Interreg Mediterranean

EUROPEAN UNION

PROteuS

PROmoting security and safeTy
by crEating a MED cluster
on Maritime Surveillance

D.5.3.1 Mainstreaming of PROTEUS model to other BLUE Growth sectors

Project co-financed by the European
Regional Development Fund

Introduction

This document was developed the CCIAA DL in the context of the WP5 / Act.5.3 of PROteuS project in order to summarize, according to the elements provided by the partners, the mainstreaming of Proteus model to other Blue Growth sectors.

Summary

1. Introduction

1.1 To define the Blue Growth sectors/other MS sectors for the mainstreaming actions

The following table resumes the Blue Growth sectors indicated by partners according to their local Maritime sector's features.

- ✓ The sectors taken into consideration are the following
  - Aquaculture/Fisheries
  - Coastal tourism
  - Marine biotechnology
  - Ocean energy
  - Seabed mining
- ✓ Additionally, partners identified other MS surveillance to be addressed by the same activities.

Country	Blue Growth Sector	Identified prominent MS Sectors	Other identified MS Sectors
France	▪ Aquaculture/Fisheries ▪ Ocean Energy	▪ Maritime Security & Safety ▪ Maritime Environment	
Greece	▪ Aquaculture/Fisheries ▪ Coastal Tourism ▪ Ocean Energy	▪ Maritime Security & Safety	▪ Defence ▪ Border Control
Italy	▪ Aquaculture/Fisheries ▪ Coastal Tourism	▪ Maritime Security & Safety ▪ Fisheries Control ▪ Marine Environment ▪ Customs	▪ Defence ▪ Aquaculture ▪ Coastal Tourism ▪ Marine Environment Monitoring
Spain	▪	▪ Defence	
Portugal	▪	▪ Maritime Security & Safety (focused in	▪ Marine Energies

		tourism) ▪ Fisheries Control	
Cyprus	▪ Aquaculture/Fisheries	▪ Maritime security&safety ▪ Maritime environemnt monit. ▪ Fisheries management	

2. Presentation of Main streaming activities carried out

2.1 FRANCE

The main domain for the French national node, selected as having the most potential of economic growth for the ecosystem is Defense domain**.**

Toulon, is the principal military port in Europe and the main naval base for the Defence of the Mediterranean with major armed forces capabilities. Toulon's naval military history began in 1679 with the French Royal Navy and continues today particularly with the development of the Technopole de la Mer (Marine Science & Technology Park) where both NAVAL GROUP and the headquarters of the Pôle Mer Méditerranée (PMM) are located. Today, 30,000 people work in the defence sector of excellence in the Toulon Provence Méditerranée (TPM), the "Metropole".

Large companies, high tech SMEs and cutting-edge infrastructure are at the very heart of the Toulon agglomeration's economy. The annual GDP on defence is 1.1 billion euros across TPM (source PREMAR: Prefecture Maritime).

As stated above, the installation of a cluster dedicated to the Blue Economy near the largest French military port "Toulon" allows it to benefit from all the ecosystem historically present in the region whose activity affects the fields of maritime safety and security:

- Three major international systems integrators, DCNS, THALES and AIRBUS DS / SIGNALIS, are present in the cluster and guarantee the dynamism of innovation and the potential for the marketing of solutions throughout the Mediterranean Sea;
- The presence of their main subcontractors in complex software development (ATOS, SOPRA, THALES SERVICE, EUROGICIEL, AKKA TECHNOLOGIE, SII, etc.)

It should also be noted that the presence in the ecosystem of the French Navy, and the Ministry of Defence, and all the entities mentioned above, that are used as actors in the framework of the action of the State at Sea on the various Missions of maritime safety and security, promotes the emergence of innovation by brewing ideas between needs and solutions.

Dual technologies can fit for other blue growth sectors that can be targeted through the mainstreaming activities: Fishing and Aquaculture and Marine Renewable Energies.

Fishery and aquaculture are both sectors in development, notably due to the food issues the world is facing. Fishery and aquaculture appear as serious food provider. However, in order to have a long-term resource, the development of the two activities has to be sustainable.

Concerning Marine Renewable energies, in order to accelerate their commercial development, research currently focuses on security of the farms, physical infrastructure (grid connection, storage, port facilities …), legal framework (licensing and permitting procedures), cost-effectiveness and value (reducing the gap between onshore and offshore will enable greater opportunities for the public sector to invest in offshore grid connections and provide the right incentives to private investors to contribute), public perception and environmental concerns and improved technologies (floating bases, wind turbine design and size etc.).

2.1.1 Criteria adopted for the selection

A detailed mapping of key stakeholders was achieved with public actors, research and industries in the field of maritime surveillance and defense. This mapping of the potential members has been built through the already existing community of actors gathered in PMM cluster and enriched with desktop research and personal contacts.

To be eligible, an organisation had to:

- belong to the 4 helix categories: Companies (Small, medium and large ones): The ideal is to have a "leading" company that serves as a model; A start-up or a large group that has diversified / specialized in the topic. This company has to have technical skills; Research: environment, hydrodynamics, technology, etc.; Training and Academics: Show that there is potential to create new trainings; Civil Society: NGOs
- Be located in one of the regions/ countries covered by PROteuS;
- Be involved and/ or interested by at least one of the MS domains.
- Be located in SUD PACA and/or Occitanie regions.

Following the identification of potential members, the selection was then prioritize based on their willingness to be involved in the node and their added value for the node. The selection criteria used were the followings:

- Adequacy between the MS domain of expertise and the NN specialisation in that case **Defense**;
- Added value that the node could bring to this organisation;
- Participation in Previous Maritime surveillance related projects;
- Products or services already on the market.

Each criteria has been assessed on 5 points, from low to high interest. The organisations having a mark below 10 were dismissed.

2.1.2 Activities carried out

The activities that have been performed at the French node level for the mainstreaming consisted in targeting other cluster organisations and initiatives in the Mediterranean .

The communication material provided to other maritime clusters and business networks an overview of the activities developed, the innovative approach followed and the results achieved.

Concerning clusters, the European Cluster Collaboration Platform allowed us to identify clusters in the field of Aquaculture, Fisheries and Renewable Marine Energies. These clusters have been emailed with the communication materials to raise their interest about the Maritime Surveillance Platform, notably the technologies mapped during PROTEUS activities that might have an interest in their sectors.

Country	Cluster
Greece	Strategis
	Blue Growth Initiative
	si-Cluster
Croatia	Cluster Inteligentna Energija
Italy	ACMM- Marche Manufacturing Cluster Association
	DITNE Scarl
	Lombardy Energy Cluster
	DITENAVE Distretto tecnologico navale e nautico del Friuli Venezia Giulia
	IDM Ecosystem Energy & Environment
	Liguria Cluster of Marine Technology (DLTM)
	Italian Maritime Cluster BIG
	Distretto Tecnologico Aerospaziale
	The Fisheries and Blue Growth District
	Maritime Technology Cluster FVG S.c.ar.l.
	ASTER - ENERGY AND ENVIRONMENT PLATFORM
	Clust-ER Greentech - Emilia Romagna
	NAVIGO
Spain	Cluster Nautic de Barcelona
	METAINDUSTRY4. CLUSTER OF ADVANCED MANUFACTURING OF METAL INDUSTRY IN ASTURIAS.
	Cluster Andalucía
	Andalusian Cluster of Renewable Energy and Energy Efficiency
	Basque Energy Cluster (Cluster de Energía)
	Catalonia Logistics
	Energy Cluster of the Valencia Region
	Spanish Maritime Cluster
Scotland	Aberdeen Renewable Energy Group
	Scottish Enterprise (Energy)
France	Aerospace Valley
	AQUA-VALLEY - French WATER cluster
	POLE AVENIA
	Pôle Mer Bretagne Atlantique
	AQUIMER
Romania	AGROPRO Oltenia Cluster
Poland	BALTIC SEA & SPACE CLUSTER
	Westpomeranian MARITIME CLUSTER
	sEaNERGIA Baltic Cluster
Bulgaria	Marine Cluster Bulgaria
	Black Sea Energy Cluster
Belgium	European Association of Remote Sensing Companies (EARSC)
	Flanders' Maritime Cluster
	IBN Offshore Energy (OWI-Lab)
Portugal	Forum Oceano
Malta	Malta Marittima Agency
United Kingdom	Marine South East
Denmark	Offshoreenergy.dk
	Maritime Cluster Copenhagen North
Germany	Maritimes Cluster Norddeutschland e. V.
Sweden	OffshoreVäst
	Swedish Maritime Technology Forum
Norway	Oslo Renewable Energy and Environment Cluster

Other organisations and initiatives acting in the Mediterranean have also been targeted to raise their attention about the clustering approach developed.

Organisation
ASCAME
Anima Investment Network
WESTMED initiative
European Business Network - EBN
UfM

2.1.3 Results/impact of the mainstreaming activities carried out

The results are mainly:

- An increase of the number of organisations registered in the platform
- A strategy around the development of an overall maritime cluster in the Mediterranean

2.2 GREECE

Coastal Tourism

Greece has 16,000 kilometers of coastline, a truly unparalleled phenomenon on the European continent and over 6,000 islands and islets, scattered in the Aegean and Ionian Sea, most of them grouped in clusters, that form the unique Greek archipelago. Tourism is an export champion for Greece as it represents 20.6% of GDP (2018, WTTC) & 25.9% of employment (WTTC).

Ocean Energy

Due to its geographical location, Greece has high potential of exploiting ocean energy. Wind potential mainly in Aegean sea is adequately exploitable and appropriate structures exist, while the western and southern part of Greek seas have the highest wave energy potential.

Aquaculture and Fisheries

With 125,772 tons of fish from aquaculture production for the year 2018, Greece stands as the number 3 fish farming producer in the world, and number 1 in the European Union. In fact, fish was the number 2 Greek export in 2018. In terms of employment in aquaculture, Greece has one of the highest percentages in the European Union. Namely, the industry employs directly and indirectly approximately 12,000 persons (not only workers, but scientific, technical and managerial personnel as well).

2.2.1 Criteria adopted for the selection

- Importance of sector for the national economy
- Potential for exploitability
- Current market trends
- Relevance and Synergies with GR cluster members of PROteuS

2.2.2 Activities carried out

The technologies and results of the PROteuS project have been disseminated to the members and maritime stakeholders. Future non-project events can be exploited for further mainstreaming actions.

2.2.3 Results/impact of the mainstreaming activities carried out

Maritime Surveillance actors are now aware of technologies that could be applied to the sectors we identified for mainstreaming. Marine Environmental Monitoring devices or fisheries devices for example, can be exploited to the aquaculture market and monitor the production and living parameters of fish in the Greek production areas so as to allow fish producers to better plan and monitor their farms. Buoys can be exploited to measure wind and wave potential in certain areas to be exploited by offshore platforms and such constructions for better placement and adjustments of their systems.

2.3 ITALY

Italy can boast excellent positions and great growth potential in the Blue Economy field. Unioncamere's Fifth Report on the Blue Economy (2018) shows that the sector is growing by 2.5% compared to 2016 and 10.5% compared to 2011; the Blue Economy, includes 194.516 companies in the business registers of the chambers of commerce (31 December 2017) (3.2% of the total). These data highlight the need to strengthen the structural links of the system through the consolidation of territorial aggregations and the creation of a national community. In the Italian scenario, shipbuilding, maritime transport and the fish supply chain are the primary sectors, followed by offshore and coastal and maritime sports and recreational activities; aquaculture, mineral resources, marine biotechnology, forecasting and environmental information services and new underwater technologies offer new business opportunities.

Finally, even if the new National Research Program 2021-2027 is still being drafted, it is already known that Blue Growth is confirmed as one of the Strategic Areas for the Country around which to structure effective national and regional policies and instruments in terms of impact on the social and economic development of our Country.

In Italy, to support these strategic lines, 12 National Clusters have been created which bring together the main stakeholders of the country in the 12 sectors considered strategic. These include the Blue Italian Growth Cluster which works to field actions that accompany the achievement of the objectives that Italy and Europe have set out in the field of the Blue Economy.

After a careful reflection and from a comparison with the stakeholders identified for the Italian node of the Proteus Project, the main domain selected as having the most potential of economic growth for the ecosystem are:

Defence: La Spezia with the Naval Base and numerous companies, including the Leonardo group, which operate in the defence sector is one of the major centres of the Defence Industry. In the field of defence policy, industrial defence policy is expressed in the direction of study, R&D, acquisition and production activities aimed at providing the military corps with the necessary means and materials, through the definition of military requirements. The industrial policy also includes the initiatives implemented both for security needs and for the safeguard and development of the "country system" and the national industry. On the supply side, the AD&S industry provides

technological solutions for military requirements. In addition to the AD&S industry proper, suppliers and also companies from adjacent sectors (ICT, consumer electronics and components, transport, new materials etc.) contribute to the offer. Furthermore, in the past 20 years, with the globalization of the European AD&S industry, the market has become increasingly transnational, so the domestic industry can supply products to foreign demand through exports. Italy has long lacked a matrix of priority technologies, so all the Prime Ministry Decree of November 30, 2012, n.253, defined the "activities of strategic importance" and the "key strategic activities" in the defence sector.

Aquaculture: Fishing today, in many cases means conservation, safeguarding and enhancement of natural coastal environments. In this context, aquaculture can represent an evolution, in a strategic key, of the natural sensitivity of fishermen towards the environment. Strategic because it combines, in a modern way, the protection of the biological and environmental resources of a given area with sustainable economic development. Therefore, it is no longer an exclusively conservative protection, but a dynamic one, projected towards the future, also to the advantage of the new generations for whom the conditions for diversified employment opportunities could arise. The term aquaculture defines today that set of human activities, distinct from fishing, aimed at the controlled production of aquatic organisms. The aquaculture of the future must not pollute, it must produce "green" and healthy food that respects the environment and consumers. There are precise indications on the fundamental elements to consider: physical, chemical and biological parameters of the site environment; training of technicians and workers; identification of any existing service structures in the chosen area; study of the commercial aspects and the possibility of placing the product on the market at profitable prices; evaluation of the financial and credit aspects in order to ensure the availability of adequate fixed and operating capital. The Liguria Region considers this field as strategic and intends to enhance it.

Coastal Tourism: The world's first tourist destination, the Mediterranean attracts millions of tourists every year, which is not without consequences for the environment. Because an increase in the population rhymes also with an increase in the waste produced and the waste water discharged. The surroundings of La Spezia attract many tourists for the uniqueness of the area. But such a high anthropization insists on an already fragile territory. From this arises the need to pay attention to the issue of safe and sustainable tourism, the Cluster can be an effective means of safeguarding this objective.

Marine Environment Monitoring: The Ligurian coastal marine environment represents an extremely diversified and peculiar reality in the Mediterranean panorama. A complex ecosystem that needs to be protected and managed effectively and sustainably. It is in fact a small strip of territory, thin both in the emerged and in the submerged part, where extremely varied environments and landscapes alternate and where man's activities are mostly concentrated. A territory that lends itself to multiple interpretations: the Ligurian coast is at the same time a strategic crossroads for port and commercial traffic, a treasure trove of biodiversity and landscape heritage, a tourist destination of international scope, residence of almost all the regional population. Perhaps in no other environmental context the issue of integrated coastal strip management is presented in such a complex and evident way. Fundamental to ensure integrated management, as well as a very topical issue, there is the need to ensure that all the infrastructures in charge of this management are able to interact and dialogue with each other. The Cluster structure, as well as ad hoc infrastructures for Big Data management could be a valid solution.

2.3.1 Criteria adopted for the selection

A detailed mapping of key stakeholders was achieved with public actors, research and industries in the field of maritime surveillance. This mapping of the potential members has been built through the

already existing community of actors gathered in DLTM cluster and enriched with desktop research and personal contacts.

To be eligible, an organisation has to:

- belong to the 4 helix categories: Companies (Small, medium and large ones)
- Be located in one of the regions/ countries covered by PROteuS;
- Be involved and/ or interested by at least one of the MS domains.

Following the identification of potential members, the selection was then prioritize based on their willingness to be involved in the node and their added value for the node. The selection criteria used were the followings:

- Adequacy of the MS domain of expertise;
- Added value that the node could bring to this organisation;
- Participation in Previous Maritime surveillance related projects;
- Products or services already on the market.

All criteria have been assessed on 5 points, from low to high interest. All the selected stakeholders had a good / very good score.

2.3.2 Activities carried out

The activities that have been performed at the Italian node level for the mainstreaming actions consisted in targeting other cluster organisations and initiatives in the Mediterranean.

Communication materials were used to provide to other maritime clusters and business useful informations on the activities developed, giving them an overview of the approach adopted and the results achieved.

Concerning clusters, the European Cluster Collaboration Platform allowed to identify clusters in the field of Aquaculture, Coastal Tourism, Marine Ecosystem Monitoring. These clusters have been contacted by email to raise their knowledge and interest about the Maritime Surveillance Platform, notably the technologies mapped during PROTEUS activities that might have an interest in their sectors.

Moreover, all the Italian National Clusters dealing with sectors covered by the PROteuS Project were involved.

Hereunder a preliminary list of some Clusters mapped:

Country	Cluster
Italy	DISTRETTO LIGURE DELLE TECNOLOGIE MARINE
	NAVIGO TOSCANA
	MARE FVG
	NAVTEC SICILIA
	DISTRETTO DELLA PESCA E DELLA CRESCITA BLU-COSVAP
Germany	MARITIME CLUSTER NORTHERN GERMANY
Belgium	BLUE CLUSTER
Spain	FAEN-FONDACION ASTURIANA DE LA ENERGIA
Finland	FINNISH MARITIME CLUSTER

Other organisations and initiatives acting in the Mediterranean will also be targeted to raise their attention about the clustering approach developed.

Country	Cluster
West Mediterranean	**WESTMED INITIATIVE**
	Source: http://www.westmed.eu/
France	**NEOPOLIA**
	Source: http://www.neopolia.fr/
Europe	**INTERNATIONAL CLUSTER COLLABORATION**
	(source website: https://www.clustercollaboration.eu/)
Italy	**ITALIAN TECHNOLOGICAL CLUSTER TRASPORTI 2020** **Source: http://www.clustertrasporti.it/**
	ITALIAN TECHNOLOGICAL CLUSTER ITALIAN BLUE GROWTH **Source: http://www.clusterbig.it**

2.3.3 Results/impact of the mainstreaming activities carried out

The results/impacts of the mainstreaming activities carried out have been:

- Increase of the number of organisations registered in the platform thanks to the development of a willing to be part of the MSS Cluster
- Innovative strategy for the development of an overall maritime cluster in the Mediterranean

2.4 SPAIN

CCSEV has selected the subsector "Defense" as the most prominent one to be addressed within the Spanish node in relation to the following criteria: 1. Number of key actors operating in the field, 2. Innovation and R&D ecosystem in the region, 3. National and Regional Strategies and main trends.

Based on the critical mass of actors registered to the Spanish node, as well as the importance of the sectors for the national economy, the blue growth sectors selected by Spain for the mainstreaming activities are:

o Aquaculture/Fisheries

o Coastal tourism

2.4.1 Criteria adopted for the selection

With almost 8,000 kilometres of coastline and 3,000 listed beaches, Spain's coastal tourism sector can be considered a key one for the national economy. The country is an established market in the global travel industry and ranks as one of the world's leading travel destinations. Latest available data (2016) show that international tourism expenditure valued 58.9 billion euros for Spain. However the country has been identified among those that will suffer from climate change. These facts served

as criteria adopted for the selection of this sector as it is considered a very significant one with potential for re-enforcements due to the detected threats.

CCSEV is also being involved in iBLUE project which aimed to enhance the yachting sector – which is further related to the coastal tourism.

The Spanish fishing fleet consists of approximately 13.400 vessels, classifying it to the first place of fleets in the European Union in terms of tonnage (480,000 GT). This tonnage constitutes 25 % of the EU-25 total. In addition the employment in the fisheries sector was estimated around 33.129 in 2013 for Spain, scoring the first place in this aspect among the EU maritime countries (2nd. Italy with 26.758). In addition the aquaculture production in Spain for 2018 was approximately 350000 tones with a value about 472 million Euro. Based on these data and the relevance of PROteuS with the sector, especially with regards to the fisheries surveillance subsector, the Spanish node selects this sector as a second for the mainstreaming activities.

2.4.2 Activities carried out

CCSEV with the support of the other Spanish partner approached the network built within iBLUE project in order to transfer PROteuS relevant outcomes via the mainstream activities. In addition, as a next step the Maritime Cluster of Andalusia has been targeted for mainstreaming actions.

All identified actors for the mainstreaming activities can be reached with information and communication materials to inform the about the project, the outcomes, the MED MS cluster and the MS platform. Future non-project events can be exploited for further mainstreaming actions.

2.4.3 Results/impact of the mainstreaming activities carried out

The expected results are of different kinds:

- An increase of the number of organisations registered in the platform
- A strategy around the development of an overall maritime cluster in the Mediterranean
- A dissemination of the MS technologies for further exploitations in the mainstreamed sectors.

Transferability of proteus approach to other blue growth clusters

2.5 CYPRUS

The main Blue Growth sectors for the Cypriot National Node, selected as having the most potential of economic growth are the following:

- Maritime Safety & Security
- Marine Environment Monitoring and
- Fisheries Management

The aquaculture sector is another sector that has been identified as having significant potential for economic growth and could be targeted for mainstreaming the activities already undertaken under the PROteuS project.

Cyprus is a small island and hence a small economy. It has an area of 9,251 square kilometres with a coastline of 648 km and is situated in the eastern basin of the Mediterranean Sea. The island strategic location, which is at the crossroads of three continents (Europe, Asia, Africa) enabled Cyprus to play a prominent role in its success as an international shipping centre. Cyprus appears to be among the top five countries and territories in the world with the largest number of third party ship management companies on its territory and among the top three EU countries with the largest fleet. About 120 large cruise ships visit the port yearly. Cruise vessels calling Cypriot ports have up to 5 thousand passengers' carrying capacity and are owned by international and all over the word known cruise companies, of which more than 50 include Cyprus in their Mediterranean routes. All these activities require involvement of the many public departments to ensure the proper and effective surveillance in ports that are major points of entry into the country.

Cyprus has 9 ports in its coastline of which 3 have been occupied during the Turkish invasion in 1974. These are: the port of Larnaca, Limassol New & Old port, Pafos port, Latsi port, Vassiliko Terminal and the occupied one Famagusta, Kerynia and Karavostasi ports. For the scope of PROteuS project we will focus in the cities of Limassol and Larnaka as the main areas of interest with established infrastructures regarding Maritime Sureillance.

The political, economic and social importance of shipping for Cyprus was recognised in 1963 and has shown phenomenal growth in the last years, a main pillar of the maritime safety & security sector. More than 260 ship-owning, ship-management and shipping related companies maintain fully-fledged offices and conduct their international operations and activities from Cyprus. Among the ship management companies established and operating from the Republic of Cyprus, 87% are controlled by Cypriot and EU interests. Such companies employ almost 55.000 seafarers out of whom 5.000 are EU nationals. Equally important is the fact that these companies employ around 9.000 people ashore. The share occupied by the fleet managed from Cyprus in the world ship management market constitutes another interesting aspect. According to recent governmental estimates, the total fleet managed from Cyprus represents 20% of the world third–party ship management market (out of 10.000 ships in the world ship management market under a wide approach). This makes Cyprus the 5th third party ship management center in the world. As mentioned earlier, Cypriot maritime registry is one of the largest in the EU and 11th largest worldwide. Without doubt Maritime Transport is one of the two biggest sectors which lead the economy of the island together with Tourism.

Estimated at around € 7.4 million, the annual contribution of fisheries in Cyprus could be considered relatively low for the island's economy. The total annual Cypriot fish production from marine fisheries varies around 1200t. The annual per capita consumption of fishery products in Cyprus is around 20kg. Nevertheless, the fisheries sector in Cyprus is considered important, mainly because it offers economic and social benefits in coastal areas, creates jobs and offers healthy products to consumers. Cyprus employs about 1276 people directly as fishermen, of which 803 are full-time and 473 part-time. The establishment of marine protected areas in Natura 2000 sites and the creation of artificial reefs are actions aimed to increase the current low fish stocks of the island. All these activities will require marine environment monitoring tools. Additional in the aquaculture sector, due to the low productivity of fisheries, nine fattening farms, three private marine fish hatchery stations, and a shrimp hatchery/breeding unit are operating currently in Cyprus. The total annual production of cultured species in fattening farms is 7.303t of which the 4.885t and 2.389t correspond to the production of the two most important cultured species, the seabream and seabass respectively. All

fattening units are based on the intensive farming technique of offshore fish cage farming. Sites for fish farms are selected with respect to marine environment protection and therefore, are developed within 1-4km distance from the shore in water depths of 20-70m. These features ensure the environmental friendly approach of the activity as well as the friendly interaction with the other economic activities of the coastal zone.

Cyprus has no freshwater bodies apart from about 20 reservoirs (capacity around 300 million tons) which are used mainly for irrigation and drinking, but also for angling. There are no rivers of perennial flow, only small brooks in the mountain range of Troodos. Draughts are not uncommon. The sea around the island is poor -like most of the Eastern Mediterranean- oligotrophic, the fishing grounds being almost fully exploited and the fishing stocks depleted by overfishing. The Cyprus government promotes marine aquaculture, acknowledging its potential in increasing the most needed good quality fresh fish for its local population, the tourists and for export.

Aquaculture in Cyprus started in 1969 with attempts to develop trout farming in the Troodos mountain range. The experimental freshwater fish culture station of the Department of Fisheries and Marine Research (DFMR) was constructed at Kalopanayiotis and initially served as a pilot research station. Three years later the first private commercial trout farms became operational. Today trout is cultured mostly in raceways by using flow through systems.

The first attempts with marine aquaculture were made in 1972 when the construction of a marine research station was initiated by the DFMR at Gastria, on the east coast of Cyprus, about 15 km northeast of Famagusta. In 1974 the Government lost access to the station due to the Turkish invasion. Research work in marine aquaculture continued from 1978-1989 in the Paphos Harbour where the DFMR successfully operated a small hatchery for the experimental reproduction of marine fish. A new experimental marine aquaculture station at Meneou, near Larnaca airport, was built by the DFMR in 1989 and all marine aquaculture research activities were resumed there.

The first private commercial marine fish hatchery began production in 1986, producing gilthead seabream and European seabass finger lings. The first marine fish fattening unit, which used land-based coastal installations, started operation in 1988 producing gilthead seabream and European seabass, while the first commercial open sea cage farm was established in 1989.

Aquaculture is an important economic activity in Cyprus and it contributes significantly to the production of fishery products, reduces fishing deficit and thereby reduces the negative trade balance, creates job placements and occupies employees with specialized scientific background. The direct employment in the aquaculture sector is 417 persons (2016); however, a greater number of people are employed in aquaculture-related jobs. Also, it provides an affordable -in terms of price- and highly nutritional product.

As the global production of the capture fisheries sector decreases in the last twenty years and the demand for fishery products continues to grow, the contribution of aquaculture to the fishery products consumed worldwide each year has increased from about 10% in the 70s to around 50% in the current year.

Government policies applied in the sector of aquaculture are driven by sustainable development, protection of the marine environment as well as emphasizing on quality and safety of aquaculture products.

In Cyprus, Marine Aquaculture constitutes an important part of the primary agricultural production as well as of the wider fisheries sector showing impressive growth rates and a high quality export product. In Cyprus there are in operation (licensed) nine marine open sea cage farms (fattening farms using offshore cage farming techniques), culturing mainly European seabass and gilthead seabream, three marine hatcheries, one land-based shrimp hatchery/farm and seven small trout farms. All fattening units are operating on an intensive basis by using marine offshore cages. Spatial allocation of the fish farms is selected taking to consideration the marine environment and eco-systems.. This ensures a more environmental friendly approach of the activity as well as the compatible interaction with other economic activities of the coastal zone (tourism, fisheries etc.). In addition to the fattening units, three (3) private marine fish hatchery stations as well as a shrimp hatchery/breeding unit are operating in Cyprus. The facilities of the aforementioned units are located in the coastal area and they are operating on in intensive basis. Their total annual production was approximately 32,67 million finger lings. The shrimp farm had a total annual production of 0,97 million larvae and 25 T of table size shrimp. It has to be noted that the shrimp unit constitutes a unique facility in the Mediterranean basin as it has developed specialized biotechnology techniques. The total national value of hatchery production is estimated at€ 6,01million.

The freshwater (FW) aquaculture in Cyprus is characterized by small-scale fish farms, with smaller growth potential when compared to marine aquaculture. The major limiting factor for FW aquaculture in Cyprus is the freshwater availability. The fish farms are mainly focused on the fattening of freshwater fish species and specifically rainbow trout (Oncorhynchus mykiss) and sturgeon (Asipenserbaeri). There are seven (7) FW aquaculture farms, all located on Troodos mountains. Their facilities are mainly constituted of concrete tanks with their water intake coming from neighboring springs and rivers. Some of these farms operate as fish hatcheries as well. The total annual production in 2016 was 40 tons of trout, 1 ton sturgeon and 72.546 finger lings totaling approximately €0,35 million. Trout and sturgeon farms employ a small number of individuals with overall technical knowledge and are usually run as small family businesses. Two of the seven trout farms operate in conjunction with adjacent restaurants. Trout farming creates employment opportunities in the mountainous and rural areas.

In the last decade, Cyprus Marine Aquaculture has been exhibiting an overall increase in production at an average annual rate of 5%. This is mainly attributed to the European funds support for productive investments in aquaculture as well as to the opening of new markets in conjunction with the global increase in demand for fisheries products. In contrast, freshwater aquaculture production decreased in the last decade. The main reason for the decreasing trend is the limited sources of fresh water availability on the island and the serious drought that Cyprus has been experiencing especially the last years. The scarcity of fresh water led to high mortalities as well as high energy costs for the companies, resulting in high production cost, thus reducing the competitiveness of the products. All the production is marketed locally or in conjunction with on-site restaurants. It has to be mentioned that freshwater aquaculture represents only around 1% in both volume and value of the total national aquaculture production.

For the next years, Marine Aquaculture production in Cyprus is expected to continue to increase due to the increase of the global demand and new markets. There are however risks that may affect this increasing trend which are associated with the price of the main products (sea bass and sea bream), which to a great extent are determined by big producing countries like Greece and Turkey.

Additionally, an important role for maintaining this increasing trend has the continuance of the support from the European funds for productive investments in aquaculture, as well the implementation of the national multiannual aquaculture strategic plan. As regards the freshwater aquaculture production, it is expected that it will remain relatively stable. Due to the high cost of production, the products are marketed nationally, as they cannot compete with equivalent products that are produced in other countries which have more adequate fresh water sources.

It is worth noting that the main export destinations for the Cypriot marine aquaculture products, namely seabream and seabass, are the USA, Russia, and Israel. The main export destinations of Cypriot marine fish fry are Greece and Israel. This preference for the Cypriot fish fry is due to its good quality and to the absence of contagious and other serious diseases in the island's hatcheries.

Overall, Cyprus due to its geographical location being the easternmost state of the European Union and located in a highly sensitive – with respect to surveillance – region of the Mediterranean Sea; should take further actions in order to develop Maritime Surveillance (MS) to the most remote borders of Europe. Maritime Surveillance includes controls on the following functions: borders, environment, ports and maritime traffic in general. Therefore, the creation of a National Node coordinating these MS activities in conjunction with the development of the other Blue Economy Sectors in Cyprus (Maritime Transport, Coastal & Maritime Tourism, Offshore Oil & Gas, Aquaculture and Fisheries) will further assist and safeguard the proper growth of the aforementioned sectors. It is worth noting that the Cypriot Node covers the entire area of Cyprus.

There are many stakeholders involved in the MS sector in Cyprus such as Public Authorities, Research Bodies, Industry and Civil Society organizations, who would benefit greatly from the creation of a National Node in this sector.

Megatrends/trends identified and analysed consistent with the local MS sector

- ***Maritime Safety & Security***

- Robotics: Ensuring safety in new and more challenging operations will be important. Humans' direct interaction with dangerous activities will be diminished
- Sensors: Sensors technologies are developing rapidly to meet the ever- growing demand for data and information that will enable consumer-driven needs. For example, The Internet of Things, which allows real-time monitoring and control of systems and processes
- Communications: as the technologies advance, we will begin to see fast market expansion and transition. For instance, maritime on service units are expected to double in 15 years
- Smart ships are being widely debated as the shipping industry's next technological revolution

- ***Fisheries Management, Marine Environment Monitoring***

- Autonomous Systems: Through subsea exploration, autonomous marine systems will help scientists expand their understanding of the ocean environment and ecosystems. Therefore, the autonomous systems will teach us how to effectively nurture the ocean space environment and could potentially actively work to protect it against damaging human activity, such as pollution or over-exploitation
- Sensors and Communications: Use of a wide variety of sensors capable of communicating data in real time via satellites and land- and ocean-based networks will revolutionise the way

information is handled in the ocean space. This will allow decisions to be made in an informed manner, improving safety, efficiency and minimising environmental impact across all aspects of human presence in the ocean space

2.5.1 Criteria adopted for the selection

The criteria used for the selection of the three focus sectors of the Cypriot Node are the following:

- Number of actors operating in the MS sectors according to the National Mapping
- Capacity of the sector to meet the socio-economic & technological trends identified in the report
- The current state of the sectors and its future prospects in Cyprus

Moreover, it is worth noting that a mapping exercise was undertaken by the Cypriot Node coordinator for identifying its potential members. For this exercise, desktop research, personal contact/ and knowledge acquired in the studying phase of the project were used, leading at an initial non-exhaustive list of potential members. The selected potential actors complied with the following criteria:

- Be located in one of the regions covered by PROteuS
- Belong to the quadruple helix. The 4 main categories of actors/stakeholders, to be balanced are:
    - Companies (Small, medium and large ones): The ideal is to have a "leading" company that serves as a model; A start-up or a large group that has diversified / specialized in the topic. This company has to have technical skills
    - Training and Academics: Show that there is potential to create new trainings
    - Research Centers: environment, hydrodynamics, technology, etc.
    - Civil Society: Public Authorities, NGOs, Other
- Be Involved and/ or interested by at least one of the MS domains

That initial list of stakeholders was then enhanced through desktop research and personal contacts and by using the following sources:

- Previous Maritime surveillance related projects through EU platforms such as:
    - CORDIS, primary portal for results of EU-funded research projects www.cordis.europa.eu
    - KEEP, Data base of Interregional cooperation funded projects www.keep.eu
    - European Defence Agency supported projects;
    - List of Regional Funded related projects;
    - List of stakeholders from Maritime Surveillance related organizations and lists of members of other Maritime Surveillance related clusters (European cluster collaboration Platform)
- List of participants of MS related events (conferences, B2B meetings)
- Previous successful collaboration with the project partners in MS related projects.

Afterwards, these potential members were prioritized based on the following criteria:

- willingness to be involved in the node
- added value for the node and the organization
- adequacy between the MS domain of expertise and the National Node specialization (in this case maritime safety and security, marine environment monitoring and fisheries management)
- participation in Previous Maritime surveillance related projects

- products or services already on the market

Each criterion has been assessed on 5 points, from low to high interest. The organizations having a mark below 12 were dismissed.

The members that have been eventually selected on the basis of the above criteria, were invited to the launching event of the Cypriot Node.

This selection process can also apply in the case of the Cypriot Node, although it has to be noted that the sector is quite concentrated, being managed mainly by the Department of Fisheries and Marine Research (government authority) and a few private companies which are presented below:

Cypriot Marine and Freshwater Aquaculture Companies/Units

Marine Aquaculture Companies (Fattening / Grow – Out Units)
• **BLUE ISLAND PLC** • **EAST MEDITERRANEAN AQUA TECHNIQUE (EMAT) LTD** • **ICHTHYS ECO-FARM LTD** • **KIMAGRO FISHFARMING LTD** • **KITIANA FISHERIES LTD** • **SEAWAVE FISHERIES LTD** • **TELIA AQUA MARINE LTD** • **OCEANIS AQUACULTURE LTD** • **TELIA VASILIKO LTD**
Marine Hatcheries
• **BLUE FISHERIES LTD** • **SAGRO AQUACULTURE LTD** • **TELIA AQUA MARINE LTD**
Marine Shrimp Farm/Hatchery
• **A.P.Z AQUARIUM LTD**
Fresh Water Aquaculture Companies
• **SABRINA LTD** • **VAMARIA LTD** • **ICHTHYOTROFIA MYLONA LTD** • **FINI FISHERIES LTD** • **CHRYSANTHOS ANDREOU** • **PSILO DENTRO LTD** • **ANDREAS CHRISTOFI**

2.5.2 Activities carried out

The pilot activities carried out by the Cypriot Node in the framework of the PROteuS project demonstrated that there is a great need in the MS sector for capacity building, for training, for supporting actors (especially private ones) in entering foreign markets (internationalization), for networking and building partnerships across the globe and for finding funding for R&I activities and

for developing competitive products and services. Relevant activities (technical and business workshops, training, funding and networking seminars) also apply to the area of aquaculture. For instance, the dual use marine technologies workshops that have been organized by the Cypriot Node coordinator do not only apply to the Maritime Safety and Security sector, but also to the Marine Environment Monitoring sector and the Fisheries and Aquaculture sector.

Moreover, the promotional material that will be shared by the Chamber of Commerce of Venice to all the PROteuS partners and will present the main project's outcomes, will be used by the Cypriot Node in order to attract the interest of other cluster organisations, initiatives and networks in Europe and especially in the Mediterranean region. This promotional material will provide to other maritime clusters and networks an overview of the activities developed, the innovative approach followed and the results achieved by the PROteuS project.

In addition, through the use of various databases (showed below) clusters in the focus areas of the Cypriot Node (Maritime Safety and Security, Marine Environment Monitoring and Fisheries Management), including the area of Aquaculture can be identified. These clusters can be contacted to raise their awareness of and interest in the PROteuS project's activities and especially in the Maritime Surveillance Platform, with special focus on the technologies and actors mapped and included in the platform that might be of an interest to their sectors.

1. European Network of Maritime Clusters	www.enmc.eu
2. European Cluster Observatory	http://www.clusterobservatory.eu
3. TCI Network	www.tci-network.org
4. Cambridge Cluster Map	http://www.camclustermap.com/
5. European Cluster Collaboration Platform	http://www.clustercollaboration.eu/
6. The European Secretariat for Cluster Analysis	http://www.cluster-analysis.org

2.5.3 Results/impact of the mainstreaming activities carried out

The expected results can be summarized as:

- Increase of the number of organisations registered or interested in the the project PROteuS and its platform;
- Increasing networking and cooperation opportunities at local, regional and international levels (including between other maritime clusters and/or networks);
- Intensification of efforts for the development of a strategy of a maritime (super)cluster in the Mediterranean;
- Greater role and impact on policy shaping on Blue Economy issues at regional and international levels.

3 Conclusions

According to partner's indications the most important Blue Growth sectors selected are Acquaculture/fisheries and Coastal Tourism.

Fishery has very deeply routed tradition in the Mediterranean Area and has an enormous developing potential by embracing a more sustainable activity plan. This could benefit local economy, preventing the impoverishment of sea species and the subsequent decline of SMEs involved in fishing and fish commerce and transformation. It is vital o adopt a more environment-friendly policy in the sector in order to try to minimize the potentially devastating consequences of global warming.

Coastal Tourism is also a crucial branch in the Mediterranean Countries' economical scenarios. Mediterreanean Sea attracts so many tourists that in many cases sailing and accesses to ports have been regulated to prevent excessive pollution – in terms of wastes – but also of people's concentration. Green tourism has proved to be a great resource and opportunity for coastal economies.

Both sustainable tourism and fishery/acquaculture require strict and effective Maritime Security and Safety, declined as controls on fishery and customs , which are indicated by many partners as prominent MS sectors.

The consolidation of the national coastal nodes and the transnational collaboration among the clusters constitutes a key factor to boost and improve a systemic innovative and eco-friendly approach to very traditional fields of economy such as fishery and tourism, creating at the same time new business opportunities for local operators.