventions or corrections to the operation of the equipment may be created. In this case the Contractor shall make the necessary corrections, which will be completed within the time period of pilot operation. The completion of the Pilot operation of the systems shall be followed by the issue of the relevant test certificate.

2.1.2 Infrastructure and Equipment requirements

The tables below illustrate the total infrastructure and equipment needs for the water aerodromes in Corfu, Paxos, and the Diapontia Islands and the total cost for their construction.

Table 1. Break-down analysis of Infrastructures & Works – Equipment (LB)

Equipment
Equipment for operation in the 5 water aerodromes in Corfu and Paxos ports & in 3 Diapontia Islands including floating pontoons, sheds and ramps, floating brake wavers etc.
Equipment for the operation of the three water aerodromes in Diapontia Islands. This includes: VHF radio, lifejackets and fire extinguisher, measures for water pollution limitation etc.
Supply of security equipment for the two mini terminal stations in Corfu and Paxos. This includes: x- ray machines, magnetic gates, offices and furnitures, it equipment. (The equipment of the pre-fabricated mini terminals on Diapontia Islands will be lighter)
Supply of a speed boat for the inspection of the water aerodrome in Corfu Port

Supply of 3 desktops
Infrastructure & Works
Infrastructure works for the formation of land side of the three water aerodromes of the 3 Diapontia Islands, Corfu and Paxos Ports including installation of floating pontoons, sheds and ramps, floating brake wavers etc.
Infrastructure works of a fully equipped mini terminal for the water airplane passengers in Paxoi Port
Infrastructure works for Central Port of Corfu and Diapontia Islands. These include construction of a fully equipped mini terminal for the water aeroplane passengers in Corfu Port and 3 pre-fabricated mini terminal in Diapontia Islands

Table 2. Overview of the Cost of the Investment (LB)

Infrastructures & Works	Equipment	Technical Studies & Supervision of the works	Total Investment Cost
531.000,00 €	**295.750,00 €**	**200.955,00 €**	**1.027.705,00 €**

2.1.3 PORT AUTHORITY OF CORFU (LB)

The Authority of Corfu will implement works and will purchased equipment for the construction and the development of following 5 water aerodromes:

Water Aerodrome in the Port of Corfu Island

The water aerodrome infrastructures in the Port of Corfu (the spatial analysis of which is presented in Figure 2) will include the following works/equipment (Figure 1):

1. Purchase, transport & Installation of a floating pontoon

A floating pontoon will be installed within the mooring space of Corfu's water aerodrome. The infrastructure will allow sea planes to remain in the Port for several hours or days.

2. Purchase & Installation of a shed & a ramp for the maintenance of the seaplanes

The purchase and installation of a specially designed shed is required for the maintenance and the prescribed technical audits of seaplanes. Additionally, the

construction of an exit ramp of the seaplanes from the water is required, in order to allow seaplanes access to the shed.

3. Purchase & Installation of a Terminal for the seaplane passengers

The Installation of a Terminal station is required during the water aerodrome operation. The Terminal will be installed near the seaplane docking space for the screening of the seaplane passengers and their luggage. The station will provide (among others) Hygiene facilities for both genders.

4. Installation of floating break waver

In order to protect the water aeroplanes in the port of Corfu from indirect waves, it is necessary to supply and install a suitable floating breakwater

5. Construction of fuel facilities for the arrived/departured sea-planes

The construction of suitable infrastructure for the storage and the supply of aviation fuel in the water aerodrome of Corfu are required to meet the needs of the arriving/departing sea-planes.

6. Purchase and installation of Safety equipment for the water aerodrome

The purchase and the installation of a Metal-Detector (WTMD), and X-ray security equipment for the baggage monitoring in passenger's screening area of the Water Aerodrome is required in order to be in line with the new requirements by the Civil Aviation Authority, resulting from the Amendment provisions of the Technical Safety Directive No. (1) – 1st T.S.D.(GG Issue B / No. 372 / 02.18.2016).

7. Purchase of a Boat Service

Under the law, a high-speed craft is required for long-term availability, pocessing the necessary permits and equipment, ready for use at any time.

A. Floating pontoon for seaplanes

B. Pre-fabricated Terminal

C. Shed for seaplanes

D. Ramp for seaplanes

E. Floating brake waver

F. Magnetic gate

Figure 1. Works & Equipment of the Water Aerodrome of the Port of Corfu

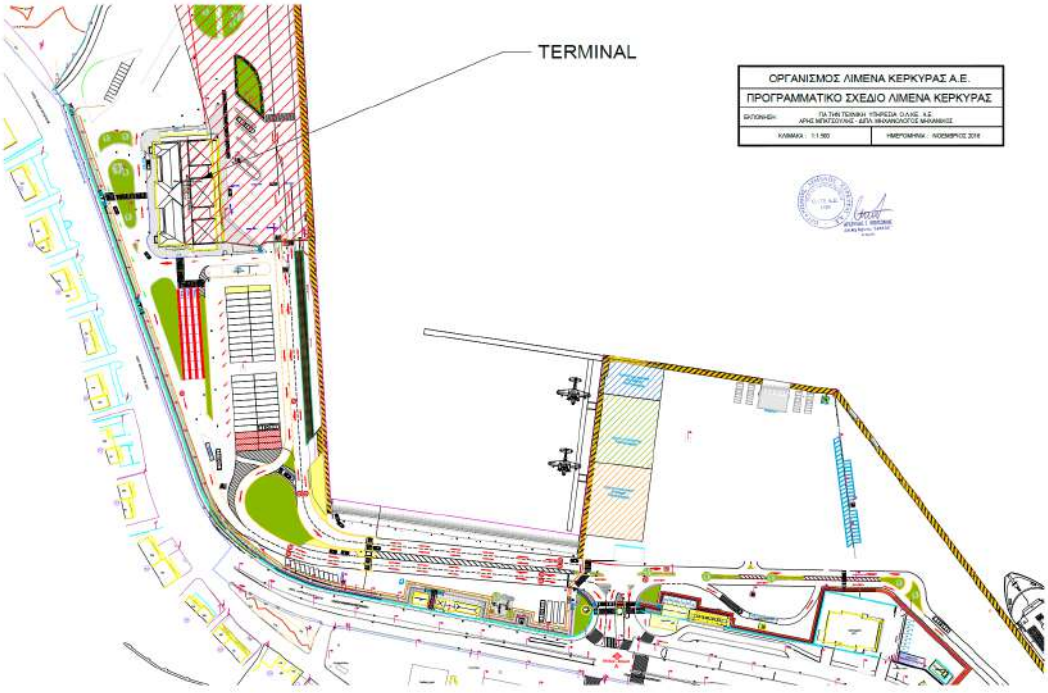


Figure 2 - Spatial Planning Analysis of the water aerodrome in the port of Corfu

2.1.4 2.2.2 Water aerodrome in Paxoi

The water aerodrome infrastructures in the Port of Paxoi will include the following works/equipment:

1. Purchase, transport and installation of a floating pontoon in the docking area of the Paxos water aerodrome

A floating pontoon is required for the long-term and overnight stays of the water airplanes at the Water aerodrome of Paxoi Port. Thus, the water aircrafts will be also able to start the morning route from Paxoi Island.

2. Creation of additional sheltered space for passengers facilities and control

Due to the fact that the existing Terminal is very small and does not have toilet facilities, it is necessary to construct a larger one which will facilitate in the passenger's control and the luggage facilities.

3. Purchase of Safety equipment for the water aerodrome

In compliance with the new requirements of the Civil Aviation Authority resulting from the Amendment of the provisions of the Technical Safety Directive No (1) - 1st ATHEX. (GOVERNMENT ISSUE B / AP.372 / 18-2-2016) requires the purchase and installation of a WTMD in the passenger control area of the Paxos waterway,

as well as an X-ray security equipment for the passengers control and of the luggage at the Water Path. The Water aerodrome of Paxoi already has a metal detection gate (WTMD), so it is necessary to purchase and install a X-ray security equipment for the control of the luggage.

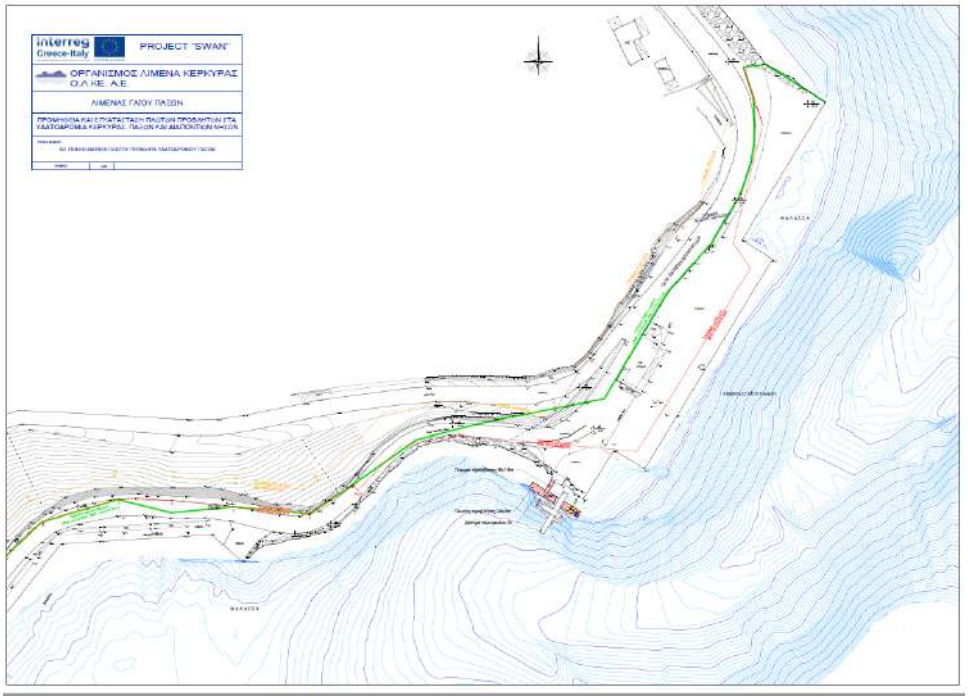


Figure 3 - Spatial Planning Analysis of the water aerodrome in the port of Paxoi

2.1.5 Water Aerodromes in Mathraki, Othonoi and Ereikoussa (Diapontia Islands)

The water aerodromes in Diapontian Islands will include the following works/infrastructures:

1. Development of the water aerodrome

Due to the height of the existing cement pier, it is necessary to install a floating pontoon for the safe seaplane seizure at the Water aerodrome of Diapontian Islands and the smooth and safe boarding - disembarkation of the passengers.
For the passengers and luggage control, it will be necessary the construction of a mini Terminal (pre-fabricated) including restrooms for the passengers.

2. Development of the water aerodrome

Due to the height of the existing cement pier, it is necessary to install a floating pontoon for the safe seaplane seizure at the Water aerodrome of Diapontian Islands and the smooth and safe boarding - disembarkation of the passengers.
For the passengers and luggage control, it will be necessary the construction of a mini Terminal (pre-fabricated) including restrooms for the passengers.

An overview of the selected locations of the 3 mini water aerodromes are presented in Figures 4, 5 and 6.

Figure 4 - Satellite photo and drawings of the location of the Water Aerodrome on Manthraki Island

Figure 5 - Satellite photo and drawings of the location of the Water Aerodrome on Othoni Island

Figure 6 - Satellite photo and drawings of the location of the Water Aerodrome on Ereikousa Island

2.2 Water aerodrome in the Port Network Authority of the Ionian Sea (Port of Taranto)

The Port Network Authority of the Ionian Sea (PNAIS) will thus build a water aerodrome presenting the requirements foreseen by the Italian Civil Aviation Authority Regulation for this kind of transport.

The intervention will be implemented in the port domain and, in particular, in the area close to the city center and to the Marina. For the final destination of the water aerodrome, the Port Network authority will take into account the results of the analysis and design activities to be carried out within the project. The location of the water aerodrome is presented in Figure 7.

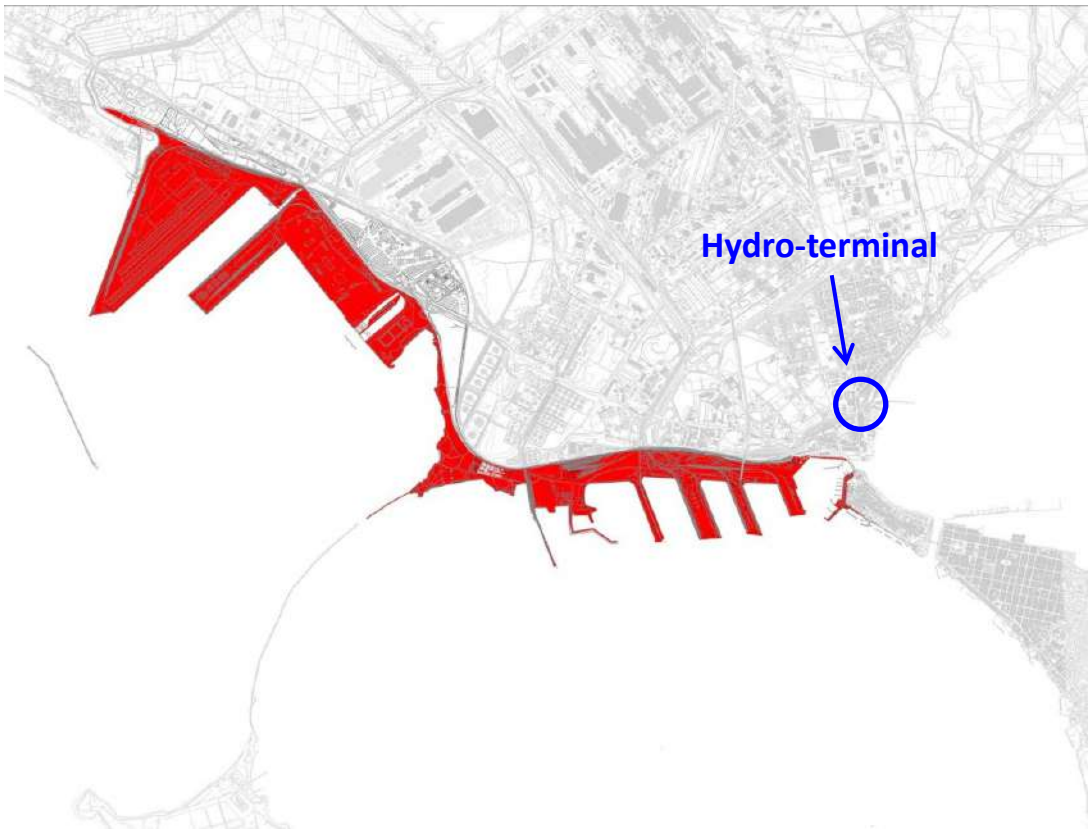


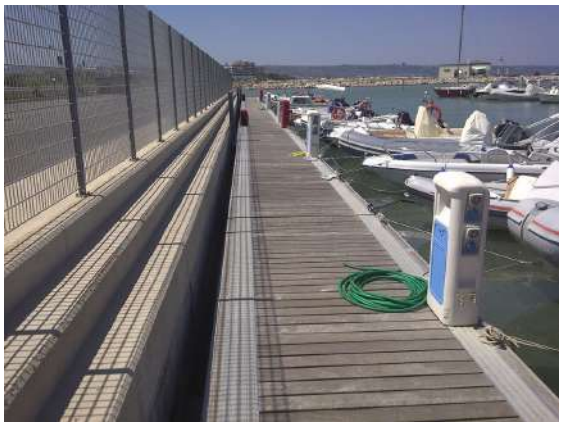
Figure 7 - Spatial Planning Analysis of the water aerodrome in the port of Taranto

The intervention will be composed as follows:

1. Permanent jetty →13,00 m x 2,5 m with a capacity of 200 kg/sqm;
2. Runway linking the floating docks →n°1 module with dimensions 3,00 m x 1,35m
3. Lifting portal serving the runway linking the floating docks → n°1 lifting portal 3,00 m long
4. (soft) Floating Dock →n° 2 modules with dimensions 12m x 2,50m and a capacity of 200 kg/sqm
5. Services facilities
6. Safety boat→ with a capacity of 10 people

The following image presents some relevant examples of the above works.

Permanent jetty



Runway linking the floating docks

Lifting portal serving the runway linking the floating docks

(soft) Floating Dock

Services facilities

Figure 8 - Works & Equipment of the Water Aerodrome of the Port of Taranto

The following tables present the total cost for the contraction of the Water Aerodromes in the Port of Taranto.

Table 3. Overview of the Cost of the Investment (PB3)

Infrastructures & Works	Equipment	Technical Studies & Supervision of the works	Total Investment Cost
199.000,00 €	**35.000,00 €**	**137.390,00 €**	**371.390,00 €**

Table 4. Infrastructures & Equipment of PB3
Equipment for the operation of the water aerodrome including: signalling equipment, buoys, VHF radio, lifejackets and fire extinguisher etc.
Supply of IT equipment and furniture for the mini terminal station

Table 4. Infrastructures & Equipment of PB3
Infrastructure works for the implementation of water aerodrome. These includes: installation of floating pontoon, underwater activities, mooring etc.
Realization of a fully equipped mini terminal integrated within the existing Multifunctional centre project

2.3 The Water aerodrome in the Municipality of Gallipoli

The following table presents the infrastructures and the equipment for the construction of the water aerodrome in Gallipoli. Figure 9 presents a Spatial Planning Analysis of the water aerodrome in the port of Gallipoli.

Table 5. Infrastructures & Equipment (PB4)
Full Analysis and design of the Water Aerodrome and Mini terminal, in accordance to Italian aviation and maritime regulations
Infrastructure works for the Implementation of water aerodrome. These includes restoration work of existing Gallipoli port break-water dedicated area, installation of floating pontoon, underwater works, mooring etc.
Infrastructure works for Port of Gallipoli of a fully equipped mini terminal for the water airplane passengers including water and electrical services
Supply of security equipment, IT equipment and furniture for the mini terminal station. Security equipment includes portable scanning device, Computer terminal and high speed connections, weather station, furniture, weighing device.
Equipment for the operation of the water aerodrome including: certified signalling equipment, lighted buoys, VHF radio, lifejackets and fire extinguisher etc.

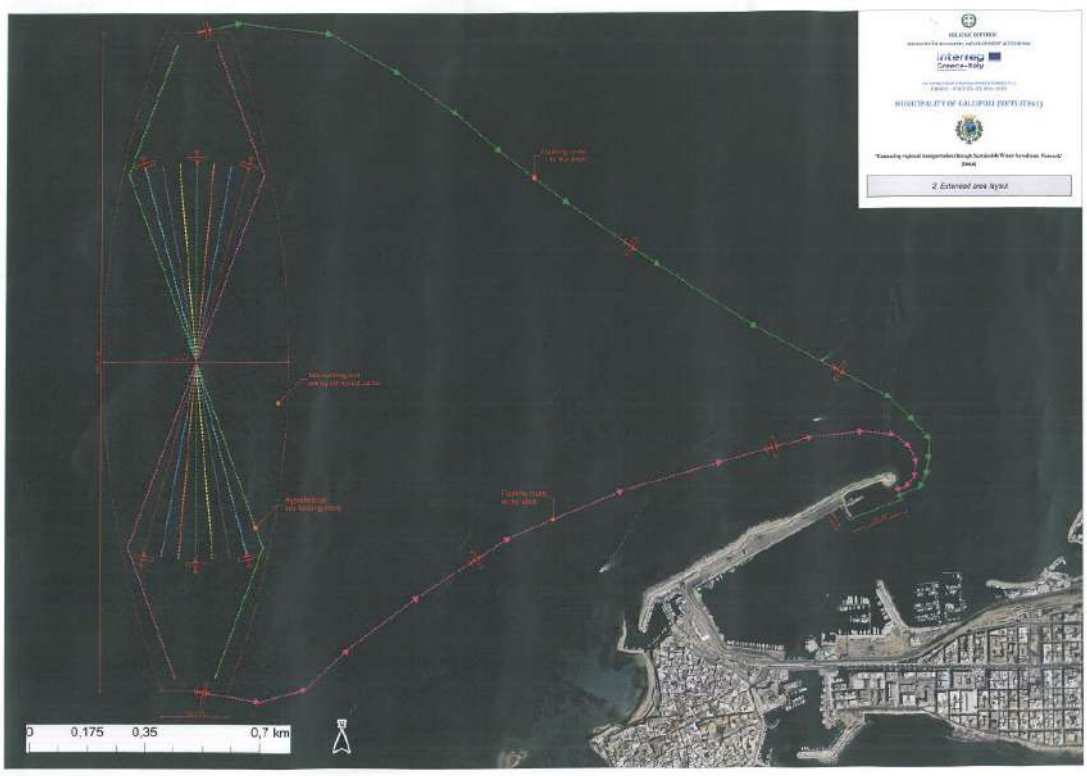


Figure 9 - Spatial Planning Analysis of the water aerodrome in the port of Gallipoli

The following table presents the total cost of the investment of the Water Aerodrome in Gallipoli.

Table 6. Overview of the Cost of the Investment (PB4)

Infrastructures & Works	Equipment	Technical Studies & Supervision of the works	Total Investment Cost
239.000,00 €	**72.000,00 €**	**226.000,00 €**	**537.500,00 €**

2.4 The Water aerodrome in the Municipality of Nardo

The following table (table 7) presents the infrastructures and the equipment for the implementation and the operation of the water aerodrome in Nardo. Figure

10 presents a Spatial Planning Analysis of the water aerodrome in the port of Nardo.

Table 7. Infrastructures & Equipment (PB5)
Full Analysis and design of the Water Aerodrome and Mini terminal, in accordance to Italian aviation and maritime regulations
Infrastructure works for the implementation of water aerodrome. These includes walking path and access platform, installation of floating pontoon, underwater works, mooring etc.
Infrastructure works of a fully equipped mini terminal for the water airplane passengers including water and electrical services
Supply of security equipment, IT equipment and furniture for the mini terminal station. Security equipment includes portable scanning device, Computer terminal and high-speed connections, weather station, furniture, weighing device.
Equipment for the operation of the water aerodrome including: certified signalling equipment, lighted buoys, VHF radio, lifejackets and fire extinguisher etc.

The following tables present the total cost of the investment in Nardo.

Table 8. Overview of the Cost of the Investment (PB5)

Infrastructures & Works	Equipment	Technical Studies & Supervision of the works	Total Investment Cost
146.000,00 €	**47.000,00 €**	**370,000,00 €**	**563.000,00 €**

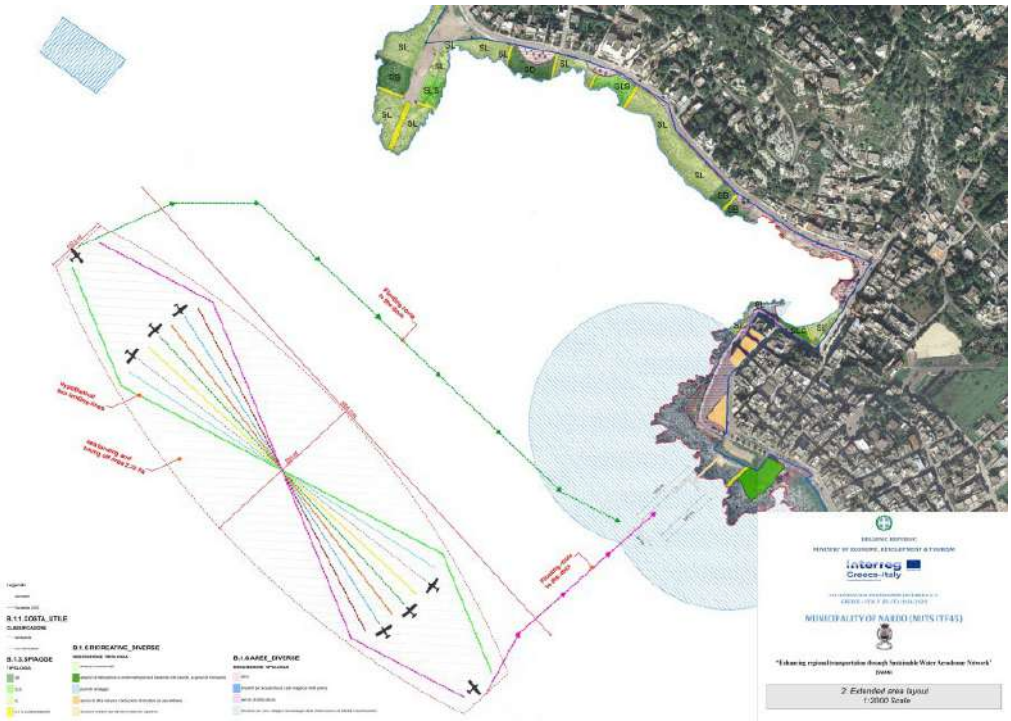


Figure 10 - Spatial Planning Analysis of the water aerodrome in the port of Nardo

3. Promotional Activities for the Valorisation of Swan Network

This Section presents indicative promotional activities for the valorisation of the Swan Network. In particular, the section presents:

- Identified Stakeholders & Beneficiaries
- Communication tools / Channels for the promotion of Swan Network
- Key messages to be communicated
- An indicative Action Plan for the valorisation of the Swan Network after project's end.

3.1 Stakeholders & Beneficiaries

The first step in order to valorise the Swan Network is to identify the stakeholders and the beneficiaries (Target Groups) of the Water Aerodrome Network.

The target groups of the project are national, regional and municipal authorities, actors related with marine and aviation sector, citizens – general public, travel agencies and actors related with tourism industry.

- Inhabitants of the involved areas,
- Tourists & travellers,
- Marine Transport & Aviation companies,
- Local SMEs including travel agencies, touristic shops, restaurants, and hotels,
- Local, regional, national authorities and European institutions
- Network institutions and organizations
- General public (citizens)
- NGOs,
- Logistic Companies,
- Port Authorities,
- Business Support Organisations (i.e. Chambers)

The Key target groups of the SWAN project are mainly the inhabitants and the travellers of the programmed area (from Greece & Italy) who will be highly benefited by the water aerodromes and described services.

3.2 Target Groups: Contact approach

This section presents the proposed approach for the identification & the involvement of the stakeholders/beneficiaries of the Swan Network.

In general, the classification of the key actors/ stakeholders in target Groups is an important first step as will facilitate the communication actions, identifying tailored solutions for each group. One possible classification could be the following:

- **Key Stakeholders / Actors:** Some of the stakeholders/actors of SWAN project could be transport companies, actors from aviation industry, water airplane manufacturers, administrative companies etc.
- **National/International/Regional/local public authorities:** This group includes different levels of elected and local government (central government, regions provinces, municipalities, etc.). Interaction will include both direct involvements of representatives (including decision-makers &elected members) from these institutions in the project's local or transnational meetings, as well as dissemination of promotional material.
- **Private Sector:** This group includes business support organisations, local SMEs, companies offering water airplanes, companies managing water aerodromes, transport transportation and aviation companies etc., whose engagement in the project activities will build the foundations for the development of long-term collaboration and new investments for growth and jobs in the water aerodromes sector.
- **Academia:** This group includes research Institutes, Aviation schools and Universities that can be involved in project's activities and be interested by project's results.
- **General Public** especially local communities of the project partners, project's areas must be directly involved and well-informed, to raise awareness on the objectives of the project and facilitated the transportation between the inhabitant between point that are not well connected.

Table 9 presents a list of key stakeholders for Swan Network

Table 9 – Indicative List of key Stakeholders in SWAN project (Greece)

Name	Target Group	Level of impact	Main Services / Actions
CORFU AIR MONITORS	Enterprise	Local	▪ Provided a first-class service to its customers whilst ensuring safety & regulations are always maintained. ▪ Charter Scheduled and Cargo airlines.

			▪ A full range of handling & support services.
Region of Ionian Islands	Regional Authority	Regional	▪ Responsible for the sustainable development and the prosperity of the Region ▪ Provide grants
Chamber of Corfu	Business Support Organisation	Local	▪ Support members / SMEs / Enterprises of Corfu ▪ Inform members / SMEs
Corfu International Airport "Ioannis Kapodistrias"	Public Provider	Local	▪ Government-owned airport on the Greek island of Corfu at Kerkira, serving both scheduled and charter flights from European cities.
Hellenic Seaplanes	Enterprise	National	▪ Passengers/cargo transportation, pilot academy, training staff, water aerodromes management, aircrafts supply etc.
Aerocandia Aviation Services - Corfu	Enterprise	Local	▪ Maintenance Provider for airplanes
Hellenic Ministry of Infrastructure, Transport and Networks	National Authority	National	▪ Concerned with infrastructures, investments and public works ▪ Provide licenses & Authorisations
Meander Handling	Enterprise	Local	▪ Provided a first-class service to its customers whilst ensuring safety & regulations are always maintained. ▪ Charter Scheduled and Cargo airlines. ▪ A full range of handling & support services.
Marine Engineering Services Corfu By Nikolaos Perdikouris	Enterprise	Local	▪ Marine Engines, Auxiliaries (Air condition, Water makers, Generators, Winches), Electrical Installation, Maintenance, Diesel Mechanic, Machining Services. ▪ Marine Accessories and safety equipment Designer
DIONISIOS - GIORGIOS S. MICHALOPOULOS.	Enterprise	Local	▪ Service and repair of diesel marine engines from 20hp to 3,000hp Service

			and repair of all types of marine engine gearboxes and stern drives Shaft construction and repair Endoscopic inspections and computer assisted diagnostics Authorised repair centre
Apulia Region	Region	Regional	▪ In charge of the overall regional development and governance
Taranto Municipality	Municipal	Local	▪ In charge of the overall municipal development and governance
Taranto Harbour Master	Public Administration	Local	▪ In charge of the civilian use of the Port of Taranto. Moreover, it has monitoring and inspection competences.
Navy – Taranto Offices	Public Administration	Local	▪ In charge of the military use of the Port of Taranto
Taranto Customs Office	Public Administration	Local	▪ In charge of the customs systems in the municipal area of Taranto.
Nardò Municipality	Municipal	Local	▪ In charge of the overall municipal development and governance
Protected Sea Area	Public Administration	Local	▪ Protection of the marine environment and promotion of a socio-eco-compatible development
Uer Civil Protection	Services provider	Local	▪ Civil defense and protection of the integrity of life, property, settlements and the environment
Legambiente Nardò	Association	Local	▪ Care of the local territory, through actions, disputes, proposals, information and proposing opportunities for active participation

The following table presents and indicative approach towards each of the target groups and the respective goals

Table 10 – The following table describes the approach towards each of the target groups and the respective goals

Target Group	Goals	Approach
Inhabitants	Create jobs Facilitate transportation	❖ facilitate main of transportation between the inhabitants.
EU level institutions	Influence EU policy Create synergies with horizontal projects	❖ Invitation of EU officials and project's representatives to project events. ❖ Presentation of the project achievements to EU events.
Private Sector (clusters, associations, business support organisations, etc.),	Transfer of innovation Support jobs' creation	❖ Networking ❖ Distribution of project material
Pilot's Academia	Development of expertise on sustainable aviation production Promotion of the innovative models	❖ Organisation of water seaplanes events (seminars, workshops, conference) ❖ Invitation of academic experts to project events
General Public	Increase social networking Attract youth to innovative water seaplanes business (growth & jobs)	❖ Website and social media accounts ❖ Press and media

3.3 Communication tools/channels for the promotion of Swan network

This section presents communication channels & tools for the efficient communication among the project consortium and the stakeholders:

3.3.1 Promotion of Project's website

SWAN official website could be the main tool for the communication and the dissemination of project's activities/results to stakeholders.

The project website will be one of the main communication tools of the Swan network, providing useful information about:

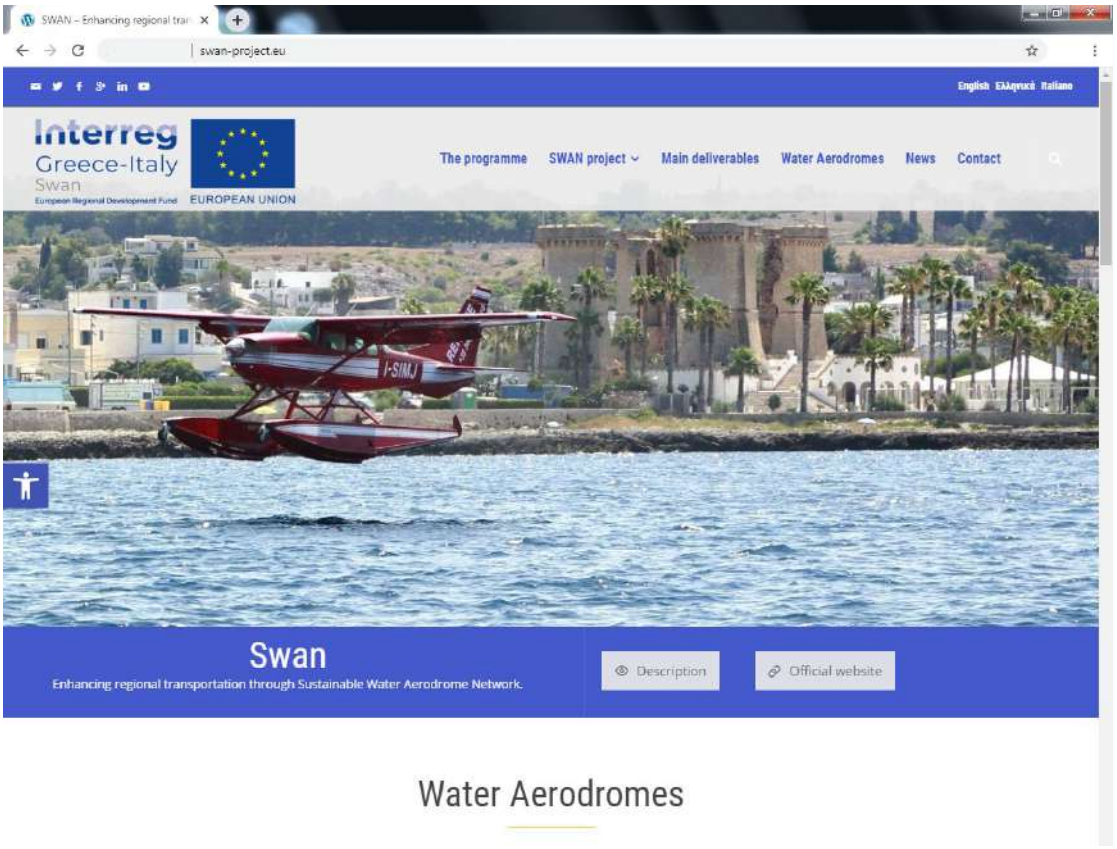
- the SWAN infrastructures & Equipment (including offered facilities and safety standards) for:
  - Water aerodromes of Corfu, Paxoi, Othonoi, Manthraki, Ereikousa, Taranto, Gallipoli, and Nardo.
  - Mini terminals of Corfu, Paxoi, Othonoi, Manthraki, Ereikousa, Taranto, Gallipoli, and Nardo
- the flights (available routes), the prices and the weather and sea forecast (images through web camera). The website will continue to operate after project implementation contributing to project's sustainability.

The Website will also provide to its guests:

- ✓ An electronic communication form.
- ✓ The ability to register in a Newsletter service.
- ✓ Navigation mechanisms, navigation information, navigation bars, and navigation map of the website, so that users can identify their position on the site (e.g. existence of an ID on each subpage and navigation menu, sitemap).
- ✓ Use of mark-up language instead of using images, to transmit navigation information (e.g. footer titles), or to table headers.
- ✓ Tools for connecting and disseminating content on well-known social networks (e.g. Facebook, Twitter, LinkedIn, Google+).
- ✓ Calendar
- ✓ Weather forecast (temperature, speed and wind direction)
- ✓ Sea weather forecast (wave height, surface wind, sea level)
- ✓ Real-time image of watercourses from web cameras

The website of Swan Network will raise the profile of the Project and improve dissemination of its results to a wide range of stakeholders.

The official website of Swan Network is www.interreg-swan.eu


swan-project.eu
English Ελληνικά Italiano
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EUROPEAN UNION
The programme
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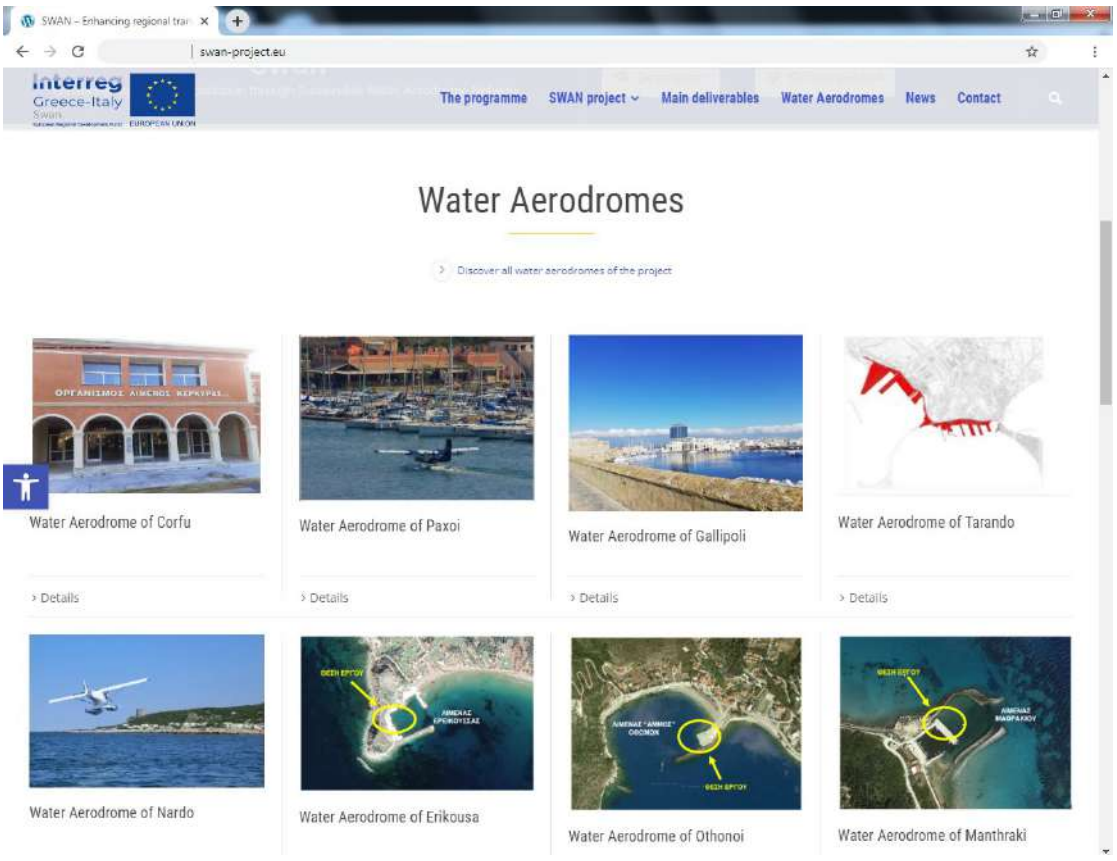
Main deliverables
Water Aerodromes
News
Contact
Swan
Enhancing regional transportation through Sustainable Water Aerodrome Network.
Description
Official website
Water Aerodromes


swan-project.eu
The programme
SWAN project
Main deliverables
Water Aerodromes
News
Contact
Water Aerodromes
Discover all water aerodromes of the project
Water Aerodrome of Corfu
Details
Water Aerodrome of Paxoi
Details
Water Aerodrome of Gallipoli
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Water Aerodrome of Tarando
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Water Aerodrome of Nardo
Water Aerodrome of Erikousa
Water Aerodrome of Othonoi
Water Aerodrome of Manthraki

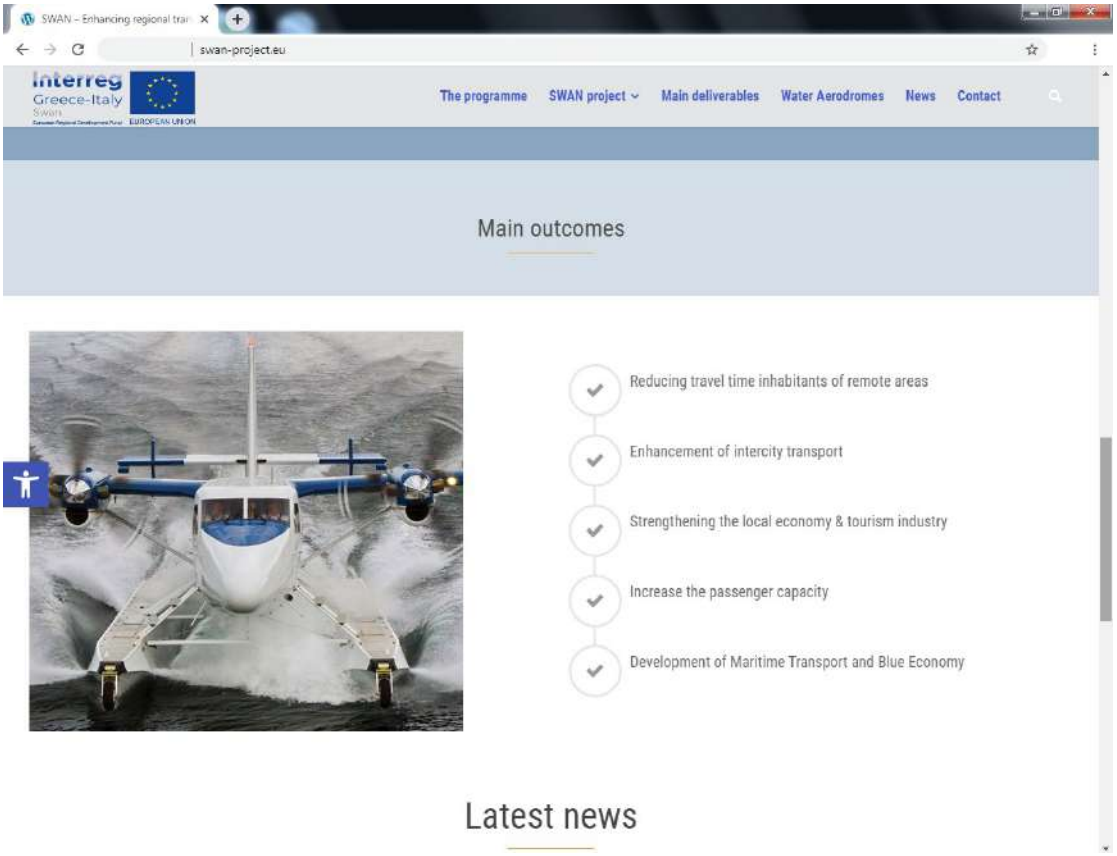


Figure 11 – Photo Gallery from Swan Website

3.3.2 Valorise project's communication plan

During the project implementation, the partners have developed a Communication plan (del.2.1). The communication plan is the cornerstone of all communication related activities. So, the partners should pay great attention in the described promotional activities as this is an important tool that should be taken into consideration for the the valorisation of the Swan Network. Figure 12, presents the structure of Swan's Communication plan.

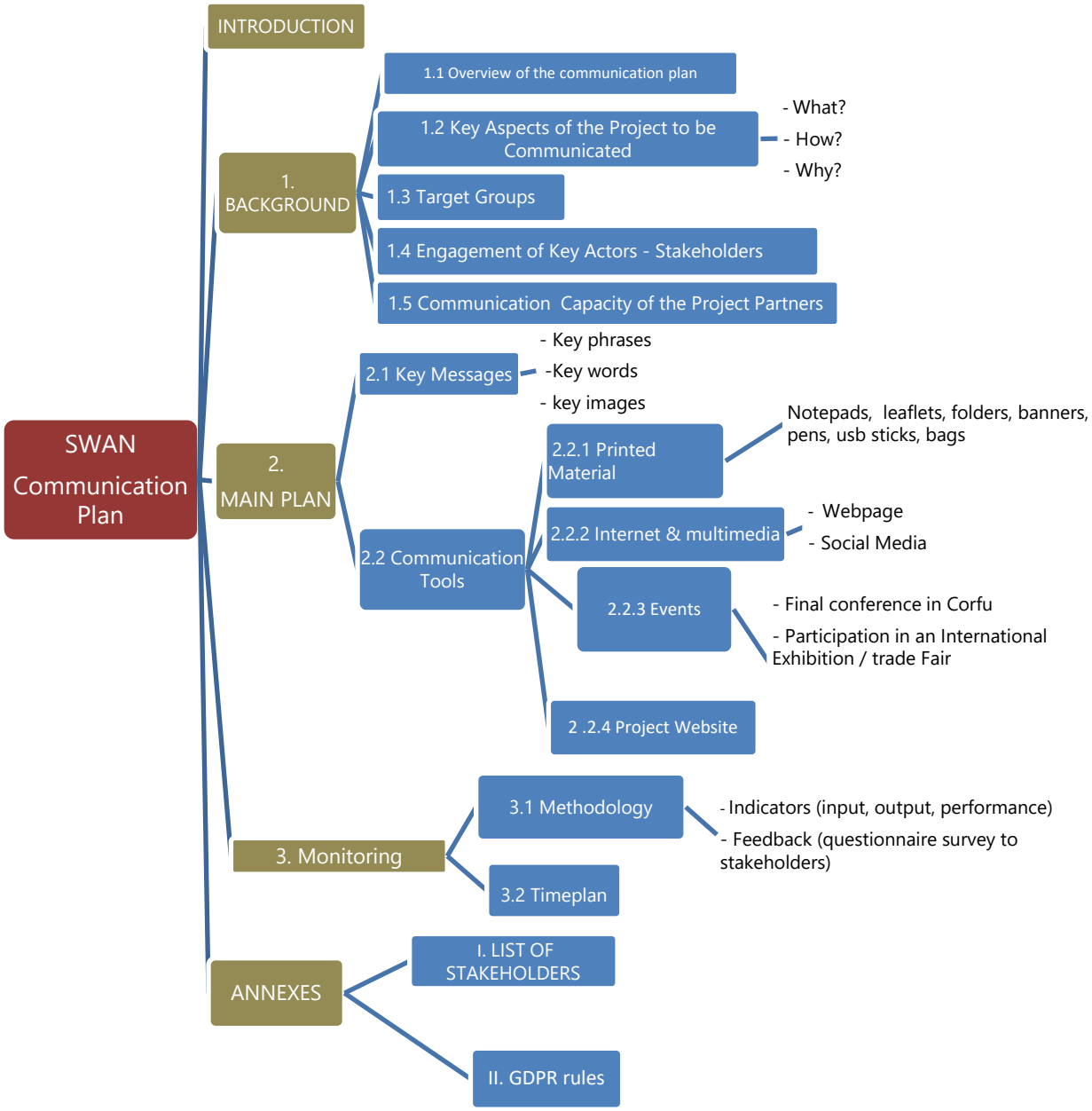


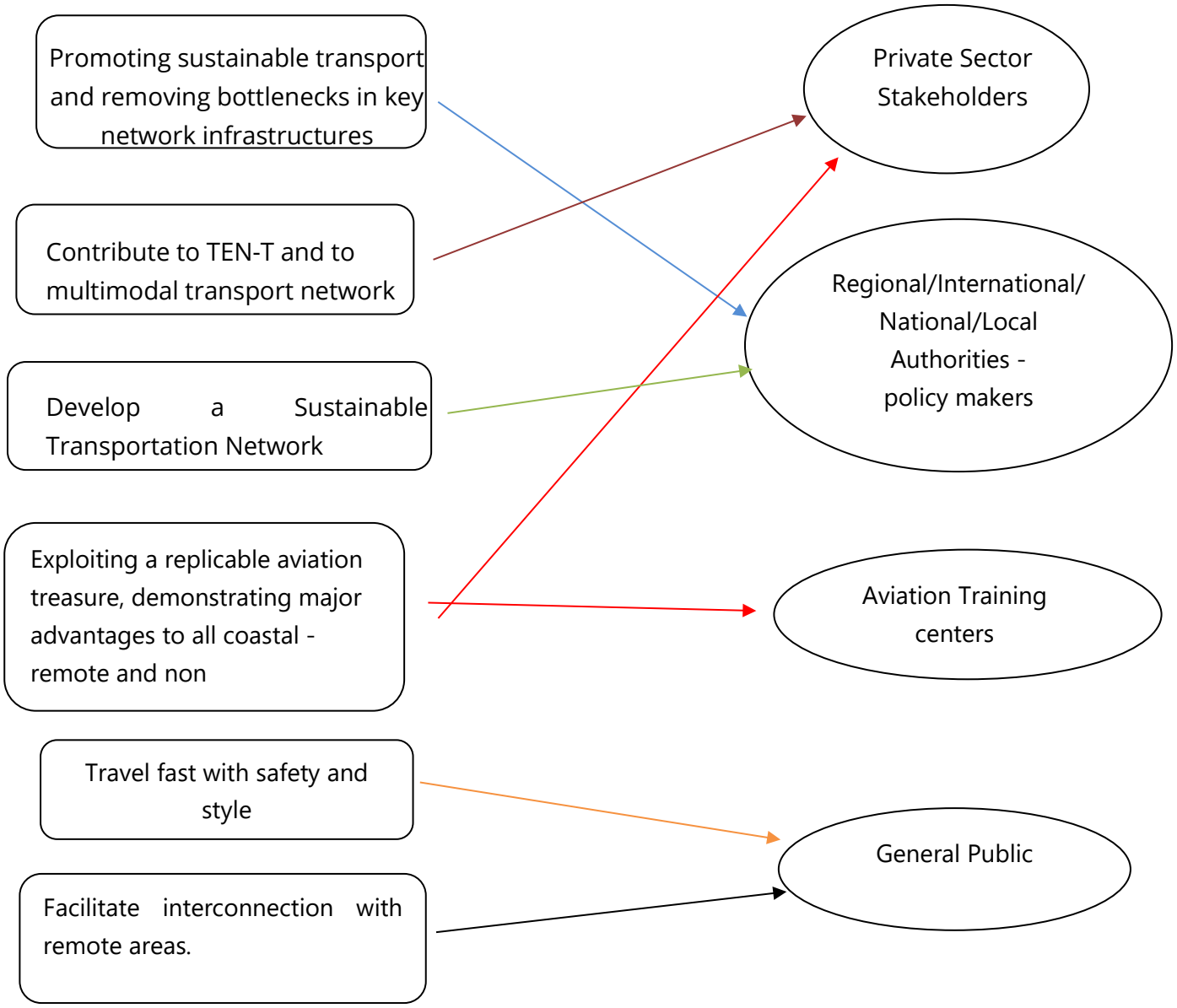
Figure 12 –Structure of the Communication Plan of SWAN project

3.4 Key messages

The use of key messages (words, phrases and images) for the dissemination of water aerodromes is another useful tool that can be used for the valorisation of the Swan Network.

3.4.1 Key Phrases

The partners should focus on key messages, for the printing of their communication material and preparation of their communication material.



3.4.2 Key words

Some key words that could be included in all relevant communications of the project, both in terms of content, and in terms of symbolism are:
Water aerodromes, Seaplanes, Aviation, Cross Border and Sustainable Transport Network, Promotion of sustainable transportation, removing bottlenecks in key network infrastructures, enhancing regional mobility, Connection secondary and tertiary nodes, Boosting maritime transportation, Sustainable development

3.4.3 Key images

We need to focus on key images related to water airplanes, sustainable transportation, and multimodal transportation.

The way to promote water airplanes and aerodromes through visual images of these creates a safe environment for the viewer and leads them to use this means of transport.

Figure 13 - Key images from infrastructures

3.5 Indicative Action Plan for the Promotion / Valorisation of the Water Aerodromes

A list of benefits brought by seaplane routes to local communities is listed by the Washington Seaplane Association (US) [1] which states that "Bringing seaplanes to your community brings tourism, prestige, and access. There are immediate and tangible economic benefits to seaplanes". Furthermore, it states that some of the commercial benefits to local communities mentioned is the connection to high-average per-person spending by private and commercial seaplane passengers via:

- ✓ Food & Beverage
- ✓ Merchandise
- ✓ Excursions and Activities
- ✓ Lodging
- ✓ Ground Transportation, including to-and-from transfers to land-based airports
- ✓ Fuel

Similarly, Prime minister of India Narendra Modi made a strong case for the benefit of seaplane routes with regards to the country's development[2] – he stated that "Effective use of waterways augurs well for tourism." and that "Sea plane services can also be helpful during times of medical emergencies. Those needing even quicker access to medical care and those living in remote areas stand to gain a lot".

Thus, Corfu, Ereikoussa, and the Diapontian Islands also stand to benefit commercially from many opportunities arising from seaplanes becoming part of the local culture. Such an example is the city of Seattle where seaplanes to and from Lake Union have become a part of local culture. In particular, the Seattle seaplanes are often featured in commercials, television shows, and travel guides[3] and benefit the community by transporting emergency repairs, tourists, and cargo to local resorts. Finally, in terms of air-sea rescue, seaplanes have an advantage over helicopters in that they can alight on the sea to rescue survivors.[4]

To this extent, a series of promotional and educational communication actions are listed to disseminate informative material of interest to all relevant local and international parties. The below-mentioned promotional activities (Table 11) are indicative and can be implemented after the end of the project. An indicative time-plan is presented in Figure 14.

Table 11 – Indicative promotional activities after project's end

	Promotional activities exhibitions/fairs and other dissemination events. / Sub-Activity/Tasks	Networks involved to help with this task	Main target groups addressed	Number of people involved with tasks related to knowledge transfer (per partner)	Indicative annual project budget per partner	Indicative Tools. (e.g, Database, partnering events etc.)
1	Create Promotional Material	external assistance	Travel & Tourism agents, Tour operators, local communities' representatives, bodies of interest (eco/green organizations, nature exploration clubs, etc.)	2-3	~€4,000	Design & Publishing Company
2	Participation in the ITB Berlin International annual Trade Fair	in-house		2-3	€1,000-€10,000	In-house
3	Participation in annual World Travel Market in London	in-house		2-3	€1,000-€10,000	In-house
4	Local Mass Media Campaign	in-house		1-2	€1,000	Local magazines
5	Social Media Campaign	in-house		1-2	€0	Social media (Facebook, Twitter, instagram)
6	Local Event / Info day	in-house		2-3	€2000	Local venues

Timeplan	2021							2022											2023											
Sub-activities (Tasks)	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Create Promotional Material	■	■	■						■												■										
Attend World Travel Market London						■												■												■	
Social Media Campaign	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Local Mass Media Campaign	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Lounge Local Event		■															■												■		
Attend ITB Berlin										■												■									

Figure 14 - Indicative time-plan of promotional activities after project's end

Further, indicative promotional activities could be:

- **Liaisons with other international initiatives:** This task will aim at coordinating and pooling existing networks of the partner's, external to the consortium such us European projects, National Platforms and International Platforms.
- **Publicity & outreach:** Press conferences, interviews, newspaper articles related to the project SWAN can further promote project's goals and activities and disseminate its results.
- **Database with stakeholders:** This database will include information with stakeholder of the sector along with contact details (address, email, telephone, website, social media accounts, etc.), their main activities, interests, challenges, and what they are excepting from the project. The use this kind of database by each partner can facilitate massive communication among all stakeholders of the project.
- **Electronic communication & multimedia:** Stakeholders will be contacted and presented with information via.
    - E-mails,
    - Social media (Facebook, twitter, Instagram).
- **Online marketing:** The most intensive communication channel will be the Internet. We assume that our main target groups are familiar with the

Internet and social media, and therefore we will make an extensive use of those means. A page on Facebook, as well as a profile on Twitter and Instagram could be created and fed regularly with information on activities and forthcoming events during the whole project lifetime by each partner.

- **Dissemination of promotional material:** The partners will produce and disseminate 10.000 pens, 5000 notepads, 5000 folders, 500 USB sticks, 15 banners, 1900 leaflets, 320 bags. This material will be distributed during the Final Conference and the launching events for the operation of the water aerodromes.

Figure 15 - Indicative leaflet for Swan Network

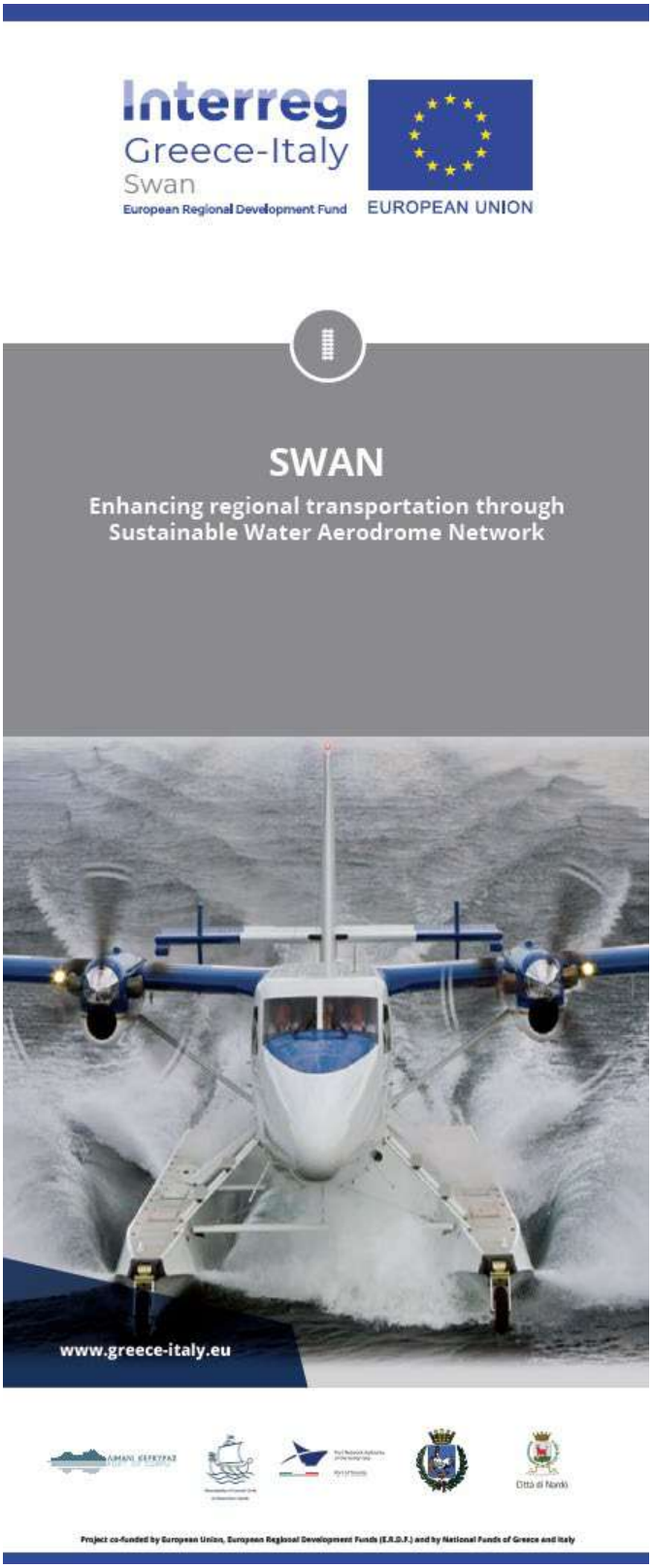


Figure 16 - Indicative Banner for Swan Network

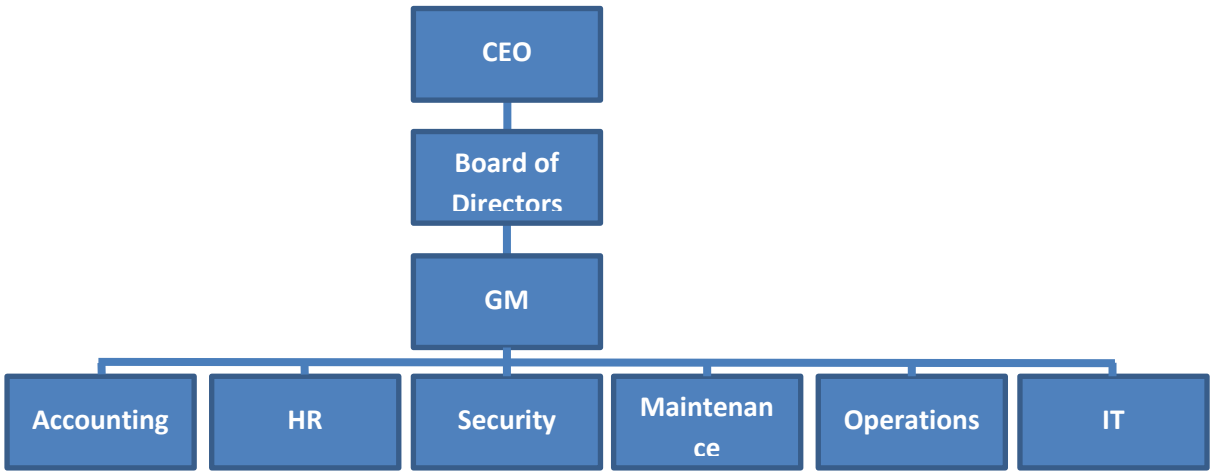
- **Face to Face presentations & participation in conferences & international events:** Every aspect of the SWAN project should be presented in international trade exhibitions such as the *ITB Berlin* and through the information and dissemination activities such as the Final Conference that will take place in Corfu. Those events will be mainly hosted by the project consortium organizations. The aim of those presentations will be mainly to increase the awareness the of seaplanes connecting any coastal site, from downtown port cities to remote areas and to areas with international airports.

4. Operational Model of SWAN Network

This section presents briefly a proposed Governance Scheme for the Water Aerodromes of Swan Network that could applied addressing all the necessary tasks and requirements. More detailed information is presented in deliverable 4.1.1.

4.1 Governance Scheme & key operations

Operational Models & Governance is a topic that has been studied a lot. In business firms, operations and governance focuses on the role of boards of directors in representing and protecting the interests of the shareholders, while in public management, it refers to the funding and oversight roles of government agencies, especially regarding the activities of private organizations that have been contracted to provide public services. An overview of a Governance Scheme is presented the following figure.



Development and implementation of a clear change management strategy

The institutional and organizational reform process usually carries risks that may, if not properly addressed, constrain the functional process in the newly established organizational structures. Individuals working within the established functional structures may resist changes partly because they were not consulted before the commencement of the restructuring process or because the roles associated with the new positions offered to them are not clearly understood.

There is a need therefore to develop and implement a change management strategy, to ensure that their new roles and responsibilities are accomplished in line with the anticipated goals and objectives of the public service reforms and restructuring initiatives.

Development of an organizational assessment process, including indicators for effectiveness

Organizational assessments follow a systems science approach to analyze a proposed transformation, determine the impacts of the transformation on the organization, assess the preparedness of the organizational entities to adopt the transformation, and assess the "people and organizational" risks associated with the transformation.

The assessment should be a repeatable process and should focus on supporting the Coordinator to assess the level that the network has managed to reach intended transformation goals (so far), identify organizational gaps, transformation risks/issues and to determine what they need to do as they move through the process.

Indicators such as output per staff, program completion, ration of overhead/program costs, timeliness of service delivery should be set for this assessment.

Enhancement of research and knowledge management operational processes within the network

Knowledge management is recognized as an important weapon for sustaining competitive advantage and improving performance. Clear processes and methods should be developed in order to search important knowledge among different knowledge management operations, as well as find, select, organize, disseminate, and transfer important information and expertise necessary for the planned activities.

Development of a stakeholders' information sharing platform/portal

A user-friendly online information-sharing portal should be developed, in order to allow stakeholders to communicate with each other search for and consult various public documents, reports, and decisions published.

The information-sharing portal will provide a one-stop access point to public documents in the field of electronic communications and will ensure public access to a comprehensive, regularly updated database of documents. In addition, it will be used for real-time exchange of information between the stakeholders.

Establishment of a formal information flow process for accessing information on emerging priorities

This action concerns the establishment of a formal information flow process with predefined steps, for accessing information on emerging priorities adopted at high level fora (Public Dialogue, Cabinet meetings, National leadership retreat and Presidential community outreach meetings) and incorporating them into the planning and monitoring framework of the network.

The information flow process will determine how raw information will become technical content. For that reason, the staff should work backward from the final information product (i.e. articles, web pages, fora) to determine the original data sources. This information can be further refined by specifying who is responsible for each step in the process and when responsibility is handed off from one department to another.

Cooperation between the network members

The successful operation of a network is significantly affected by its structure. An initial proper planning can bring significant results regarding the implementation of network actions, while the definition of specific processes and organizational structures can be the driving force for the activation of the network and its smooth operation.

The organizational structure of each water aerodrome should be simple and clear as presented in the following graph. The roles and responsibilities for each position are described in the following sections.

4.2 Organisational structure of a Water Aerodrome

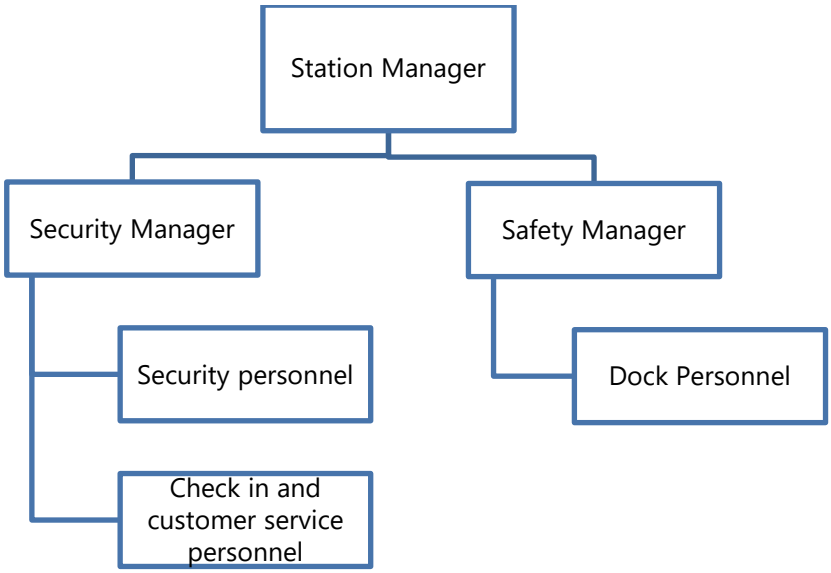


Figure 17 - Organisational structure of a Water Aerodrome

As shown above, there are three distinct organisation levels within the required personnel for the operation and the governance of a Water Aerodrome. These are:

I. **Senior Management**: Station Manager
II. **Management positions**: Security Manager and Safety Manager
III. **Personnel**: IDs Officer, Check in Personnel, Dock Personnel & Duty Co-Pilot, Lost & Found Officer

A brief presentation of each role is presented below:

Station Manager: responsible in general for the smooth operation of all staff and facilities; the elaboration and application of the procedures; the training; the logistical infrastructure; the renewal of manuals; the elaboration of instructions; NOTAMS, etc.

Safety Manager: responsible for maintaining the procedures for safe access; the mooring and departure of the seaplane at the pier; the safe boarding and disembarking of passengers; the personnel's safety in the mooring area; the refuelling and the prevention of pollution.

Security Manager: responsible for ensuring the procedures for the passengers' control, hand luggage, luggage, mail, goods and their separation (checked / unchecked) but also the security control of all areas and facilities of the water aerodrome.

Check in and customer service personnel: properly trained ground staff to check the tickets and provide services to the passengers.

Security personnel: properly trained ground personnel for passengers' control, hand luggage, luggage, mail, goods and their separation (checked / unchecked) but also of all areas and facilities of the water aerodrome.

Dock Personnel: properly trained ground personnel to serve the seaplane while it is moored.

The following table presents the key responsibilities of each position in relation to the operational procedures of the water aerodrome.

Table 12. Key Responsibilities of Personnel in a Water Aerodrome

Role	Responsibilities
Station Manager	• existence and control of signs and markings (mandatory, informative, guidance)
	• existence and control of Hydroplanes Parking Signs
	• existence and control of Windsocks
	• accuracy of water aerodrome data
	• notification of the operational status of the water aerodrome
	• execution of regular and extraordinary inspections of all water surfaces in the area of seaplanes' movement, as well as inspections of the corresponding signs, markings and additional markings
	• training of pier staff
	• recording and archiving of water aerodrome's movements
	• address the risk of bird collision
	• report on accidents, serious incidents and incidents of compulsory reporting
	• description of devices and available fire supplies for research and rescue of the water aerodrome
	• procedures and services for the execution of fire and rescue operations
	• provision of emergency medical services to passengers, visitors and staff
Safety Manager	• safe management of seaplanes during the mooring process
	• movement of immobilized seaplanes (Towing)
	• tackling any land and sea pollution in the parking lot

	• refueling of seaplanes
Security Manager	• safe movement of passengers
Seaplane crew	• ensuring the provision of meteorological information at the water aerodrome

5. Social-Environmental Impact of the SWAN Network

Due to the development of the Swan Network, the maritime transport of passenger's is expected to be increased, in the mid-term, by 80.000 annually in the involved ports (Corfu, Paxoi, Diapontia Islands, Taranto, Gallipoli and Nardo).

In terms of increased passengers capacity, this goal will be met, not only through the increase in the number of passengers arriving and departing with the seaplanes, but an important indirect benefit is the boost of the maritime growth which is also supported by the substantial media coverage following the establishment of a water aerodrome; thus, attracting an additionally higher number of people & passengers, who will benefit from the new innovative and fast service.

The Swan Network, together with the information and local transport services provided within the mini-terminal info point, will create high added value to the local Port transportation system & will directly affect all transportation and tourist activities. By increasing the number of the visitors/tourists, a significant job creation effect is also expected to be achieved boosting local economies and further developing tourist industry. Intermodality will be boosted, thanks to the natural characteristics of the amphibious seaplanes & also thanks to the information and services provided in the water aerodrome mini-terminal that will support the CB ferry connectivity. Passengers, residents and tourists will not only use the seaplanes to move from the Port to another destination but they will also increase the use of the local maritime transportation means to reach the water aerodromes.

The following sections present the Social and the Environmental Impact of the Water Aerodromes and its contribution to EU and National Policies.

5.1 Social Impact

The project idea was developed as direct consequence of the lack of fast transportation within the region and takes advantage of previous experience gained. One important issue is the need to use seaplanes to connect main ports, thus enhancing intermodality and also providing direct access to the city centre, where ports are usually located.

The clear understanding of the need to develop direct connections inside ports, created the synergy among the port authorities of Corfu and Taranto. The seaplane infrastructures, called water aerodromes, will support the multimodal integration and interconnection of transport modes; particularly the use of amphibious aircraft will enable the direct connection from land to water areas, like port to airport or from port to port or other remote or tourist areas.
The areas' inhabitants will benefit greatly by the water aerodromes and described services in a number of ways, including the following:

- Joining broader multimodal transportation networks
- Transportation services to inhabitants of remote areas
- Safe, fast and reliable transportation of cargo and freight
- Means to highlight the local tourist & sightseeing experience
- Emergency medical search, rescue, and evacuation and transport of emergency medical supplies
- Charter flights for administrative and other official events
- Charter flights for the transport of repair components for local infrastructure and/or boat and other vehicles
- Means for ecological, marine and coastal research
- Development of Food & Beverages services to cater to passengers arriving

5.2 Environmental Impact

The seaplane infrastructures (water aerodromes) will support the multimodal integration and interconnection of transport modes; particularly the use of amphibious aircrafts will enable the direct connection from land to water areas, like Port to Airport or Port to Port or other remote areas.

The water airport infrastructures will be environment-friendly, having simple & removable pontoons, while the operations area, in the water, will be developed considering noise-abatement, take off and approach, paths. Furthermore, an extensive flight-testing activity will be performed to guarantee the maximum safety & best efficiency.

During the Development of the Swan Aerodromes, several technical studies have been undertaken for the Analysis, the design the features/requirements of the required equipment and the infrastructures (Terminals and water aerodromes – floating pontoons etc.) Furthermore, for every new licence requested to be

obtained for the operation of a Water Aerodrome, an Environmental Impact and noise assessment has been elaborated in order to ensure that the construction and the operation phases of the waterways are environmental friendly and have zero impact to the ecosystem. Analytical environmental impact studies were conducted for each of the ports - the main findings of these assessments are presented below:

5.2.1 Paxos Water Aerodrome - Port of Gaios, Paxoi.

Impact on climatic and bioclimatic characteristics:

The construction works will be small-scale (installation of floating piers and construction of a building with a total built-up area of 320 sq.m. on already formed land area) and will not substantially affect the parameters that determine the microclimate of the area (temperature and air humidity, wind flow, surface temperatures and radiation environment). The load of air caused by the construction works with pollutants and dust, as well as the heat emitted by the operation of the machines, are not sufficient to substantially change the microclimate, due to the scale of the works and the relatively small required number of construction machines.

Besides, the duration of these indirect and low intensity effects will be very limited, while at the end of the construction works they will be completely undone. The overall operation of the port and in the future after the completion of the proposed projects and the installation of the waterway, does not significantly affect the parameters that determine the microclimate of the area (air temperature and humidity, wind flow, surface temperatures and radiation environment).

The load of air pollutants caused by the operation of the engines of the vessels, as well as the heat emitted is very small due to the very small number of coastal vessels served and the type and size of other vessels (fishing boats, small boats, dinghies, and yachts). Also, due to the low level port works and the absence of bulky building infrastructure, the flow of the wind is not affected, nor is the free movement of the gas masses in the wider area hindered, resulting in the immediate dispersion of the pollutants.

Therefore, it appears that the aforementioned indirect effects from the operation of the port on the parameters of the microclimate are not sufficient to cause it to be significantly degraded. Similarly, the effects on the bioclimatic characteristics of the area from the overall operation of the port after the completion of the projects under consideration are considered negligible.

Effects on morphological and landscape features:

During the construction phase, local visual pollution caused by the temporary degradation of the landscape at the construction site, as well as by the configuration of the construction site is inevitable. This will be limited in time during the construction phase and will be completely removed after the completion of the works. As for the morphology of the bottom, the installation of floating elements has little effect on it (the immersion of the artificial boulders for anchoring the floating elements and the anchorages affect the bottom point and do not cause significant swing of bottom material).

With regard to the effects associated with local changes in the morphology of the coast, these are limited to the port, where the coast is already formed, and are estimated to be very small due to the scale of new port and land projects, as well as the very limited spatial spread of construction work. After all, the sinking of floating piers (as opposed to the coastal platform) does not cause any alteration in the natural terrain. Therefore, any changes in the topography are limited to the construction site of the new building, which is constructed on an already formed embankment area near the existing building infrastructure of the port.

In conclusion, the implementation of the new port and land infrastructure of the port will not cause significant and radical changes in the relief characteristics of the land and the seabed. In addition, both existing and new projects do not cause "visual obstruction" of the sea view from the coast and the surrounding area. Also, for the operation of the port there will be no substantial "visual nuisance" in the sense of degrading the objectively acceptable aesthetics of the natural landscape of the area. Therefore, there will be no substantial effects on the physiognomy of the area and the aesthetics of the landscape.

Impacts on geological, tectonic and soil characteristics:

The infrastructure of the Port of Gaios has been developed in the coastal and marine zone and is not related to activities in the wider land area and

consequently does not affect the quality of the soil and the subsoil. Also, from commencing their operation until today, no geological phenomena of special importance have been observed. The new port projects only concern the sinking of floating piers and do not require earthworks on land, while in the sea area the intervention is limited locally. The new port projects concern only the sinking of floating piers and do not require earthworks on land, while in the sea area the intervention is limited locally to the location of the artificial boulders that will be used to anchor the floating elements.

Also, the new building will be formed on an already formed embankment area, therefore the necessary earthworks for its foundation do not concern natural areas. Therefore, the implementation of the new port and building projects will not cause alterations to the outer surface of the rocks nor will they help to enhance the possibility of geological phenomena of special importance (such as unstable conditions, landslides, landslides, etc.).

Impact on spatial planning:

Given that the port still exists today and due to the construction method and the small scale of new projects (construction of most of the projects within a demarcated construction site and supply of materials by sea), there will be no substantial impact on spatial planning and land uses during the construction phase. It is estimated that there will be no disturbance from the construction work to the residents and visitors of Gaios. In addition, with the implementation of the new projects under consideration, the port will contribute to the integrated organization of the coastal area of the region while also promoting a better quality tourist product and supporting fisheries. Also, the projects under consideration of the Port of Gaios do not contradict the existing land uses of the settlement and in fact its operation will support the existing and new activities in an environmentally more efficient way compared to the current situation. Road traffic problems in the wider area are not expected yet.

Impact on utility networks:

The new port projects, as well as the existing ones, will be serviced by the existing utility networks (electricity, water, telecommunications and solid waste disposal), while no changes will be required beyond the connection of the new building. The energy and water requirements of the new projects are small and will not place a significant burden on utility networks. Effects related to wave conditions, oceanographic features and coastal mechanical phenomena: The construction of new projects and the general operation of the port and the seaport do not affect the wave conditions and oceanographic characteristics of the wider area, as the proposed port projects involve very small-scale interventions on the existing port infrastructure, without significantly change the characteristics and geometry of the port's external works. The most important effects related to the installation and operation of the waterway under study are located in the following parameters of the natural and man-made environment:

Impact on the natural environment

Construction phase:

As mentioned above, for the needs of the Port of Gaios and its installation The existing port and land port infrastructure will be used mainly, while limited-scale works will be required for the construction of the building and floating works within its maritime zone. Regarding the atmospheric environment in the construction phase of the project, it is expected that there will be some small-scale effects that mainly concern the emissions of gaseous pollutants from the various construction sites and the release of dust from the movements of vehicles. The above effects are estimated to be of limited duration and negligible in terms of their intensity, while in no case will they exceed the institutional limits. Taking into account all the above, it is estimated that the effects that may occur during the construction phase will be of a very limited scale. Therefore, the effects on terrestrial ecosystems, flora and fauna will be negligible.

Impact on marine ecosystems, flora and fauna:

As mentioned above, for the needs of the Port of Gaios and the installation of the Paxos Waterway, the existing port and land infrastructures will be used mainly, while limited-scale construction works will be required in the land area of the port and floating piers in the sea. As far as the interventions in the marine area are concerned, they are limited to the sinking of floating piers for the mooring of boats

and the approach and mooring of seaplanes. It should be noted that the installation of floating elements locally causes only sea cover, while it does not affect the quality of the sea water (the immersion of the artificial bays for the anchoring of the floating elements and the anchorages affect the bottom and do not cause significant bottom), nor will habitat areas be occupied, with the result that the effects of the construction works are essentially negligible. Regarding the mammals and turtles, which are located in the wider area of the project, the main nuisance during the construction phase is related to the underwater noise from the boats and the floating crane that will be used to immerse the floating piers. The nuisance will last for the few days that will be required for the construction of the project and the noise levels are expected to be relatively low. Therefore, the effects on marine ecosystems, flora and fauna will be virtually negligible.

Impact on terrestrial ecosystem:

Operating phase:

The operation of the port and the future of the waterway is limited within the existing watershed and the marine area and therefore will not affect the natural characteristics of the terrestrial flora and fauna habitats of the wider area. As for the charge of the acoustic environment from the operation of the seaplane engine), it concerns a very short period of time (during the seasickness of the seaplane), while it is a charge in a limited radius around the seaplane. Regarding the burden of the acoustic environment, the total noise pollution will be very short during the day, while it will not contribute significantly to the increase of the noise level produced by the overall operation of the adjacent port. Impacts on marine ecosystems, flora and fauna: Since the operation of the port, the marine ecosystem of the wider area has not been degraded, with the exception of the illegal use of sliding fishing gear and the uncontrolled mooring that have caused local damage to the seabed and especially the meadows of Poseidonia. Especially with regard to smaller vessels (fishing boats, small boats, day boats, pleasure boats), it is recommended in the future to consider the possibilities of limiting the use of the anchor, with the immersion of permanent anchorages.

During the operation of the port it is possible to indirectly cause aggravating effects related to the possible deterioration of the characteristics of the sea water and the quality of the bottom sediments due to the operation of the engines of the boats, but also a series of activities of accident-occasional character,

mentioned above , such as the accidental discharge of small quantities of sewage from the vessels at sea or the possible accidental leakage from the vessels at sea of fuel, lubricants, centrifugal water, etc. coastal vessels and the small size of vessels, it is estimated that they will not cause a significant deterioration in the quality of the marine environment and therefore will not endanger the marine ecosystem.

Regarding the land area washes, they mainly concern rainwater, which will not be polluted as the use in this area of the land area will be mild and will essentially concern the traffic of pedestrians and a small number of vehicles. Therefore, the burden on the marine environment from land-based leaching will be negligible in intensity and extent. Taking into account the following elements related to the technical and operational characteristics of seaplanes, it appears that the marine ecosystem is not affected by the limited time and space of seaplanes.

Specifically: The load sink of the seaplanes does not exceed 30 cm and therefore does not affect the aquatic fauna and flora. - The exhaust of the engines of seaplanes is vented directly into the air, at a sufficient distance from the surface of the water and therefore the quality of seawater is not burdened by chemical compounds and heavy metals. - Seaplanes, unlike other vessels (e.g. pleasure boats), do not discharge sewage into the sea, which reduces the possibility of contamination of the area with increased organic load. Seaplanes (unlike most vessels) do not have sheets and therefore there is no risk of leakage or discharge of bilge fluids (i.e. a mixture of water and petroleum products) into the marine environment.

The propellers of the seaplane as well as all the means of propulsion are completely above the surface of the sea and therefore do not shake the seabed and do not cause damage to the seabed and marine life. During the maneuvers of the seaplanes, very small streams of water are produced, with significantly less impact than the corresponding streams produced by the operation of the engines of the marine vessels. During the landing and take-off of the seaplanes, noise is expected to be produced, which, however, is mainly from the air and not from the sea. Therefore it is not expected to particularly affect marine mammals and turtles. Waterways refer to a free sea area, in which no kind of project, construction or demarcation is required or foreseen. In addition, the sinking of seaplanes when sailing is particularly small (about 30 cm load), while the load of

marine pollutants from seaplanes is particularly small to negligible. Therefore, the operation of the waterways will not affect the meadows of Poseidonia.

The risk of collision of marine mammals with seaplanes is particularly reduced, due to the small load sinking of seaplanes (not exceeding 30 cm) compared to other vessels approaching the bay. Regarding the possibility of accidental leakage of fuel from the seaplanes, it is estimated that the possibility of such a pollution event is extremely small due to the small capacity of the waterway and the limited number of daily routes and on the other hand the increased safety this means of reporting (small percentage of accidents - collisions, supply of specialized personnel). In conclusion, the operation of the port and the seaport is estimated not to cause disturbance to the marine ecosystem of the area.

Impact on protected areas:

Impacts from the operation of the port and the future implementation and operation of the seaport in the protected area of the European Ecological Network Natura 2000 and in particular the Special Conservation Area (SCI / SAC) entitled "Paxos and Antipaxos Islands and wider sea area" (GR223000) From the operation of the port until today, the ecological functions in the sea area of Ormos Gaios have not been damaged. Local degradation of the marine ecosystem has only been observed in and around the Port of Gaios, due to the illegal use of sliding fishing gear and the uncontrolled mooring that have caused local damage to the seabed and especially the meadows of Poseidonia.

In conclusion, from the operation of the waterway can be caused by zero to negligible effects. Effects on air quality Construction phase: During the implementation phase of the project, the temporary burden of air quality is expected locally due to the emissions of gaseous pollutants from the operation of construction site and heavy vehicles, and the release of dust from the circulation of heavy vehicles, material storage and construction materials. scale earthworks for the foundation of the new building. In general, the burden on the atmosphere will not be particularly high due to the scale of the project, the transport of materials by sea directly to the construction site, the construction of port projects entirely by boat, while it will be temporary as it will be completely undone after the completion of the construction works, and will be practically felt only in the immediate vicinity of the construction works and the construction site. Taking into account the extremely good current state of the atmospheric environment of the

area , the possibility of exceeding the institutionalized limit values set by the current legislation (US No. 14122/549 / E.103 K. Y.A. on "measures to improve the quality of the atmosphere" in compliance with Directive 2008/50 / EC, Government Gazette 488 / B / 30.03.2011) due to the installation works of the waterway is extremely small up to unlikely.

Operating phase:

In general, the operation of the port and the future of the seaport does not cause the production of significant quantities of atmospheric emissions. The limited intensity and transient burden on the quality of the atmospheric environment is related to the operation of the engines of the ships, the movement of the seaplanes approaching it, as well as to a lesser extent to the road traffic related to its operation (movement of passengers on ships, port users, staff and passengers from / to other destinations on the island). As far as coastal vessels are concerned, they remain in the port for a period of a few hours, minimizing the pollution caused by the atmospheric environment due to the operation of their engines. Also, the fact that approaching and moving the ship from its mooring position does not require complex maneuvers entails the emission of gaseous pollutants as much as possible. In addition, the absence of natural or artificial barriers contributes to the adequate dispersion of the pollutants produced into the atmosphere of the area. The quantities of pollutants emitted (CO, PM, HC, NOx) from the operation of the vessels' vessels (cruise ships - cruise ships, fishing vessels, small boats and other passing vessels) during their voyage within the port are estimated not to be change in relation to the current situation, ie they will continue to be small. The temporal and spatial distribution of pollutants due to the arrangement of berths, combined with the absence of natural or artificial barriers in the area contribute to the dispersion of gaseous pollutants into the atmosphere.

Regarding the movement of seaplanes, the capacity of the seaplane is small (the seaport will be able to serve one seaplane at a time) and the frequency of the itineraries will be very limited (2 itineraries per day initially, and possibly slightly increased in number in the future) . In addition, the type of seaplanes approaching the waterfront will use fuel for Jet A1 aircraft, which does not contain methyl tert-butane ether (MBTE) which is a toxic component of the fuels used by the majority of ships. Also, with regard to CO2 emissions, it should be borne in mind that in the Port of Gaios the movements of ships will exceed those provided for seaplanes,

resulting in the impact on the atmospheric environment of the wider port / port area of CO2 emissions. seaplanes to be particularly limited to negligible in relation to that of ships.

The emission of aggravating gaseous pollutants (CO, VOC (HC), NOx, PM, SO2, Pb) and greenhouse gases (CO2) from the road traffic is related to the vehicles that move with the E / G- O / G ships (I. X. vehicles, two-wheelers, small trucks, etc.), the passenger transport vehicles of ships and seaplanes, the I.X. vehicles of the staff and other users of the port, trailers, etc. Also, the movement of passengers of the ferry, seaplane and day ships includes the movement and temporary parking of taxis, minibuses and other rental conventional vehicles. Given that this road traffic still exists today, the emission of aggravating gaseous pollutants from road traffic in the future state is not expected to cause an additional burden on air quality. Furthermore, the movement of vehicles to / from the waterfront, which will be related to the movement of staff and to a very small degree of passengers, will involve a very small scale traffic of mainly passenger vehicles, so as not to burden its atmosphere. area with significant amounts of gaseous pollutants. In addition, since the wider area has no air pollution problems, as human activities are not intense; this potentially small atmospheric load from vehicle traffic will not cause extreme levels of gaseous pollutants. In conclusion, the overall operation of the port and the seaport will not cause a significant deterioration of air quality with atmospherically aggravating air emissions.

As for the quantities of gaseous pollutants emitted by ships, they show a slightly increased concentration during the embarkation and disembarkation of passengers and vehicles from ships. It is also estimated that there is a satisfactory dispersion of these pollutants in the atmosphere of the wider area, which, after all, does not face problems of air pollution. Effects of noise and vibration Construction phase: Given that the location of the new projects is at a considerable distance from the settlement, but also that all materials will be transported by sea directly to the project site, virtually eliminating road transport and the construction of port projects only concerns the sinking of floating piers and will done by boat, the disturbance caused to the acoustic environment by the construction works will be reduced and will concern mainly due to the construction of the new building. This nuisance, which will mainly concern users and employees in the port, is estimated to be of limited intensity, will be limited to the construction time and will be temporary (the noise level will be fully restored

after the completion of the construction works). Therefore, the noise caused by the construction works will be limited in time and space and will not be characterized by extremely high noise levels. In the case of high noise emissions due to particularly noisy work (eg use of a compressor) they will be occasional and irreversible at the end of the work.

Operating phase: The operation of the port can cause nuisance to the acoustic environment mainly by the following factors: - From the operation of the engines of ships during their voyage within the port or during their parable on the berths (coastal vessels, fishing vessels, cruise ships, passing pleasure craft), as well as the seaplane during its docking and docking and the voyage of.

- From the traffic of vehicles (private vehicles, two-wheelers, small trucks, etc.) that are in circulation, of the passenger transport vehicles of coastal shipping and seaplane as well as of other private cars such as vehicles of port users.

- From the operation of the building infrastructure. - From the presence of port users (coastal and seaplane passengers, fishermen, tourist tourists and other port users). The above noise sources also exist during the current operation of the port, without implying increased noise levels and disturbance of the residential environment. Therefore, after the implementation of the projects under consideration, there will be no additional burden on the acoustic environment, except for that related to the circulation of seaplanes, both in air and water. Regarding the operation of the waterway, it is related to the following sources noise:
- the operation of seaplane engines,
-road traffic (passenger vehicles, taxis, etc.) related to movement staff and passengers, and the facilities that will operate on the land area of the waterway (control tickets and luggage, ticketing, administration office). Regarding the noise caused by the operation of the seaplane engines, it concerns a very short period of time (during the seasickness of the seaplane) and corresponds to the intensity of the noise caused by a speedboat.

In addition, given the low frequency of itineraries (2 itineraries per day initially, and possibly slightly increased in number in the future), the total noise pollution caused will be particularly short during the day. Also, since there will be no flights at night, the nuisance to the anthropogenic environment is further reduced.

Finally, this noise affects the acoustic environment at a limited distance from the seaplane (for the usual types of seaplanes, the noise ceases to be particularly annoying within a radius of 300 m from the seaplane). The road traffic from / to the port that mainly concerns I.X. Port users' vehicles are small in scale and the noise emitted by it does not cause particular nuisance to the anthropogenic environment due to the very small number of vehicles moving daily to / from the port. With regard to road traffic related to the movement of waterfront staff and passengers, as mentioned above, this will involve a very small scale traffic of mainly passenger vehicles (due to the limited number of routes, the small number of staff required the waterway and passengers served by each seaplane), so as not to burden the acoustic environment.

Also, the noise pollution that will be caused by activities in its facilities land service area of the needs of the port (ticket and luggage control, ticket issuance, administration office, waiting area) is not characterized by high noise levels and is limited in time during the embarkation and disembarkation of the planned itineraries. In general, the presence and activities of port users are characterized by very low noise volumes, as they mainly concern human voices (ship and seaplane passengers, port staff, fishermen and passengers on passing boats), depending on those of the coastal activities of the adjacent settlement.

Impact on water and marine environment:

Construction phase:

The main sources of burden on the marine environment and marine waters during the construction of port projects are their construction itself, as well as any excavations for their safe accommodation. In the present case, the port projects relate exclusively to the sinking of floating piers within the existing port. It is pointed out that the installation of floating elements locally causes only sea cover, while it does not affect the quality of the sea water (the immersion of the artificial boulders for anchoring the floating elements and the anchorages affect the bottom and do not cause significant precipitation).

As a result, the impact of the construction work is virtually negligible (unlike the construction of quays. Also, the drilling of the artificial anchorage bays of the floating piers will not require reef excavations and therefore will not be burdened by the marine environment. In the case of new land projects, the risk of transport

to sea, by wind or by rains, dust will be particularly limited as small-scale earthworks are required (for the foundation of the new building), while measures will be taken for the emission of dust. Therefore, the burden on the quality of the marine environment caused by the construction of new projects will be substantially negligible.

Operating phase:

As mentioned above, in the case of the Port of Gaios, its operation does not affect the land water resources, as the project concerns the coastal and marine zone and is not related to intensive activities in the wider land area, but neither is it near streams or rivers. Consequently, their operation will not affect the quality, quantity and distribution of surface water of the wasteland, nor the diet of groundwater. The layout of the port works (and the absence of transverse port works on the coastal front) allows the renewal of the waters and consequently the maintenance of their quality, despite the significant length and elongated (narrow) shape of the port due to the presence of the islands of Agios Nikolaou and Panagia.

Therefore, during the operation of the port after the completion of the projects under consideration, there will be no restriction of maritime traffic and reduction of the rate of water renewal, which may cause eutrophication and a substantial reduction of oxygen dissolved in seawater.

Thus, even during the summer, when there is stratification of water and less water renewal, they are not observed today and it is estimated that in the future there will be no local eutrophication (increased levels of nutrients, limited concentration of dissolved oxygen) or anoxic conditions in port area.

Therefore, the overall operation of the port will not worsen the picture of the wider maritime area in terms of water circulation and renewal. The implementation of the new port infrastructure will not cause a change in the hydromorphological characteristics of the coastal water system Coastal Water System (HS) Paxos Coast in which the port (including the waterway) is located. In particular, the planned new port projects concern exclusively the sinking of floating piers, with the result that the existing coastline is not substantially altered or the seabed is occupied (the seabed area occupied by the artificial anchorages is extremely small alteration of the hydromorphological characteristics of the water system will be caused and consequently the proposed project does not endanger the capacity of

the PC. achieve 'good standing' in accordance with Directive 2000/60 / EC. from the leaching of the land area will be of negligible intensity and extent.

In the case of the Port of Gaios, where the water renewal is quite satisfactory, the risk of local pollution is reduced. Therefore, taking into account the type of vessels approaching the port and the small capacity of the coastal pier, combined with the occasional nature of these activities (which are also related to small amounts of pollutants), the above potential problems of sea water pollution and sediments are of a fragmentary nature and of low intensity, and therefore it is estimated that they will not cause a significant degradation of the quality of the marine environment.
Regarding the possible burden of the marine environment from the traffic of seaplanes, the following elements shall be taken into account:

- The exhaust of the engines of seaplanes is vented directly into the air, at a sufficient distance from the surface of the water and therefore the quality of seawater is not affected by chemical compounds and heavy metals.
- Seaplanes (unlike most vessels) do not have sheets and therefore there is no risk of leakage or discharge of sheets (i.e. a mixture of water and petroleum products) into the marine environment. - Seaplanes (unlike some vessels, e.g. pleasure boats) do not discharge sewage into the marine environment, which reduces the possibility of organic pollution in the area. - Seaplanes do not use toxic continental paints (unlike some vessels, where their use causes an increase in toxicity levels in seawater).
- The propellers of seaplanes do not come into contact with seawater, therefore (unlike most vessels) there is no risk of agitation of the bottom material and consequently alteration of the physicochemical parameters of seawater.
- Possible accidental leakage from seaplanes into the sea of fuel, is a cause of degradation of the marine environment as it causes pollution from petroleum or other chemical compounds. Petroleum products create a thin layer ("film") on the surface of the sea, which prevents the penetration of sunlight and the diffusion of oxygen. The reduction of incoming solar radiation results in the reduction of photosynthetic activity and consequently the reduction of dissolved oxygen. Of course, the type of seaplanes approaching Paxos will use fuel for Jet A1 aircraft, which does not contain methyl tert-butane ether (MBTE), a toxic component of the fuels used by the majority of ships. Especially with regard to the possibility of accidental leakage of fuel from seaplanes, it is estimated that the possibility of

such a pollution event is extremely small due to the small capacity of the waterway and the limited number of daily routes and on the other hand the increased safety this means of reporting (small percentage of accidents collisions, supply of specialized personnel).

In addition, the Paxos Railway does not provide for refueling of seaplanes (seaplanes will be refueled at the main seaport of Corfu, of the same operator), which significantly reduces the possibility of accidental fuel leakage.

With regard to the risk of fuel leakage during the refueling of ships, this does not exist in the case of coastal vessels approaching the Port of Gaios, as their need for refueling is met by larger ports to which they arrive during their voyage and which have the appropriate infrastructure for this purpose. It is noted that the proposed design and operation of the projects ensure the safe mooring and the safest approach to all types of vessels that are intended to serve. As mentioned above, the implementation of the proposed projects will significantly improve the conditions of berths, fishing boats, day boats and small boats, the presence of which is particularly high during the summer months.

5.2.2 Diapontia Islands (Mathraki, Ereikoussa, Othonoi)

The establishment and operation of the aerodromes (waterways) will require small-scale works with very limited impact on the natural and man-made environment. Specifically, for the mooring of seaplanes it is proposed to use the existing port and land infrastructure of the Diapontian Ports (Mathraki, Ereikoussa, and Othonoi) with the installation floating platform on the existing quays. Therefore there is no requirement for construction of new projects. In addition, in terms of passenger service, the placement of a prefabricated house is recommended which will function as a waiting and control area. It is a light construction with a short completion time - assembly requiring small-scale work. In conclusion, the establishment and operation of the waterway will take place with the minimum possible interventions in the existing infrastructure and the minimum possible effects on the natural and man-made environment.

Impact during construction:

For the needs of the waterways, the existing ports and land infrastructure of each port will be used and limited-scale interventions will be required within existing

facilities. Specifically, regarding the operations in these sea areas are limited to the placement of a floating platform within its boundaries existing watershed. The installation of the prefabricated house on the land area of the port does not require significant construction work, given in fact that the surface of the land area of the port at the three sites in question are already shaped.

Finally, waterways relate to free marine space within which does not require or envisage any kind of project, construction or demarcation. It is pointed out that the installation of floating elements causes only local seabed coverage, while it does not affect the quality of seawater (the sinking of artificial boulders for anchoring floating elements and anchorages affect the bottom point and do not cause significant bottom swing resulting in the effects of the construction work being substantial negligible.

Regarding the atmospheric environment in the construction phase of the project, some effects mainly related to the emissions of gaseous pollutants from various construction machinery is expected due to the use of a floating crane and dust release from vehicles. The above effects are estimated to be negligible and in no case will they exceed the institutional limits. As for the acoustic environment, during the construction of the occasional high levels of noise emissions are expected to occur due to use machinery of the construction site.

However, these annoyances will not exceed permissible noise limits as defined by the P.D. 1180/81 (Government Gazette 293 / A / 06.10.1981). Regarding mammals and turtles found in the wider main area, some annoying noise during the construction of the project will occur underwater from the vessels and the floating crane that will be used for the sinking of the floating platform. The nuisance will last a small amount of time (not even a single day) and the noise levels are expected to be relatively low.
Given all of the above, it is understood that the effects can be arise during the construction phase of the necessary infrastructure for its operation will be of a very limited scale, both at sea and in the sea land area of the Ports. Therefore, the environmental parameters that mentioned in the introduction to this chapter will not be significantly affected.

Effects during operation

The use of seaplanes with the start of operation of the waterway is not expected to affect the microclimate and climatic data of the Study Area due to small-scale project and low-capacity port and air activity expected.

Impact on seawater:

The effects on seawater are expected to be limited. It is worth noting that seaplanes do not store or dispose of seawater in the sea, unlike many merchant ships and pleasure boats. The only water discarded by seaplanes is a small amount pumped daily by the floats. In general, there are no further substances that are eliminated directly within its marine recipients. Excess fuel after shutting down the engine is collected in the special accumulator (container), which is emptied at regular intervals to prevent water pollution. In addition, seaplanes are made exclusively of aluminum and synthetic materials (fiberglass, carbon fiber) resulting in no oxidation that could be a source of pollution to marine waters. Also, regarding the possibility of seawater burden, the following data are additionally mentioned (FUSETRA 2011): The exhaust of seaplane engines is vented directly into the air, at a sufficient distance from the sea surface, thus avoiding the burden of water with polluting chemicals and heavy metals. Seaplanes, unlike other vessels (e.g. yachts), do not discharge sewage into the sea, which reduces the possibility of contamination area with increased organic load. The propeller system of the seaplane does not come into contact with the sea during its operation and therefore does not cause agitation of the lower structure. Consequently, there is no risk of altering sea waters in any physicochemical manner.

Noise impact on environment:

Regarding the noise caused by the operation of the waterway, this concerns a very short period of time (during the offshore of the seaplane) and corresponds to the intensity of the noise caused by a speedboat in a limited radius around the seaplane. In addition, given the low frequency of itineraries (2 itineraries daily initially, and possibly slightly increased in number in the future), total noise pollution will be particularly short-lived during the day. Also, since there will be no flights at night, the nuisance on the human - residential environment is further reduced. Regarding the noise caused by the operation of seaplane engines, it concerns a particularly short duration of 20 to 60 seconds required for take-off and leaving the waterfront. This noise burdens the audio environment to a limited distance from the seaplane (for normal seaplane types, the noise ceases to is

particularly annoying within a radius of 300 m from the seaplane) and corresponds to an intensity of 75 dBA, i.e. the noise caused by a speedboat.

Residues and emissions

Atmospheric pollutants:

The operation of the waterway will not result in significant production of gaseous pollutants as well the number of seaplanes approaching it will not be too large and the frequency of the routes will be relatively small. In addition, it is noted that almost all seaplanes used currently for commercial purposes in Europe, run on turbo-prop engines and use Jet-A1 jet fuel which is free of some of the most volatile and flammable compounds contained mostly in the fuels of (eg MTBE - methyl tert-butyl ether). In any case, the amount of gaseous pollutants produced by its operation compared to the corresponding quantity currently produced in total from the operation of the port, will not contribute significantly to its burden atmospheric environment.

Liquid residues and solid waste:

The effects on seawater from the operation of the seaport are expected to be limited. Seaplanes do not store or dispose of linseed water or other liquid residues directly to the marine recipient. The leaching of the land area, in the wider area of the project, will mainly concern rainwater with low pollution load, given the mild activity it will exercised in the Ports (pedestrian traffic, passage of a small number of vehicles). It is pointed out that the leakage of fuel from the seaplanes due to accident or damage is theoretically possible, which could be the cause of marine degradation due to pollution from petroleum or other chemical compounds. However, such marine pollution situations can be addressed successfully. The daily operation of the waterway will also result in a small amount of solid waste from the activity taking place on land (passenger control and waiting area - ticket offices) but also within seaplanes. This waste will be collected in bins inside the waterfront facilities, then will transported under the responsibility of its operator to the collection bins waste within the port area from where their final disposal will take place at a designated landfill on the island of Corfu.

Impact on marine habitats, flora and fauna:

The marine ecosystem is estimated not to be adversely affected from the limited travel of seaplanes in terms of time and distance. Specifically, the following are highlighted:
- The load sink of seaplanes does not exceed 30 cm and therefore does not affect aquatic fauna and flora.
- The propellers of the seaplane as well as all the means of propulsion are completely up from the sea surface and therefore do not shake the seabed and do not cause damage to bottom material and marine life. During the manoeuvres of seaplanes very small streams of water are produced, with significantly less effect than the corresponding currents generated by the operation of marine vessel engines.
- Noise generation is expected during the landing and take-off of seaplanes, which, however, is mainly by air and not by sea. Therefore it is not expected to particularly affect marine mammals and turtles.
- As habitat 1120 is located in individual sparse clusters and at a sufficient distance from the infrastructure in question and to a point not related to the operation of the port or the seaport, it is estimated that the quality and density of the meadows in question will not be further affected angiosperm.
- Waterways refer to a free sea area, in which it is not required nor is any kind of project, construction or demarcation foreseen. In addition, the sinking of seaplanes when sailing is very small (about 30 cm load), while and the burden of marine pollutants from seaplanes is particularly small to negligible. Therefore, the operation of waterways will not affect the meadows of Poseidonia.
- The risk of sea mammals colliding with seaplanes is high reduced due to the small load of the seaplanes (not more than 30 cm) in relation to other vessels approaching the area. In conclusion, the effects on marine habitats, flora and fauna which may be caused by the operation of the waterway are from zero as negligible.

Effects on birdlife

There may be disturbance to the birdlife by seaplane traffic, in a place where basic functions of a large number of life cycles take place and different species of birds (migration stop, predator prey, breeding, nesting and feeding of seabirds). The nuisance is due to two factors, which act in combination, in the visual and audio related to seaplane flight. Adverse effects on birdlife are related to the nuisance caused from aircraft (military, helicopters, jets, helicopters, seaplanes) to the

various bird activities (e.g. nest care, breeding, etc.) in various bird species (predators, seabirds, etc.). In the majority of these surveys, birds are accustomed to flying, as they can "Learn" that a stimulus does not pose a risk after repeated exposure and as therefore they may not show substantial signs of behaviour change while often the visual stimulus causes more panic than the sound. Additionally, no Studies have been found on eating and eating disorders seabirds and land birds, due to airborne disturbances. The location of the waterfront is a potential nuisance, due to seaplane flights near areas where protected birdlife is active. The nuisance is not only about the noise, but also the very form of the aircraft that approaches the space. The degree of nuisance varies depending on the type, whether or not the bird nests (those that nest react less than others, Fjeld et al., 1988, Olsson & Gabrielsen, 1990), but also with the type and distance of the air instrument. Also, in the aforementioned research, a variety of reactions are recorded of avian fauna in terms of aircraft flight.

As mentioned above, the burden on the audio environment from its operation seaplane engine will not be continuous (it will have a very short duration and low frequency) and will be limited mainly to the area around them waterways. In this context, it is estimated that the effects of the induced noise pollution will be of limited intensity and scale and that they will not cause permanent damage to the birds of the area. However, given the conclusions of the aforementioned research available in the literature During the first year of operation of the waterway, it is recommended to carry out on-site observation of the reaction behaviour of migratory birds (see section 6.3) in order to ascertain the real effects of the project on its operation and if deemed necessary to take measures (mainly with regard to the location and orientation of the waterways and the air course followed by the seaplanes). In conclusion, there is no identified nuisance / reaction of its species birdlife in the waterway mode. On the contrary, according to the available conclusions of the majority of international research in this area, birds they get used to the flights and the noticeable nuisance for them is gradually reduced.

In addition, in the case of the Ereikoussa waterway, the limited frequency of itineraries seaplanes, the absence of high noise stations in the study area and the capable distance of waterways from land (islands and islets) contribute to reduced bird nuisance.

5.2.3 Suggested solutions

Proposed Solution with gentle interventions for the development of a waterway: According to the proposed scenario, for the establishment and operation of the waterway will small-scale work with very limited impact on the physical and anthropogenic environment. Specifically, for the mooring of seaplanes it is proposed to use the existing port and land infrastructure with the installation of a floating platform on the existing quays of the port. Therefore, there is no requirement for construction of new projects. In addition, in terms of passenger service, placement is suggested prefabricated house which will function as a waiting and control area. It is a light construction with a short completion time - assembly requiring small-scale work. Finally, two (2) alternative waterways were selected for the on / off-sea of seaplanes. The choice was made taking into account the usual weather conditions that prevail in the area, its morphology and limitations and the distance from the proposed mooring point for seaplanes and other port infrastructure. The planned establishment and operation of the waterway will take place on minimal possible interventions in existing infrastructure and minimal possible impacts on the natural and man-made environment. Dealing with the effects during construction: For the operation of the waterway, the construction of new projects is not required, except transport, installation and assembly operations and hence the effects that will arise in the construction phase will be very limited (both spatially and temporarily) and completely reversible upon completion of the necessary interventions. Regarding the measures to deal with and minimize the negative consequences that may occur during the construction phase to the marine ecosystem the following are proposed::

• Use of the most modern mechanical equipment to reduce it level of noise produced.

• Implement proper management of all waste, hazardous and non-hazardous (liquids waste, municipal waste, etc.) resulting from it site activities in order to avoid any contamination of seawater. Dealing with the effects during the operation phase of the waterfront, there are expected to be minimal environmental ones effects of low intensity. Given the lack of impact on the marine habitats, flora and fauna of the area due to its operation proposed waterway, as analysed in the previous chapter, is not judged it is necessary to take precautionary or compensatory measures. In particular, with regard to the marine environment, it is considered that the measures to deal with potential impacts proposed for the protection of water resources, they also indirectly contribute to

the prevention and reduction of possible negative consequences in the marine ecosystem.
Regarding the protection of the bird fauna of the wider area, avoiding flights over islands and especially islets. More specifically, it must avoid flights over certified breeding colonies (e.g. uninhabited rocky islets of the area, Tracheia, Diaplo, Diakopo, Karavi, near the Diapontian Islands in Northwest Corfu).

To this extent, it is important to strictly adhere to the proposed program of monitoring and environmental assessment Prevention and fight against marine pollution: The operator of the proposed project should maintain a satisfactory level of operational preparedness to deal with pollution emergencies of the sea that may be caused by its normal operation (e.g. leakage which will be detailed in the Security Program Program) and in the Emergency Plan Waterfall, but also in the Emergency Response Plan Marine Pollution (Contingency Plan) of the Port, with which it should the operation of the waterway is perfectly compatible. In case of an emergency of marine pollution in the three Ports - Waterways of the Diapontian Islands, the contracted body for the reduction of pollution and decontamination should be notified immediately. This body should have qualified personnel and appropriate equipment (e.g. floating dams, oil pumping system, dispersed chemicals, etc.) to deal effectively with accidental marine pollution incidents.

5.3 The Benefits of developing a Water Aerodrome Network in Adriatic Sea

Sea plane transport systems are receiving increasing attention both in the European Union and worldwide as these are characterised for the following advantages:

- **Provision of real multimodal capability, connecting any coastal site, from downtown port cities to remote areas and to areas with international airports**.
- **Limited requirements for infrastructures: a simple and economic floating pontoon**.
- **Low environmental impact; both from the infrastructures and the sea planes**.

The limited requirements from the infrastructural point of view and its **low environmental impact** makes seaplane transportation **one of the best**

alternatives for multimodal & integrated transport systems. For those reasons SWAN project aims to the development and implementation of dedicated seaplane infrastructures within Ports and other coastal areas. The project idea was developed as a direct consequence of the lack of fast transportation within the region and takes advantage of previous experiences.

The seaplane infrastructures (water aerodromes) **will support the multimodal integration and interconnection of transport modes**; particularly the use of amphibious aircrafts will enable the direct connection from land to water areas, like Port to Airport or Port to Port or other remote or touristic areas. These infrastructures will include the construction of mini-terminals, providing additional services to passengers, tourists and inhabitants, providing different types of connections to the destination – and Programme - areas, working as a mini-hub for local transport needs & providing also web-based & easy to access & use information to the community. The water airport infrastructures will be environment-friendly, having simple & removable pontoons, while the operations area, in the water, will be developed considering noise-abatement, take off and approach, paths. Furthermore, an extensive flight testing activity will be performed to guarantee the maximum safety & best efficiency.

Key target groups are the inhabitants of the Programme area who will be highly benefited by the water aerodromes and offered services. An important target of the project is to develop and implement a training scheme related to the commercial seaplane handling and management on the water aerodromes. Previous experiences have proven the lack of qualified & skilled personnel for the daily seaplane operations and the management of the infrastructure. The training program which will be developed during the project, will qualify the involved personnel to Civil Protection duties as well. Learning from previous experiences, a different and more sustainable approach in the management of the water aerodromes will be adopted and promoted. In the previous Adri-seaplanes project, the water airports were supposed to be managed directly by the Ports or by the Municipalities within the Port/Municipality budget, but that approach was not always successful; thus, the project will focus on awarding the management of the water aerodromes, to private companies, contributing to the local economy growth, job creation and making the operation's cost of the aerodromes more sustainable through PPP's.

Due to the development of strong communication components (communication strategy, participation in WTM, Final Conference) and the concrete infrastructures, the facilitation of the flights with the info-points, the strong policy component for

the improvement of the existing framework and the extended test flights for the improvement of the provided services, the maritime transport of passenger's is expected to be increased, in the mid-term, by 80.000 annually in the involved ports.

In terms of increased passengers capacity, this goal will be met, not only through the increase in the number of passengers arriving and departing with the seaplanes, but an important indirect benefit is the boost of the maritime growth which is also supported by the substantial media coverage following the establishment of a water aerodrome; thus, attracting an additionally higher number of people & passengers, who will benefit from the new innovative and fast service.

The above-mentioned infrastructures, together with the information and local transport services provided within the mini-terminal info point, **will create high added value to the local Port transportation system & will directly affect all transportation** and tourist activities.

By improving the connectivity and accesibility at the implementation area a significant **job creation** effect is also expected to be achieved boosting local economies.

Intermodality will be boosted, thanks to the natural characteristics of the amphibious seaplanes & also thanks to the information and services provided in the water aerodrome mini-terminal that will support the Cross-Border (CB) ferry connectivity. Passengers and residents will not only use the seaplanes to move from the Port to another destination but they will also increase the use of the local maritime transportation means to reach the water aerodromes.

Regarding the EU strategies and policies, the project will contribute to the DECISION No 661/2010/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 7/7/2010 and following Union guidelines for the development of the **Trans-European Transport Network (TEN-t)** / COM/2011/0650 final - 2011/0294 (COD), where it is stated that, The European transport network must:

- Offer users high-quality infrastructure on acceptable economic terms
- be, insofar as possible, interoperable within modes of transport and encourage intermodality between the different modes of transport
- be, insofar as possible, economically viable
- in general, link island, landlocked and peripheral regions.

As stated in the White Paper on Transport *"Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system"*, the efficiency

& effectiveness of transport can be significantly enhanced by ensuring a better modal integration across the network, in terms of infrastructure, information flows and procedures. TEN-t should ensure the accessibility of all regions in the Union, including the remote and outermost ones, strengthening cohesion between them.

Furthermore, the project contributes to **EU 2020 strategy**. The promotion of sustainable transport has been identified as one of the means for achieving one of the 3 key priorities of the EU 2020 strategy for smart, sustainable and inclusive growth, by addressing critical bottlenecks, in particular CB sections and intermodal nodes.

SWAN project will also contribute to **EUSAIR strategy** as it is in line with Pillar 2 - "Connecting the region" and more specifically it contributes to the achievement of the specific objectives 3.1 "strengthen maritime safety and security and develop a competitive regional intermodal port system" and 3.2 "Develop reliable transport networks and intermodal connections with the hinterland, both for freight and passengers" and to the topic "Maritime transport". This is achieved through the development and implementation of seaplane infrastructures within Ports and other marine areas, increasing the multimodal capability, boosting maritime connectivity and connecting coastal sites and port cities with remote areas and international airports. Furthermore, it contributes to EUSAIR Pillar 4 "Sustainable Tourism / Topic 4.1 Diversified tourism offer - products and services" providing an alternative sustainable (eco-friendly) transportation services to touristic destinations.

For all the above reasons, the SWAN project is expected to develop multilple benefits in Adriatic Region, at social and environmental level, contributing also to the growth of the local economy and several EU policies and strategies.

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