PLOCAN

Oceanic Platform of the Canary Islands

Strategic Plan 1316

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1. Introduction

The Strategic Plan 2013-2016 of the Consortium for the design, construction, equipment and operation of the Oceanic Platform of the Canary Islands, PLOCAN, sets out the objectives, strategies and specific actions that will guide the management of the organization in the coming years. It will also set the next steps to follow to convert PLOCAN in an international benchmark in terms of its technical and scientific capabilities and to achieve a model of efficient organization based on excellence.

For the making of this document the initial objectives with which the Platform was created have been taken into account and combined with the values and vision that define the particular form of understanding and achieving them. The revision of these objectives has been made bearing in mind the changes the global reality and in particular the European and national ones have suffered in the last years as well as the consequences arising from these new scenarios. For all these reasons the following basic references have been used in the development of this Strategic Plan:

The cooperation agreement between the General Administration of the State (at the time of signature, the Spanish Ministry of Education and Science) and the Canary Islands Government for the creation of the Consortium, signed on December 10th 2007, and its amendment signed on December 28th 2012 (at that time the GAS being represented by the Ministry of Economy and Competitiveness) that sets its objective, purpose and the basic lines of activity.

The Spanish Strategy of Science, Technology and Innovation 2013-2020, which is the general reference of the Spanish system based on the fact that scientific and technological progress is an essential part of the progress of modern societies as there is a clear relationship between the capacity a country has for generating knowledge and innovation and its competitiveness and economic and social development. Also the State Plan for Scientific, Technical and Innovation Research 2013-2016, which is its specific and concrete executive development tool, has been taken into account

The proposal for the Canarian Research and Innovation Smart Specialisation Strategy 2014-2020 (RIS3[1]), and the Commission communications "Regional Policy contributing to smart growth in Europe 2020"[2]

[1] http://aciisi.itccanarias.org/ris3-consulta/images/documents/ris3_canarias_borrador_v0.9.pdf
[2] http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/smart_growth/comm2010_553_en.pdf

and "The outermost regions of the European Union: towards a partnership for smart, sustainable and inclusive growth"[3].

The Europe 2020 Strategy[4], which arises as the tool for the EU to come out stronger from the crisis and turn into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion; the Integrated Maritime Policy; the European Strategy for Marine and Maritime Research[5]; the Marine Strategy Framework Directive[6]; the Blue Growth strategy[7]; the Atlantic strategy[8] and the Limassol Declaration[9].

The scientific and technical project of the Consortium approved in November 2009, (PCT09), as well as, the work and experiences generated by the government bodies and the activity of the Consortium since it was launched.

This Strategic Plan 2013-2016, will give continuity and will allow the adjustment of the Consortium's initial approaches presented in the Scientific and Technical Project, thus allowing the synchronization of its scheduling with the mentioned regional, national and European plans and strategies. All these elements have been integrated and adapted taking into account the basic lines that from the outset defined the vision of the organization, these being:

- The exponential growth of underwater activity
- The need of knowledge and technology
- The need of reliable environmental guarantees
- The high and deterrent entry threshold

As will be shown throughout this document, in the past years this initial vision has not only not weakened but, on the contrary, it has been reinforced:

Although this Strategic Plan provides a basic reference which shall guide all actions of the organization in the coming years, it should not be understood as a closed document, but as an element in continuous evolution and improvement, like the organization itself. For this reason, alongside the Plan processes for monitoring and periodic review are established to allow its updating and adapting to a changing environment, something essential for the achievement of the goals.

[3] http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/rup2012/rup_com2012287_en.pdf
[4] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF
[5] http://ec.europa.eu/research/mmrs/documents/pdf/a_european_strategy_for_marine_and_maritime%20_research_en.pdf
[6] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:164:0019:0040:EN:PDF
[7] http://ec.europa.eu/maritimeaffairs/documentation/publications/documents/blue-growth_en.pdf
[8] http://ec.europa.eu/maritimeaffairs/policy/sea_basins/atlantic_ocean/documents/com_2013_279_en.pdf
[9] http://ec.europa.eu/maritimeaffairs/policy/documents/limassol_en.pdf

2. General Information

2.1.Identification

Name: *Oceanic Platform of the Canary Islands*

Responsibility: *The technical and scientific responsibility of the ICTS is held by the manager and director*

Director: *Octavio Llinás González - direccion@plocan.eu*

Manager: *José Joaquín Hernández Brito - gerencia@plocan.eu*

2.2.Description

The Oceanic Platform of the Canary Islands is a Singular Scientific and Technological Facility (*Instalación Científica Técnica Singular* (ICTS)) funded by the Spanish and Canary Islands governments, Its aim is to enable the best research, technological development and innovation through an efficient access to the ocean at increasing depths in an environmentally sustainable way. The infrastructure will be dedicated to experimentation and scientific-technological research in all aspects of marine science and technology, and in particular those whose development requires the availability of scientific and technical laboratories located in the marine environment. The platform will be available to the whole national scientific and technological community, opened to international collaboration, and fully integrated within the current and future European coordination and collaboration initiatives in this field. Additionally PLOCAN plans to become involved in R+D projects with the objective of enabling research and scientific and technological development of maritime and marine sciences.

The infrastructure working guidelines are derived from the following objectives:

1.- **To offer unique scientific and technical capabilities.**Provide the scientific and technological community with the most effective conditions and means, in an international context, to test and observe at increasing depths.

2.- **To be one of the leading international test sites.** Provide the business community with one of the best and, in some cases, a unique test site in the deep ocean with adequate environmental guarantees.

3.- **To offer a base for underwater vehicles.** Create a base for deep sea vehicles and working tools, on a permanent basis, for all those tasks that require these kind of devices.

4.- **To be a scientific-technological environment of excellence.** Offer a unique meeting space for both the scientific and techological public community of highest excellence and dynamism, and the most innovative companies, in the fields of accessing, understanding and utiilizing the deep ocean.

5.- **To offer highly specialized training.** Offer a set of training programmes, from professional to postdoctoral training, including specific training for the use of facilities and devices for working in and accessing the deep ocean.

6.- **To be a organisation model.** Test a public, entrepreneurial and innovative scientific and technological organisation, capable of managing highly qualified human resource teams, expensive, complex instruments and devices, and relationships with innovative companies along with public and private socio-economic institutions.

Regarding the legal status of the organization, the Consortium has a legal personality and full capacity to reach its specific goals.

The governance and management board of the Consortium consists of a Strategic Council, an Executive Committee and the Director of PLOCAN.

In addition, the PLOCAN Consortium is advised by the Socioeconomic Activities Advisory Committee (*Comité Asesor de Actividades Socioeconómicas (CASE)*) and the Scientific and Technological Advisory Committee (*Comité Asesor Científico y Técnico (COCI)*).

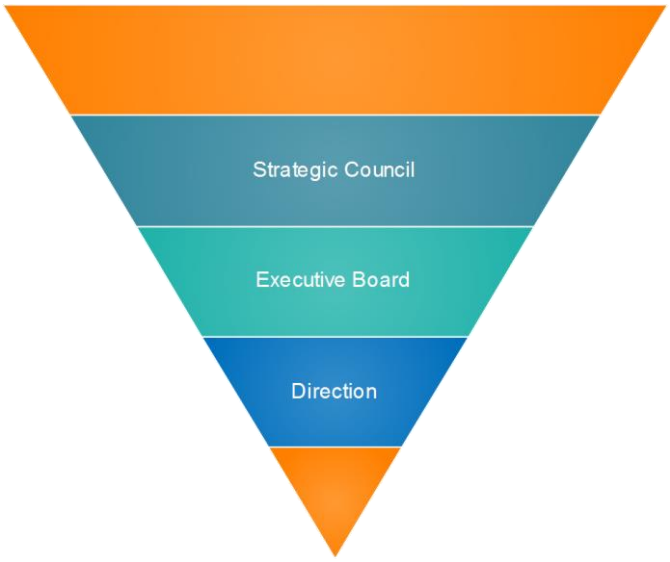


Figure 1 PLOCAN's Governance and management board structure

The consortium also has an economic committee that examine the annual accounts and the budget to advise the strategic council.

PLOCAN has the status of an instrument and technical service of the State General Administration as well as of the Public Administration of the Canary Islands Government.

2.3.Identification of the ICTS infrastructures

PLOCAN is, according to its Management Methodology, structured in 3 main areas: the Administrative and Financial Area, the Scientific and Technological Area and the Socio-Economic Area. The organization of the PLOCAN consortium is flexible and adapts on an ongoing basis to the needs derived from the fulfillment of the six main goals described in the previous section.

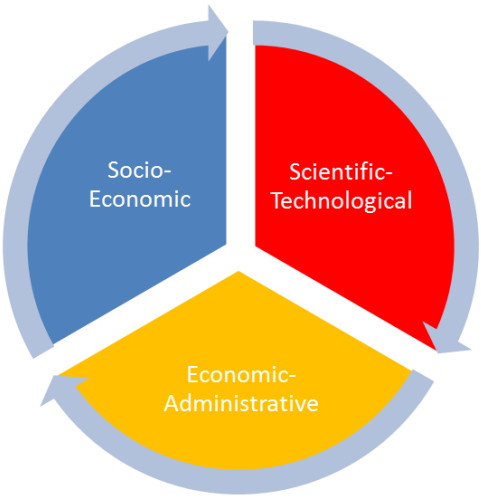


Figure 2 PLOCAN's Management Structure

According to the agreement signed on December 10th, 2007 between the Spanish National Government and the Regional Government of the Canary Islands from which ensued the creation of the Consortium for the building of the Oceanic Platform of the Canary Islands, 2012 was the planned year for the beginning of its operational phase. However, in December 2012 a modification of the agreement established 2014 as the new date for the conclusion of the construction phase and 2015 as the beginning of the operational phase.

For this reason, the platform is currently in its construction phase, and although officially the operational phase will not start until 2015, some of the infrastructures (e.g. landbase, test site or gliders) have begun to operate partially with the aim of testing operational procedures, develop management methodologies and protocols or standardize data collection. These initial operations will contribute to providing guarantees for the initiation of the operational phase as it was previously established in PLOCAN's Scientific and Technical Project.

Figure 3 PLOCAN is still in its construction phase. The operational phase will start in 2015

The following list highlights the main elements of the PLOCAN infrastructure together with the description of their construction status and the processes and provisions established in order to initiate operations and services in the planned schedule.

2.3.1. Platform

The main aim of the PLOCAN consortium is the construction of a sustainable oceanic platform that will underpin national research and technological development capacities at the cutting-edge of knowledge and within the framework of international competitiveness. The Platform will be located in the open sea, one mile offshore, in the municipality of Telde, Northeast of Gran Canaria. Marine depths at this location are 30.5 meters (referred to the 0 at the Port of Las Palmas de Gran Canaria).

Geophysics campaigns, maritime climate conditions and environmental conditions studies were used to determine the final location of the platform among three previously defined options. Following economical, technical and environmental assessments the selected position was considered the most suitable (See **Annex 5.2**).

Figure 4 Infographic of the Platform

The optimal location for the Exclusive Reserve of the Publicly Owned Seafront (*Reserva Exclusiva de Dominio Público Marítimo Terrestre* (RDPMT)) was set off the coast of Jinámar (between Punta del Palo and Malpaso). The main selection criteria were the following:

- No spaces under special environmental protection within the area.
- Proximity to the Jinámar power plant, which facilitates the evacuation of the electricity, generated at the PLOCAN marine test site reducing costs and impact.

- Optimal location between two strategic ports: the Port of Las Palmas (North) as the logistic base of the Platform and the Port of Taliarte (South) as its scientific base. In Taliarte, not only the onshore facilities of PLOCAN can be found but also the Scientific and Technological Marine Park of the University of Las Palmas de Gran Canaria.
- No military uses in the area.
- Proximity to the airport and to the Emergency Helicopters Unit of the Canary Islands Government.
- No aquaculture uses in the area.
- Area of minor impact for other maritime uses such as diving, fisheries or maritime traffic which will therefore be unaffected by the activities of the scientific platform.
- No residential uses in the selected coast, dominated mainly by industrial activities.
- Highly anthropomorphic marine area.

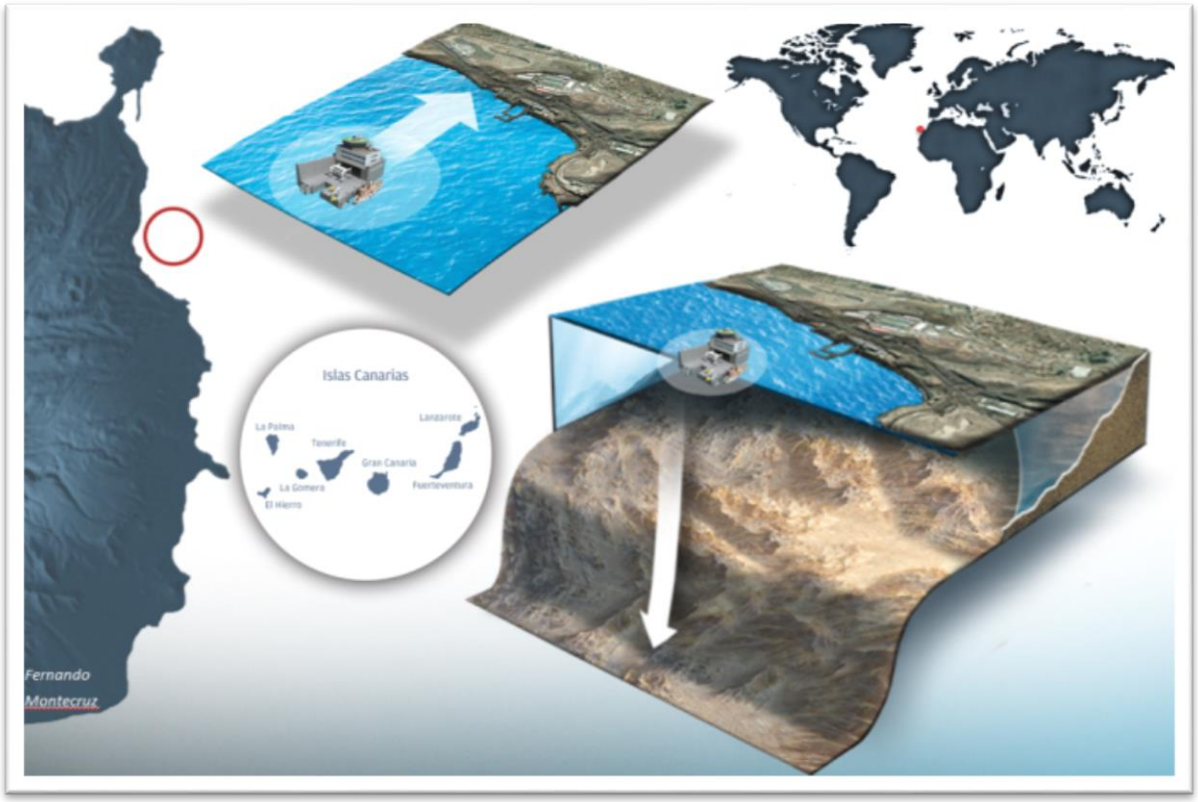


Figure 5 Platform situation

2.3.2. Onshore headquarters

The collaboration agreement signed on December 10th, 2007 contemplated in clause 6, point 1, that the Canary Islands Government would make PLOCAN headquarters on land available throughout the term of the agreement, establishing a headquarters agreement with the Canary islands Government or other entity designated by it which would establish the characteristics of the facilities, whilst not including any financial provision by the consortium.

That agreement was modified on December 28th, 2012, through another agreement between the Central Government, the Ministry of Economy and Competitiveness and the Canary Islands

Government. In clause 6 a new paragraph was added stating that the Canary Islands Government assigns PLOCAN the use of the facilities of the Canarian Institute of Marine Sciences (Instituto Canario de Ciencias Marinas (ICCM)) for the duration of the collaboration agreement.

The following is a list of facilities that are part of the land-based headquarters belonging to PLOCAN:

Figure 6 On land facilities and harbour area

On land:

Offices, laboratories, workshops, assembly rooms, multipurpose rooms, container area, machine rooms, etc.

Table 1 Facilities on land

CENTRAL AREA	LEVEL 1 EAST	LEVEL 2 EAST
Reception	Director Office	Multipurpose Room.
Security Desk	Board Secretariat	Assembly Hall
Visiting Room	Administration	Classroom
	Register	Laboratories
	Training Room	
	Assembly Hall	
LEVELS 1 AND 2 WEST	**NORTH WAREHOUSE**	**CENTRAL BUILDING**
Offices and laboratories	Workshop	3 floor Central building
	Storage shed	
	Laboratory	
	Dry Laboratory	
	Showroom	

Harbour Area:

"Taliarte" oceanographic vessel berth
Storage warehouses.

2.3.3. Test site

The test site is defined as the set of infrastructures and services for testing and monitoring new marine technologies. This test site will have an experimental marine area (See **Annex 5.2**) in order to safely and effectively carry out the testing and monitoring activities; this will avoid interactions with other uses of the marine space, and ensure the utmost respect at all times for the environment.
PLOCAN offers a marine test site[10], complemented by ocean observation services, in order to facilitate and accelerate the development of new ocean technology and marine experiments and in turn reduce the associated costs. This test site has a marine area of about 40 km^2 equipped with the necessary infrastructure for the development of the experiments.

Table 2 Features of the resrve area

Aproximate surface (km^2)	Depth (m)		Distance to the coast (km)	
40	*Minimum*	*Maximum*	*Minimum*	*Maximum*
	0	1000	0	12

Marine reserve area

The application for a marine reserve area, according to Article 47 of the Law of Coasts 22/1988, July 28th, and at the request of the Ministry of Economy and Competitiveness (MINECO), is a prerequisite to the operation of the PLOCAN marine test site. This application is currently still pending. The purpose of this reserve area is to provide a restricted marine area and all services and infrastructure required for the testing and development of new technologies directly related to the sea, which could not otherwise be carried out elsewhere:

Some of the areas in which PLOCAN will initially focus its activities are:

- Exploitation of renewable marine energies: wind, waves, currents, etc.
- Ocean Observation
- Underwater vehicles, instruments and machines
- Offshore Aquaculture
- Behavior of materials in extreme environments

Electrical and communication infrastructure

The aim of the marine and terrestrial electrial and communication infrastructure of the test site is to enable the connection of marine technologies that harness energy from the sea for the production electricity and its subsequent evacuation to shore. In this way, sea energy harnessing prototypes in the

[10] González, J., V. Monagas, E. Delory, J. Hernández, y O. Llinas. «A marine test site for ocean energy converters: Oceanic Platform of the Canary Islands». En OCEANS, 2011 IEEE-Spain, 1–6, 2011.
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6003471

development and testing phase located in the test site, such as wave converters or offshore wind turbines, will be able to connect to this infrastructure.

This infrastructure includes the following elements:

- Underwater cables
- Underwater junction box
- Underwater transformer station
- Beach manhole
- Landline

Sea energy harnessing prototypes in the development and testing phase located in the test site, such as wave converters or offshore wind turbines, will be able to connect to this infrastructure.

The project for the Electrical and Communications Infrastructure for the PLOCAN test site (Infraestructura Eléctrica y de Comunicaciones (IECOM)), started in 2010. A conceptual design of the infrastructure and a detailed study, based on technical objectives to be achieved and the foreseen technological needs, was completed. This in turn led to a final electrical design based on technical, economic and environmental criteria.

The drafting, of the technical project, detailing the final design of the electrical infrastructure, as well as a technical description and the corresponding environmental-impact study, were accomplished in 2012. All legal procedures to obtain the environmental authorisation and permission for the electrical installation and connection to the Canarian electrical grid have also been completed so that the IECOM will be able to become operational in 2014.

Oceanic Platform

With the aim of developing the uses described in the above section entitled Marine reserve area, it is necessary to install a central control and management system; this will be the previously mentioned platform. This platform will allow the proper management of operations, procedures and control within the reserve area.

Other energy harvesting devices

Regarding the installation of experimental offshore turbines in the test site, an environmental report that assesses the potential environmental impacts arising from their installation and operation has already been drafted, and administrative procedures with the regional or state environmental agencies are expected to begin mid-2013.

Aeronautical easement

The required documentation for obtaining permission for the installation of offshore wind turbines over a height of 100 meters in the test site has already been prepared and procedures with the Spanish Air Safety Agency (Agencia Española de Seguridad Aérea (AESA)) are invisaged to start mid-2013.

Role of the other infrastructures in the test site

The platform, land-based headquarters or submarine vehicles will be also used to test either/or and allow the proper management of operations, procedures and control within the reserve area. In

addition, with the aim of developing the uses described in the above, the platform will provide an offshore central control and management system for the marine reserve area.

2.3.4. Observatory

The concept of ocean observatory is defined by a set of infrastructures that allow the characterization and study of the surrounding area, from the ground to the atmosphere, at scales ranging from nanometers to hundreds of kilometers and from microseconds to decades. PLOCAN will support observation in two different environments: on the one hand the European Station for Time Series in the Ocean (*Estación Europea de Series Temporales Oceánicas de Canarias* (ESTOC)), and on the other, the real time monitoring of the sensors placed on the tested and within the platform environment[11].

Observation at the ESTOC area

The ESTOC station is located at about 100 km north of Gran Canaria, at 29°10'N 15°30'W, at a maximum depth of 3670 m in oligotrophic waters, that include major deep water masses of the Eastern North-Atlantic. It is a meteorological, biogeochemical and physical operational observatory.

Figure 7 ODAS buoy deployment as part of the ESTOC observatory

[11] Delory, E., J. Hernández-Brito, y O. Llínas. «The PLOCAN observatory: A multidisciplinary multiplatform observing system for the central-eastern Atlantic ocean». En OCEANS, 2011 IEEE-Spain, 1–6, 2011. http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6003593.

PLOCAN has been responsible since 2011 for the operational section of ESTOC. The station is now the oceanic observation node of the platform. At this node, *in situ* sampling is performed by research vessels, helicopters and autonomous underwater vehicles.

Observation at the test site area

As mentioned in previous sections, PLOCAN will provide a test site where experimentation and monitoring of new marine technologies will be carried out, but the test site will also be a site where all kinds of sensors can be tested and developed in a perfectly monitored environment. The real-time monitoring of the sensors from the data control center will allow continuous monitoring of the information collected, thus allowing evaluation of the performance of these sensors under real environmental conditions.

The use of remote operated underwater vehicles will enable the deployment (mooring and recovery) of sensors on the seabed, facilitating and speeding up the operations and testing.

At the same time, the presence of an hybrid cable will supply power to the sensors and will allow the reception of real-time information collected by these sensors.

Although the platform will not begin its operational phase until 2014, several oceanographic cruises have taken place at the test site, and some oceanographic instrumentation has been already deployed which is contributing to the physicochemical and biological knowledge of the area.

Observation with Gliders

In line with the philosophy of providing maximum integration of all the services and infrastructures required for the operations, underwater vehicles and machines are available for the deployment and operation of the observatory. Currently, gliders are operating periodically at the test site.

The entire coastal observatory located at the test site, together with the ESTOC oceanic area and the connection between them using gliders constitute the "Extended Observatory".

2.3.5. Base for underwater vehicles, instruments and machines (VIMAS)

The aim of the base for underwater vehicles, instruments and machines (VIMAS), is to make a vehicle and instrument base at the deep ocean permanently available, for all tasks requiring such devices. The test site requires the availability of a set of vehicles, tools and machines that allow tasks of deployment, collection, monitoring, control, operation, etc. Moreover, the observatory requires the vehicle base in order to come into full effectiveness as noted in the previous section.

A further objective of the base is to attract vehicles and machines from companies and institutions, both from Spain and abroad. These devices would be operated at PLOCAN for testing or personnel training purposes throughout the whole year whilst, in the meantime, other sites may not be operational for a variety of reasons. There is already a collaboration framework between PLOCAN and NOCS (National Oceanography Centre of Southampton) regarding unmanned autonomous underwater vehicles.

The following vehicles are currently available at the base:

- *Slocum G2 underwater Glider*
- *iRobot SeaGlider 1K*
- *Benthos deck unit UDB-9000-M*
- *ROV Bleeper-AT*
- *Support vessel QUER-40*

Figure 8 Operating a glider al PLOCAN

Another aim is the promotion of specific technological developments, as well as the training in underwater vehicle operation. At PLOCAN, several specialized training activities for the operation of ROVs, underwater gliders and other underwater devices take place regularly.

The addition of the following elements to the VIMAS base is foreseen:

- Underwater vehicles and machines from institutions and companies, both national and international, which would be operational for testing and personnel training purposes during non-operational periods in other places.
- Specific technological developments
- Three 2000 m depth ROVs
- Between 4 and 8 gliders and / or next-generation autonomous vehicles
- Instruments and tools for the deployment and collection of experiments, purpose-built for PLOCAN, and for deep diving support
- Light support vessel
- Outsourced public and private fleets both Canarian and national

Figure 9 Operating a ROV

2.4.Scientific and Technological Community user of the ICTS

PLOCAN has been conceived and developed as an infrastructure that is destined to provide services to both the research community and the business community, including within that both the private and public sector, all its services being available to the scientific and technical community. Thus, the community of users of the infrastructure and services offered by PLOCAN can be broadly classified as follows:

- The scientific and technological community (local, national, European and international) which includes scientists and researchers, both from public and private sectors, as well as students in training.
- Companies, in different fields and sectors, both SMEs (Small and Medium Enterprises) and large enterprises. Special attention will be paid to supporting the creation and development of technological SMEs, and all other initiatives that promote innovation and development.
- The administration, in any of its fields.
- The general public, through outreach activities, training, widening of knowledge, environmental awareness and so on, always bearing in mind as part of its mission, the contribution to regional and national development, acting at all times as an adjunct element to the regional, national and European policies.

3. Critical Analysis

In the development of any strategic plan, decision-making aimed at establishing updated targets and at defining strategies to achieve them, should be based on the use of strategic analysis tools that help to obtain a clear and accurate vision of the current organization status.

The SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis is a simple and effective tool to support decision-making. It helps to determine the status of an organization; assessing the real situation at a given moment, in terms of weaknesses, threats, strengths and opportunities whilst aiding in drawing strategic lines. This in turn allows this knowledge to be taken advantage of through the exploitation of competitive advantages available in the setting in question.

Furthermore, the required diagnosis of the current situation cannot be complete without an analysis of the socio-economic situation in which the project will be developed and of the associated interactions with this setting. These aspects, along with a brief study of the status of other infrastructures similar to PLOCAN and its interrelationships with these, constitute a snapshot of the present moment and will be discussed in the following sections.

3.1.SWOT

The targets set in the organization´s Strategic Plan and the strategies to reach these targets must be consistent with the organization's internal and external reality, hence the importance of aligning these objectives and strategies with the results of the SWOT analysis. This analysis constitutes the starting point from which the analysis of the current situation is based on.

Figure 10 Elements on wich the Strategic Plan is based

3.1.1. Methodology

A fundamental requirement in this process is that the objectives and strategies derived from the SWOT analysis be realistic, measurable, and achievable, as well in tune setting and with the definition and personality of the organization. Therefore, the sources that will inform the analysis have been selected in order to allow a realistic adaptation to the setting and context and the current and foreseeable circumstances, without losing sight of the goals, values and vision with which the Platform was created.

The initial objectives, previously gathered in the Scientific and Technical Project of the Platform and the Scientific, Technical and Economic Report, which defined at the time the need for the creation of PLOCAN and the uniqueness of this ICTS, as well as its subsequent modification in January 2013.

The vision, mission and values that define not only the objectives to be achieved, but also how to achieve them and establish, together with the social responsibility of the organization, a framework for relations with the social reality and the setting.

Previous experience. The experience gained from 2007 to 2013 while the infrastructure was at a pre-operational stage, has allowed the testing of procedures, methodologies and forms of organization as well as the trialling of the first services to customers so that the accumulated experience and information can now help develop this current analysis of the situation.

Context analysis. The analysis of external factors has taken into account global changes, mainly at European and national levels, which have occurred over the past few years along with the consequences derived from these new scenarios. Particular attention has been paid to economic and social factors and not forgetting the latest developments in science and technology.

In this analysis of external factors, particular attention has been paid to finding an effective alignment of PLOCAN's objectives and strategies with those of the Canary Islands Government, the Spanish Government and the European Union. This will allow the joining of forces and improve results, contributing effectively to the success of policies defined by these organisms. For this reason, The European Union strategies for 2020, the Union's marine and maritime growth policies and national and regional R + D + i. plans have been taken into account throughout the process.

The reality of the organization. An internal analysis of each of PLOCAN's functional areas has been made, as well as an analysis of the factors affecting the organization as a whole.

Whilst bearing in mind the limit to the study's length that was marked as an initial criterion, it has been considered appropriate to incorporate into the analysis views provided by people who in a variety of different roles, have or have had a relationship with the organization. To this end, surveys were conducted among groups that include: PLOCAN staff, researchers, potential users and companies.

3.1.2. Diagnosis of the situation

3.1.2.1. Weaknesses

- *Organizational structure conditioned by not enough flexible procedures.*

  PLOCAN performs its work in many different environments (local, national and international) servicing companies, public administrations and research centers in many different fields of knowledge, combining advanced research with the development of new technologies and permanent innovation. In this context, to be competitive it is essential to have the ability to act quickly and effectively in response to new opportunities and with flexibility to adapt to the demands of the moment.

- *Management models constrained by ambiguous procedures*

  The organization has to compete with other service infrastructures both at national and international levels. To do so with sufficient guarantees of success, models and management procedures that maximize every available resource, both material and human, are essential.

- *Limitations in recruitment.*

  The scientific and technical objectives that were established at the time of the creation of the organization were defined with the expectation that the team employed would be significantly larger than it is currently. The limitations imposed subsequently, have hindered the achievement of these goals and introduced delays or have prevented their accomplishment.

- *Poorly defined work framework.*

  The lack of a specific employment framework that clearly defines all aspects of working relationships, low wages and limited productivity incentives hinder the recruitment of highly qualified staff. The incapacity to compete with more attractive offers from other organizations is hindering the retention of current staff.

- *Capabilities not in accordance with objectives.*

  The objectives established so far may turn out be too ambitious and difficult to achieve given the current number of staff, lack of flexibility available and conditions imposed by the socioeconomic context of crisis and budgetary restrictions.

3.1.2.2. Strenghts

- *Human resources*

  The staff at PLOCAN is certainly one of its greatest assets. The ICTS has a team dedicated to its work and capable of overcoming that which is lacking by means of effort and dedication. They are highly skilled experts who are also engaged in an on-going process of learning and professional development, showing at all times a high degree of responsibility and commitment.

- *Singularity of the infrastructure.*

  The Oceanic Platform of the Canary Islands combines in one facility a number of infrastructures designed to interact with each other so that their services are complementary and enhance each other. When operational, the platform will include a marine test site, an oceanographic observatory, a large pool of machines and underwater vehicles, a communications, data storage and analysis infrastructure and a training center, all served by a highly specialized team. This unique combination of elements allows research to be performed, and development and innovation tasks to take place in a single location whilst all the elements needed for the different phases of the process are available.

- *Environmental conditions.*

  The location of PLOCAN ensures the existence of unique environmental conditions that guarantee a high percentage of days in which operations in the vicinity of the platform are

possible. The unique environmental conditions result in a lower average cost of operations and a lower risk for equipment and staff.

- *Access to the deep ocean.*

  The oceanic and volcanic nature of the Canary Islands has shaped the underwater topography of the area, resulting in a very narrow island (a.k.a continental) platform and very pronounced slope. This particular configuration of the subsea relief of the Canary Islands makes access to deep waters possible at a relatively short distance from the coast, further reducing the cost of operations and installations.

- *Efficiency and speed in activities. Customer satisfaction.*

  The gradual opening of facilities to users that has been conducted as a prelude to the operational phase has shown a high degree of satisfaction and the efficiency and speed of the services offered.

3.1.2.3. Threats

- *Competition with highly specialized centers.*

  The Oceanic Platform of the Canary Islands has been built up, as already mentioned, with a vision to integrate different services and capabilities that enhance each other. In contrast to this comprehensive service vision that characterizes PLOCAN, there are other centers with a highly specialized vocation as, for example, the EMEC in the UK, specialized in marine energy, or NEPTUNE Canada, specialized in ocean observation. Certain services require technologies, equipment or a high degree of specialization of personnel, which may not always be possible to achieve in a multipurpose infrastructure such as PLOCAN.

  Although these are two clearly different visions, it is evident that there is still an overlapping area, not necessarily stable, in which to compete.

- *Current economic context. Reduction of public funds for research.*

  The recession being experienced by major world economies and in particular the EU has a direct and clearly visible influence in their business economic activity in general and, which is even more worrying, in all development and innovation activities in public administrations, research centers and companies.

  This new economic reality is far from the medium-term overarching goal that could have been foreseen at the time when the consortium was formed (2007), and requires actions to mitigate, to a large as possible extent, a decrease in anticipated revenues from services provided to potential users and particularly to public users.

  In this context it is expected that the decline in public funding for research groups and centers, as well as the funding of research and innovation projects involving companies will also result in a reduction of national users of PLOCAN's facilities.

- *Lack of visibility.*

  Since its first steps in 2007 the Oceanic Platform of the Canary Islands has been in a first stage called construction phase, which will end in 2015 when the platform enters the operational phase.

  Despite a major and on-going effort to publicize PLOCAN, both nationally and internationally, it is clear that further and continued tasks need to be carried out to broadcast this infrastructure in its many niches of action, where it is still an innovative element without tradition or being known previously to the users.

- *Characteristics of the business sector.*

  The Canarian and Spanish business sectors are not specially known for companies that stand out for their distinctive innovative activity or for having a strong technological base. In the major developed economies, the business sector represents about 2/3 of the total expenditure on R&D, while in Spain this figure is only 55.1 % .In addition, most enterprises are SMEs, thus making it difficult to maintain R&D departments or to face own technological developments

3.1.2.4. Opportunities

- *Partial funding of the organization through external projects.*

  Although the platform is not yet in its operational phase, a significant portion of its current funding comes from projects, agreements and contracts that have been obtained competitively, in most cases, from international institutions. As soon as the operational phase begins and all infrastructures are operating at maximum capacity, funding obtained competitively, both from companies and institutions different from those constituting the consortium, may exceed baseline funding.

- *Strength of renewable energy at a global level.*

  In December 2008, the European Union set very ambitious targets[12] for 2020 in relation to the use of renewable energy: 20% of the energy consumed by member states has to be, by that date, from renewable sources; CO2 consumption should be reduced by 20% and energy savings should reach 20%. In the same vein, according to the United Nations Program for the Environment, investment in renewable energy sector increased 32% in 2010.

  In this scenario, marine renewable energies play an important role and for its research and development test benches equipped with all necessary material and human resources for offshore operations are essential.

- *Energy dependence of the Canary Islands*

[12] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0772:FIN:EN:PDF

The electrical system in the Canary Islands is a fragmented system due to insularity, isolated from large electric grids and based on fossil fuels.

The Canary Islands are a clear example of the situation of many island territories isolated from large electric networks and can therefore serve as a test site for solutions exportable to many other territories.

- *Blue Growth*

In the resolution on "Blue Growth"[13] adopted in September 2012, the European Commission considers the marine sector as a key in contributing to Europe's economic recovery and proposes the Blue Growth strategy as forming part of the contribution to integrated European Union maritime policies growth targets set out in the Europe 2020 strategy.

The marine and maritime sectors employ 5.4 million people and provide a gross added value of approximately 500,000 million euros. By 2020, these figures could increase to 7 million people and almost 600,000 million euros, respectively.

European structural funds will be invested within a timeframe of seven years and be based on five basic pillars: Marine renewable energies, maritime tourism, both coastal and cruises, marine biotechnology, aquaculture and exploitation of marine mineral resources.

- *Offshore Aquaculture*

The increase in population and the consequent need for protein along with the decline in catches due to the overexploitation of fish stocks have led to the takeoff of an aquaculture which has already begun to experience problems in its development. Aquaculture, as we know it, competes with tourism, agriculture and artisanal fisheries for land or coastal waters. Faced with this situation offshore or ocean aquaculture is presented as an alternative with great potential for development because of its advantages over the coastal alternative.

The refinement of this productive activity requires constant innovation in terms of processes, techniques, materials, tools, etc. These needs to be designed and tested in controlled and monitored environments whose conditions resemble real ones as far as possible.

- *Training*

Training is a key element for the implementation of the European marine and maritime policies that foresee an economic growth based on the sea.

According to the forecast of the Union, in 2020 the economy linked to the sea will employ 7 million citizens. These figures imply the need to provide specialized training to a large number of people in the coming years.

The Canary Islands have many of the necessary conditions needed to become an international platform of training and specialization in marine issues, thus contributing to the objectives of the Union. This due to the geographical position; close proximity to a continent with huge development potential in the next decades, the fact that they are islands and oceanic, their

[13] ttp://ec.europa.eu/maritimeaffairs/policy/blue_growth/documents/com_2012_494_en.pdf

belonging to Europe and their traditional relationship with Spanish speaking countries in the Americas.

- *Standardisation*

  The commitment made by the United States and the European Union in support of ocean research in all its aspects, has entered a new phase in which the need to share observations becomes increasingly evident. In this sense, marine observatories are joining forces to create networks that, by sharing data, will be able to address more ambitious goals and reduce costs.

  This need to share observations in turn generates the need to standardize sensors and procedures and in this field the Canaries can offer an ideal location to become a landmark in standardization processes in a subtropical ocean environment

3.1.3. Matrix

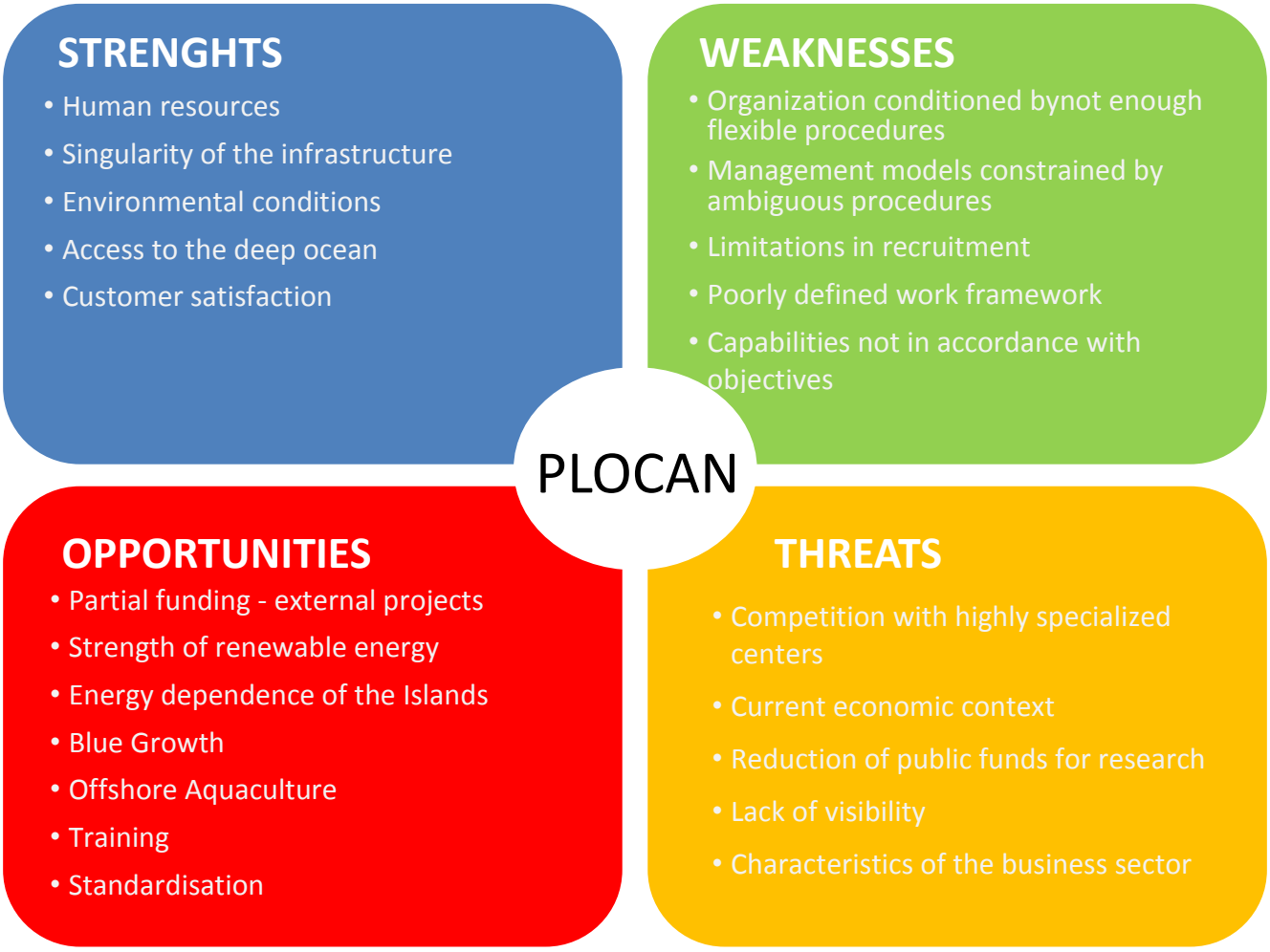


Figure 11 SWOT analysis matrix

3.2.Relational analysis of the installation

It is also necessary to analyze PLOCAN in its context as occurs with any new product or service that is intended to be introduced into the market or with the realistic monitoring of any already established product,. Not only is a study of the offered infrastructures and services needed, but also their position in the local, national and international context. This can be carried out by analysing their relationships, overlaps and complementarities.

Given the focus on multifunctionality and integration of services with which PLOCAN was developed, the approach to this analysis must cover the aspects that represent relevant infrastructures and services of the organization that are also present in other centres of similar characteristics: the test site, the observatory and the base for vehicles, instruments and underwater machines (VIMAS).

3.2.1. Test site

The “Blue Economy” is of key importance to Europe's overall economic health during the next decades, as have been pointed out recently. The European Commission presented the Blue Growth strategy in 2012 as a contribution to the Integrated Maritime Policy of the European Union for the achievement of the objectives of smart, sustainable and inclusive growth from the Europe 2020 strategy. In this strategy the Commission proposes sustainable growth based in the marine and maritime sectors of the European economy by promoting innovation and marine research, supporting innovation for small and medium enterprises and promoting innovative solutions, products and technologies, blended together with environmental protection and respect for biodiversity, to ensure long-term sustainable use of the oceans.

It covers major maritime activities such as shipping, fisheries, offshore oil and gas production, safety&security or coastal tourism. It also encompasses developing or emerging sectors, such as offshore generation of renewable energy, ocean mining or marine biotechnology.

Blue Growth strategy defines five specific areas of high potential growth on which to focus the stimulus measures, these are: marine tourism, marine mineral resources, aquaculture, marine biotechnology and marine renewables. New concepts and technologies are needed to fully untapped the potential of these areas. PLOCAN´s test site will support and respond to these demands of high and varied offshore testing services on subjects like:

- Exploitation of renewable marine energies: wind, waves, currents, etc.
- Ocean observation and exploration
- Underwater vehicles, instruments and machines
- Offshore Aquaculture
- Oil&gas
- Safety and security
- Behavior of materials in extreme environments

Test sites qualify to assay new devices and prototypes to harness renewable energy in the ocean, PLOCAN among them, will also contribute to Europe 2020 "A strategy for smart, sustainable and

inclusive growth"[14] which is an integrated package of measures on climate change and energy that provides new and ambitious goals for 2020. From these goals the following stand out:

- To reduce emissions of greenhouse gases by 20%.
- To save 20% in energy consumption through energy efficiency techniques.
- To promote renewable energies to 20%.

The importance of renewable marine energies in the continent highlighted by the European Commission, becomes even more evident locally in an island territory as far-flung as the Canary Islands. This situation is frequently to be found, both on islands and in large coastal areas not incorporated into continental networks.

The strategies mentioned above demonstrate the existence of the political will to invest in marine renewables. As a result of this there is also a growing number of innovative companies willing to take on this challenge by developing and putting into practice the devices and technologies that allow the use of these sources of clean energy and it is precisely these innovative companies together with research institutes, universities, etc. which require a series of infrastructures, services, advanced machinery and expertise that will facilitate their goals.

It is important to note here that when a company or research center decides to develop and test a device that harnesses marine renewables, the socio-economic impact of this activity is not only limited to the test itself, it also results in a series of wealth-generating processes such as: opportunities for new services, need for suppliers, technology transfers, training opportunities, specialized employment which go alongside the test and are often as important.

3.2.1.1. Main renewable energies test sites

Marine renewable energy is, almost without a doubt, a main driver for the test site business plan.

According to Justin Wilkes of the European Wind Energy Association[15], the European Union is, so far, a world leader in the development of marine renewable energy. This leadership is due in large part to the stimulus measures listed above, although this vantage may change in the near future due to the rise of renewable energies in countries like USA, Canadad, China, India or Japan. The **Annex 5.3** presents relevant international test sites.

European Union leadership supported by decades of experience, must clearly have an effect on the availability of test sites where trails can be conducted and new technologies can be developed to meet the needs of marine energies Europe highlights both the number and the quality of its test sites. These are generally highly specialized infrastructures that offer a service specifically designed to facilitate the development and implementation of these energy production systems.

[14] http://ec.europa.eu/commission_2010-2014/president/news/documents/pdf/20100303_1_es.pdf
[15] http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/News/Press_Releases/Clean_Energy/clen-G20-report-2012-FINAL.pdf

PLOCAN test site has been designed with a different vision, a vision of service integration and multi-purpose orientation to improve process efficiency and reduce costs.

Multipurpose. In contrast with models of test sites specializing in a single type of energy, PLOCAN waters will host clean energy devices at their development and implementation phases, especially for offshore wind and wave energy. At the same time the PLOCAN test site allows the development, innovation and fine-tuning of other advances, technologies and devices related to the marine sector in a secure and controlled environment. In this vein, PLOCAN's test site is qualified to carry out developments related to offshore aquaculture, marine biotechnology, study of material corrosion processes, development of new underwater vehicles and machines, safety in the sea, etc.

Integration. The PLOCAN test site has been designed with the aim of offering a complete service, so that a range of complementary services that facilitate development and implementation tasks will be included alongside the infrastructure and services of the test site. These complementary services include, on the one hand, a marine observation, which will provide all sensors needed for monitoring not only the device under development but also all physical and chemical parameters that may affect the device. On the other hand, a fleet of underwater vehicles and machines, which, together with surface vessels, constitute the necessary support for mooring and maintenance tasks on the tested devices.

3.2.2. Base for underwater vehicles, instruments and machines

3.2.2.1. Autonomous Underwarter Vechicles: Gliders

Several initiatives in the form of programs and projects in the European context, with direct impact on a global level, are continuously evolving and improving. This is in accordance with the Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008, which established a framework for community action within the policy for marine environments (Marine Strategy Framework Directive), and in direct concordance with several of its specific objectives. Other, more recent, initiatives have already been launched with new and complementary objectives. Within this context autonomous, underwater unmanned vehicles technology has been included. This includes the so-called gliders; one of the most relevant tools, in terms of technological development, designed for ocean observation and for a complementary response to the objectives established in the afore mentioned Directive. Among the programs and projects directly related are the following: IOC-GOOS[16], GEOSS[17], Euro-ARGO[18], GROOM[19], JERICO[20], COST Action ES0904[21].

[16] http://www.ioc-goos.org/
[17] http://www.ioc-goos.org/
[18] http://www.euro-argo.eu/
[19] http://www.groom-fp7.eu/doku.php
[20] http://www.jerico-fp7.eu/
[21] http://www.cost.eu/domains_actions/essem/Actions/ES0904

Figure 12 Some of the most relevant Glider Technologies

Gliders are nowadays considered to be a tool used globally and with a clear future projection in terms of use and diverse application in the main socio-economic sectors of the marine and maritime sector including: oceanography, marine pollution, safety and defense, natural disasters, biodiversity, fishing, etc.

One of the main contributions of this technology is the possibility of reducing notably (around two orders of magnitude) the costs of operation, associated to the permanent observation of certain marine areas, compared with conventional observation systems based on oceanographic vessels or vessels of opportunity.

With an average estimated cost of € 180,000 and € 270, figures which refer to acquisition and daily operation costs respectively, the technology is currently provided by four manufacturers on a global scale (three from the USA and one from the EU). The most recent figures reflect a total of 300 operative glider-units in the entire world. 80 of these units are based in the EU. Specifically, in Spain there are 12 units, distributed between the only two Spanish gliderports currently in existence 3 in the ICTS PLOCAN and 9 in the ICTS SOCIB.

The Gliderport concept refers to an infrastructure strategically located and focused on the development, testing, daily operations, maintenance and specialized training in Glider Technologies. This concept is one of the key elements with added value in the design and launching of an EU coordinated research infrastructure based on Glider Technology.

Figure 13 Some examples of the main equipment to be found in a Gliderport infrastructure

International Gliderports

The following list shows relevant and well recognised non-EU, Gliderports:

Table 3 List of main International Gliderports (2013)

NAME	COUNTRY	WEBSITE
University of Washington	USA	http://www.washington.edu/
Rutgers University	USA	http://marine.rutgers.edu/main/
WHOI	USA	http://www.whoi.edu/
SIO	USA	http://sio.ucsd.edu/
University of Hawaii	USA	http://www.hawaii.edu/
MBARI	USA	http://www.mbari.org/
University of South Florida	USA	http://www.usf.edu/
ANFOG	Australia	http://www2.sese.uwa.edu.au/~hollings/anfog/
Institute for Ocean Technology	Canada	http://www.nrc-cnrc.gc.ca/iot-ito/index.html
JAMSTEC	Japan	http://www.jamstec.go.jp/e/
Qingdao Ocean University of China	China	http://www.ouc.edu.cn/english/

European Gliderports

Specifically, in Europe there are gliderport infrastructures to be found in 19 locations throughout 9 countries (France, Germany, Italy, Spain, UK, Norway, Cyprus, Greece and Finland):

Table 4 List of the main European gliderports (2013)

NAME	COUNTRY	WEBSITE
CNRS	France	
UPMC	France	
IFREMER	France	http://www.dt.insu.cnrs.fr/gliders/gliders.php
NERC-NOCS	UK	http://noc.ac.uk/research-at-sea/nmfss/mars
UEA	UK	http://ueaglider.uea.ac.uk/DIVES/index.php
SAMS	UK	http://www.sams.ac.uk/smart-observations/north-atlantic-glider-base
UT	Germany	http://www.uni-trier.de/index.php?id=48&L=2
AWI	Germany	http://www.awi.de/?id=6039
GEOMAR	Germany	http://www.geomar.de/en/research/ongoing-projects/project-details/prj/2160/
HZG	Germany	http://www.hzg.de/institute/coastal_research/cosyna/011312/index_0011312.html
NERSC	Norway	http://www.nersc.no/
UIB	Norway	http://www.uib.no/en
FMI	Finland	http://en.ilmatieteenlaitos.fi/
HCMR	Greece	http://en.ilmatieteenlaitos.fi/
OC-UCY	Cyprus	http://www.oceanography.ucy.ac.cy/cycofos/glider.html
NURC	Italy	http://uncw.edu/nurc/auv/pelagia/
OGS	Italy	http://www.ogs.trieste.it/en/content/gliders-research-and-ocean-observation-and-management-groom
PLOCAN	Spain	http://www.plocan.eu/es/gliders-en-plocan/flota-de-gliders.html
SOCIB	Spain	http://www.socib.es/?seccion=observingFacilities&facility=glider

In addition to those already mentioned, new groups of glider technology users in countries such as Brazil, Mexico, Chile, Colombia, Puerto Rico, Egypt, Tunisia, South Africa, India, Argentina or Sweden, among others, are initiating training and acquisition of equipment for the operation of this type of vehicles at regional, national and international levels.

PLOCAN is currently participating as a partner in the FP7 project GROOM (Gliders for Research, Ocean Observations and Management), led by the Université Pierre et Marie Curie. The international consortium made up of 19 partners from 10 countries, aims to design a European infrastructure for applied research based on the use of underwater gliders as observation tools to provide information of value to different socio-economic sectors.

PLOCAN is participating actively in specific work packages within the project including activities such as training and outreach, specific missions and gliderport infrastructures, leading some of the tasks

associated with these such as the identification and assessment of synergies between gliders and other autonomous observation platforms.

3.2.2.2. Autonomous Underwater Vehicles (AUVs)

Autonomous Underwater Vehicles (AUVs) have demonstrated great potential in many areas of underwater applications from ocean observation to military or industrial based operations. The engineering and research communities involved in AUV development are vast and fragmented. AnChORA Action aims to develop a network that will stimulate joint working between academia, companies and public organisations. The expected outcomes will be networking, innovation and contributions to the solving of scientific and engineering problems, where students and ESR may play a major role in the development of original, open and affordable AUV designs to attract new researchers and users towards this technology.

Developing vehicles to operate autonomously underwater presents significant challenges to designers and operators. With sufficient coordinated research they will start to replace traditional technologies, that are more expensive to operate and less versatile. AUVs may carry a great variety of sensors increasing their complexity and capabilities. They are still regarded as a relatively new technology; the estimated market for this decade being around € 1,800 M.

Their applications include:

- Technical Operations: marine renewables, cable laying and repair, oil & gas, coastal construction
- Security, Rescue and Inspection: environmental monitoring (Fukushima), military, oil spills (Gulf of Mexico), black box search (Air France wreck)
- Natural Resources: mining (4000 m. depth polymethallic nodules), food, pharmaceutical and cosmetics
- Science: climate, geology (El Hierro volcano), biology, archaeology

ANNEX 5.4 show some of the main centres using autonomous underwater vehicles.

3.2.3. Observatory

Oceans regulate the Earth's climate and are integral to all known sources of life. Marine and oceanic ecosystems, from coastal waters to the deep open-ocean, rely on a diverse range of multi-scale physical, chemical and biological processes. Mineral and organic nutrients affect the lives of micro and macro-organisms, from bacteria to plankton, fish, to marine mammals, and are exposed to a plethora of external, natural and anthropogenic forces. The ocean may also be a source of hazards, e.g. for coastal human populations living near seismogenic areas, or from anthropogenic events such as oil spills, harmful algal blooms, among others.

As for all monitoring activities, strategies need to be tailored to the observed phenomena. Ocean processes occur at different spatial and temporal scales. They are of biological, geological, chemical,

physical nature, occurring at micro- to kilometre scales, from less than seconds to centuries. Evolution of ocean processes and ecosystems is also often specific to ocean and sea basins, domains (coastal, open-ocean), and water depth (surface, water column, seafloor).

European marine policy makers stated in the "Ostend Declaration" of 2010 that the major challenge is now to support the development of a truly integrated and sustainably funded European Ocean Observing System (EOOS) to monitor key ocean processes. This would form the European component of the Global Ocean Observing System (GOOS), and would continuously monitor the European seas from near-coastal to open ocean, and surface waters to seafloor. Fixed and mobile observing platforms would be used to offer real-time, or near real-time, open and standard downstream services to the public and private sectors. This system would re-establish Europe as a global leader in marine science and technology, as well as support effective management of the European maritime environment.

As reflected in the following table, international projects and initiatives have also been progressively demonstrating the growing interest of society in establishing permanent cabled and deep-sea observatories.

Table 5 Permanent Ocean Observatories, cabled or deep-sea, in the world

OBSERVATORY NAME	LOCATION	STRUCTURE	DEPTH
SABSOON (South Atlantic Bight Synoptic Offshore Observational Network)	Continental. South east American. 50-100 km. offshore.	PLATFORM (8 towers)	26-45 m
LEO 15 (Long-term Ecosystem Observatory at 15 meters)	9 Km off the New Jersey coast	CABLE	15 m
MARTHA'S VINEYARD COASTAL OBSERVATORY	South Beach Edgartown (Massachusetts) at 1.5 km. from the coast	CABLE	12 m
PLUTO (Panama LJL Underwater Tropical Observatory)	Panamá	CABLE	18 m
VENUS (Victoria Experimental Network Under the Sea)	River Fraser delta, in the South of British Columbia (Canada), 48° 39.0792' N 123° 29.1613' W	CABLE	93 m
MARS (Monterey Accelerated Research System)	Monterey Bay, California, USA	CABLE (52 km)	891 m
BONNE BAY MARINE STATION	Bonne Bay Estuary (Canada)	CABLE (1.4 km)	18 m

OBSERVATORY NAME	LOCATION	STRUCTURE	DEPTH
NESTOR Neutrino Extended Submarine Telescope with Oceanographic Research	West Peloponnese Methoni 36° 38.12'N, 21°35.49'W	CABLE (~15 km)	3800-4100 m
ANTARES Astronomy with a Neutrino Telescope and Abyss Environment Research	Near to Toulon, France 42° 50'N 6° 10' E	CABLE (45 km)	2400 m (module at 2000 and 2300 m)

NEMO-SN1 **a) NEMO Neutrino Mediterranean Observatory**	Eastern Sicily Near to Capo Passero	CABLE (80 km) Test area 23 km from Catania and depth 2031 m	3500 m
b) SN1 (2000-) Cabled multidisciplinary observatory	AUTONOMOUS and soon CABLED	25 km offshore Eastern Sicily Cable connected to NEMO	2060 m
ORION-GEOSTAR 1,2,3 (2000-2004) Ocean Research by Integrated Observation Network	Tyrrhenian Sea (Marsili volcano) and in the Corinth Gulf, joining the ASSEM project coordinated by IFREMER	NO CABLE (Autonomy one year)	3320 m
BOOM (2005-) (Baltic Observatory for Oceanographic Monitoring)	Eckernförde Bay (Baltic Sea)	CABLE	Until 2000 m (version installed in Monterey Bay Canyon)
ASSEM (2001-2004 -?) (Array of Sensors for long term SEabed Monitoring of geohazards)	Ormen Lange (Norway) and the Gulf of Corinth (Greece) and probably ORION-	CABLE (optional) +Satellite +GSM-GPRS to Internet server	1000 m (Gulf of Corinth) Up to 4000 m

The European Union, with the contribution of Member States and the European Commission, has developed policies and initiatives, the aim of which is to define priorities and facilitate improved information from a sustainable and integrated approach to the monitoring of the ocean. This is the Marine Strategy Framework Directive[22] (MSFD) which sets out a list of descriptors to warrant the Good Environmental Status (GES) of marine waters (also linked to the Water Framework Directive), the Data Collection Framework for Fisheries[23] (DCF), aimed at the collection of high-quality fisheries data for improved management, the INSPIRE Directive[24], aimed at improving the sharing of datasets according to common standards, and the Blue Growth communication, addressing growth opportunities for sustainable marine sectors (COM(2012)494).

The Commission's 'Marine Knowledge 2020' communication dated September 2010 showed that better management of marine observations and data would cut the cost of operations at sea, stimulate innovation and reduce uncertainty about the future behaviour of the sea (Ref: IP/12/920). Currently, data is held by hundreds of institutions in Europe. It is hard to find the data on a particular parameter in a particular area, it is difficult to obtain authorisation to use it and to put together mutually-incompatible data from different sources into a coherent picture is time-consuming. This adds to the costs of marine operators and means that many potential activities never get off the ground. A marine service has been set up under the European Earth monitoring programme (GMES) using satellite and in-situ data to provide oceanographic forecasts and the EU's Data Collection Framework has set up a process for a structured collection of fisheries data.

If marine data accessibility doesn't improve, some high value-added services, such as management of fish stocks, the protection of coastal infrastructures, among others, can only be provided by organizations holding the data. This situation is inefficient and detrimental to competitiveness. With interoperability, small businesses or students can develop new products and services based on different data types and from various sources. It is therefore urgent that international standards are adopted to enable Web-based sharing, discovery, exchange and processing of sensor observations,

[22] Directive 2008/56/EC
[23] Council Regulation (EC) N° 199/2008 of 25 February 2008
[24] Directive 2007/2/EC establishing an Infrastructure for Spatial Information in the European Community

as well as task planning of sensor systems without the need to know the sensor communication details and the heterogeneous sensor protocols from the application layer. Data producers will benefit from a common methodology for data distribution and end users will benefit from a standardized method for discovery and data query. Benefits for downstream users will be an open door to innovation and the development of multiple services and applications.

3.3.Analysis of the competitive advantages of the infrastructure

In the previous section, a brief description was presented of the most prominent research centers and infrastructure among those who develop their work in areas of activity similar to that of PLOCAN. In almost every case, these sites have arisen with a different outlook. They are, in the most part, centers offering a highly specialized service in a very specific area of knowledge and in many cases arising as a support entity for a pre-existing research center.

Given this philosophy, the Oceanic Platform project offers a different outlook, a comprehensive vision that aims to concentrate in one unique area a number of infrastructures, skills and services that complement and enhance each other.

3.3.1. Uniqueness of the infrastructure

As it has been pointed out so far, the PLOCAN project offers a different approach to that of the centers analyzed in the previous section, as the initiative is not based on only one element such as an observatory, a test bench, etc. On the contrary, it provides the possibility of accessing the deep ocean effectively, realistically and operatively either permanently, in the environment of the platform, or sporadically, using the set of tools and machinery. These services are offered to the national and international scientific and technological community, together with business innovations. This will result in the possibility of addressing deep ocean projects, which are currently impossible, due to the fact that the deployment of the experiments is higher in economic cost than the experiments themselves.

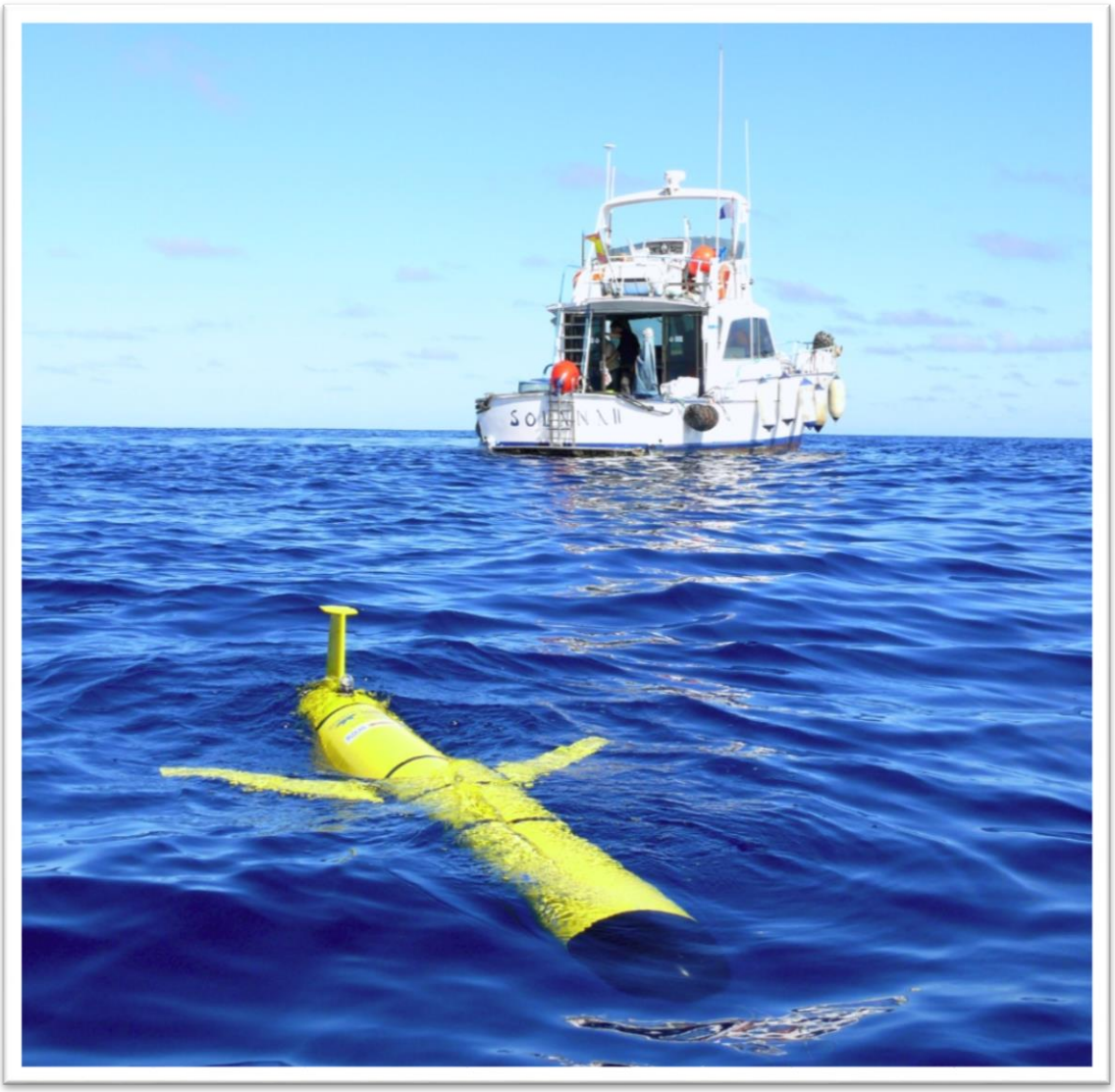


Figure 14 Operation with glider

PLOCAN's location in the Canary Islands is a unique component and offers some special characteristics for the study of the sea. These islands offer, in a relatively small area, the richest marine environment in the whole of Spain, with a variety of ecosystems and species showing components of both the Mediterranean and Eastern Atlantic or the Caribbean. Geologically the sea floor is of high interest, from the volcanic, geomorphological and mineralogical point of view. There is the possibility of reaching great depths within a few meters from the coast, which cannot be found off any other Spanish coast. These islands are also an excellent laboratory for testing solutions for renewable energy generation on islands or other grids isolated from the large continental energy networks.[25]

[25] J.J. Hernández-Brito, V. Monagas, J. González, J, Schallenberg, O. Llinás. Vision for Marine Renewables in the Canary Islands. 4th International Conference on Ocean Energy, 17 October, Dublin (http://goo.gl/74elN)

3.3.1.1. Factors of uniqueness

Multidisciplinarity of the infrastructure

PLOCAN's approach is essentially holistic and integrated, in as much as it attempts to combine in one single infrastructure, most of that which has been achieved at the international level through a range of partial structures. This unification will produce important savings of resources, many synergies and new possibilities. But besides of being economically efficient, relevant open challenges to understand the marine systems can only be answered using a multidisciplinary approach, combining new technologies and continuous observations.

Scientific Singularity

The possibilities that PLOCAN offers to the Spanish and international scientific community, allows the infrastructure to be at the forefront of many scientific areas and even lead many of them. This, in addition to the intrinsic value produced, is already generating synergies and collaborations between internationally renowned research groups and Spanish groups, with the corresponding benefits that can be derived from such collaboration.

The following are noteworthy elements of the scientific singularity that characterises PLOCAN:

- The systematic, simple, controlled access to great depths is important for the development of any type of experiment, with efficient and previous environmental guarantees.
- The availability of real time bi-directional communication with any type of observation and experience at increasing depths from anywhere in the world.
- The possibility of using high cost and complex instruments, operated by highly qualified staff that provide support, deploy and monitor experiments, and carry out tests and observations at great depths.
- Availabilty of facilities. PLOCAN is an infrastructure of services destined to become a tool at the disposal of the scientific community, enterprises and administrations and therefore the aim of the organization is to offer most of the capacity of its service infrastructures to users.

Uniqueness of the location

The Canary Islands bring together a set of optimal conditions for the intended installation and for the planned activities. These are, for example:

- Accessibility to the deep ocean environment at an adequate distance in each case.
- Sufficiently representative sea conditions that allow the extrapolation of any development
- General weather conditions that allow non-stop operation throughout the year at reasonable costs.
- Frequent international air and sea connections to many destinations.

Additionally, thanks to the characteristics of its location, the Oceanic Platform of the Canary Island is able to meet its objective of accessing the deep ocean at only a short distance from the coast whilst

being at the same time very close to the aerial and maritime bases which are necessary for its operation and safety, thus reducing the operational costs in these critical areas.

Opportunity

In 2007 the need for a singular infrastructure was already stated; in the initial documents that outlined the ICTS project, and later in 2009, within a much more extensive and rigorous scientific - technical and economic report produced by PLOCAN. This infrastructure should be capable of concentrating the most advanced and innovative developments in fields such as the use of marine renewable energies, the sustainable exploitation of ocean resources, biotechnology, new materials, shipping, or offshore aquaculture.

Years later, the strategic outlines that define European policies now give particular importance to precisely these areas, considering the investment in research and development in the marine and maritime sectors as one of the pillars on which the European economic development is based.

The objectives and strategies that PLOCAN defined from its origins are in tune with the priority action lines of the European Union and with the state and regional research plans as it corresponds to any research center or infrastructure fully or partially funded with public grants. But unlike other centers, PLOCAN has already started its activity in these areas, even before the completion of the construction phase, and as a result the platform has already gathered extensive experience in this pre-operational phase and is currently in contact with 573 stakeholders that belong to institutions or companies, 68% of which are international. PLOCAN has been integrated, participates or collaborates with the most important scientific networks in the marine sector and leads in 2013 four projects of the European framework programme. The strategy in designing the observing system of the PLOCAN infrastructure has resulted in the highest European interests. Tangible results have been obtained with the involvement as Steering Committee member (lead of the Transnational Access work-package) of the European Fixed Open Ocean Observatories initiative FixO3, the selection of the Canary Islands and PLOCAN as Central Atlantic site for the European Multidisciplinary Seafloor Observatory future European Research Infrastructure Consortium (ERIC), and the selection of PLOCAN as co-lead of the Ocean Thematic Center unique proposal for the Integrated Carbon Observing System (ICOS ERIC) with Norway and the UK. For all these reasons, PLOCAN finds itself in an unbeatable situation to capitalize on this momentum, that current European and national policies are giving to the research and economic development based on the growth of the marine and maritime sectors.

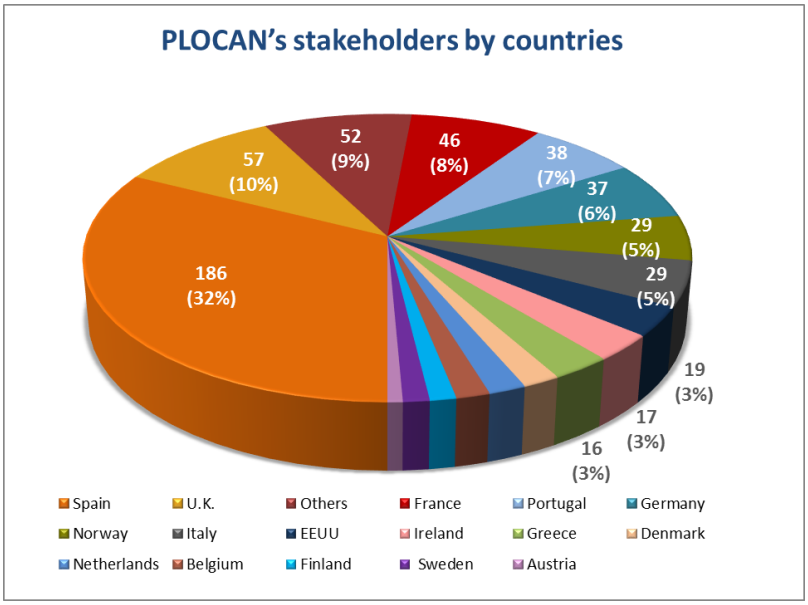


Figure 15 PLOCAN's stakeholders by countries (n=573)

3.4.Analysis of the socio-economic impact

In this section the socioeconomic impact of PLOCAN will be analyzed, encompassing both the direct effects on economic and social activity in the immediate environment as well as those planned and instigated as a result of its existence and activity. To achieve this, initially the economic and social context of the environment will be briefly described, as well as the strategy and planning in the marine and maritime sectors. Subsequently the direct impact of the construction and actions being undertaken will also be described.

3.4.1. Strategic lines

The current international financial and economic crisis has led to a rethinking of the European policies for economic growth and job creation, in order to help the EU "to come out stronger from the crisis and turned into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion"[26]. The strategic approach that Europe will take to face this major challenge is closely linked to the national and regional policies on economy, employment and social development.

According to the specific objectives of this analysis, three general performance guidelines can be pointed out. These are considered repeatedly in the European Union strategies, in the National Plans

[26] EUROPE 2020 A strategy for smart, sustainable and inclusive growth. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF

of the Spanish Government and in the regional strategies of the Canary Islands Government. These guidelines are:

- Supporting an economic diversification based on R&D&i
- Fostering renewable energies
- Supporting the growth of the maritime and marine sector as a whole.

The Europe 2020 Strategy, developed and extended in 2012 by the communication "Blue Growth", the Research and Innovation Smart Specialisation Strategy RIS3 promoted by the EU and adopted by the Canary Islands Government, and the State Plan for Technical and Scientific Research and Innovation 2013-2016, These documents comprise and develop these three aforementioned lines of action that should contribute along with the others to achieve the planned growth and development objectives.

The Europe 2020 Strategy replaces the previous Lisbon Strategy, presented in 2000 and revised in 2005. Europe 2020 is the EU growth strategy for the next decade.

Looking ahead to the year 2020, the European Union has set up, five ambitious objectives in terms of innovation, employment, education, social integration and energy. For each of these areas, the state members should set their own goals which should always be based on these five priorities. As far as this analysis is concerned the Union mentions among its priorities, on the one hand, increasing the investment in research and development and on the other hand promoting the use of renewable energies until these represent at least a 20% of the total consumption.

The communication on Blue Growth[27] presented in September 2012 by the European Commission, develops the contribution of the Integrated Maritime Policy for the achievement of the objectives of smart, sustainable growth. Currently, in Europe the marine and maritime sectors employ 5.4 million people, and contribute € 500,000 million gross added value to the European economy. The European Strategy sets the goal of achieving 7 million jobs and € 600.000 million in added value by the year 2020. To achieve this objective, the Commission considers necessary to remove obstacles to growth and to exploit the latent economical potential in these areas, promoting research, development and marine innovation, supporting innovative companies, facilitating the adoption of the necessary competencies and fostering the creation of innovative solutions and products. All these whilst respecting the environment and biodiversity in order to ensure the sustainable use of the oceans in the long term.

This communication from the Union further notes the five specific areas where efforts should focus given its potential for growth and job creation:

- Biotechnology.
- Aquaculture.
- Maritime tourism.
- Marine energy.
- Marine mineral resources.

In 2005, the European Commission established the independent expert group called "Knowledge for Growth Group" (K4G) composed of 17 renowned economists, in order to advise on the contribution that knowledge can and should make to sustainable growth and prosperity. In 2009 the aforementioned group presented, among others, the conclusions stating that the competitiveness gap between Europe and the United States is a result of lower economic and technological specialization, and less able to prioritise regional efforts. As a mechanism to reduce this gap, the Commission urged the regions to develop regional strategies based on finding a Smart Specialisation[28] that provides them with a competitive advantage, but also comparison with other regions, and also allows them to develop new activities for the future. The Commission emphasizes the strategies and actions to adapt to the reality of each particular territory, by promoting the creation and development of smart specialization strategies in all European regions.

The Canary Islands has been one of the first Spanish and European regions to address the development of the smart specialization strategy in the context of Europe 2020 and specifically in the Canary Islands this strategy RIS3 has identified a limited number of priorities for economic

[27] http://ec.europa.eu/maritimeaffairs/documentation/publications/documents/blue-growth_en.pdf
[28] http://s3platform.jrc.ec.europa.eu/en/c/document_library/get_file?uuid=e50397e3-f2b1-4086-8608-7b86e69e8553&groupId=10157

development based on innovation and knowledge, aligned with existing and potential sectors of the Canary Islands. Marine science and intelligent use and conservation of marine resources, are some of these priorities. Specifically the following lines of action are mentioned:

- Development and testing of innovative and sustainable technologies for the supply of electricity and water
- The study of the big challenges that stem from the climate change
- The use of important oceanic resources
- The contribution to the sustainability of major ocean areas

In November 2011, the European Commission published the Communication COM (2011) -782[29], on the promotion of a Maritime Strategy for the Atlantic Ocean Area (Atlantic Marine Strategy) which develops the above action lines and provides a new maritime strategy to boost growth and jobs in the Atlantic Ocean. This proposal includes the challenges and opportunities facing the Atlantic, which are specified in five major areas: the implementation of the ecosystem approach, reducing carbon footprints, sustainable exploitation of natural resources of the seabed, the response to threats and emergency situations and inclusive growth. This marine strategy for the Atlantic area has been specified in May, 2013 in a Action Plan for a Maritime Strategy in the Atlantic area[30]

A properly developed marine strategy embedded within higher-level strategies such as Smart Specialisation Strategy and Horizon 2020 strategy, can and should contribute to economic and social development of the Canary Islands and the national state in line with the objectives of the European Union.

3.4.2. PLOCAN as part of the Marine Strategy

Nowadays in the Canary Islands, marine and maritime sectors account for 6% of GDP which gives them a specific weight relevant in the economic development of the region. The European Union, having as one of the pillars of its development the European Maritime Strategy for the Atlantic region, plans to turn Europe into the most important knowledge-based economy in the world. With both premises, the region of Macaronesia in general and the Canary Islands in particular, can contribute significantly and lead the implementation of new knowledge and the development of innovative technologies in Marine and Maritime sector. A successful implementation of these initiatives can lead to the sector, according to some estimates, to account for up to 20% of GDP with the consequent economic development and creation of new jobs that this might entail.

According to estimates of the Canary Islands Maritime Cluster (CMC - Cluster Marítimo de Canarias), in 2020 the marine and maritime sector in the Canaries will employ between 40,000 and 60,000 people and generate a turnover of 4,800 million euros.

[29] http://ec.europa.eu/maritimeaffairs/policy/sea_basins/atlantic_ocean/documents/com_2011_782_en.pdf
[30] http://ec.europa.eu/maritimeaffairs/policy/sea_basins/atlantic_ocean/documents/com_2013_279_en.pdf

Table 6 Objectives of the Marine and Maritime Sector in the Canary Islands. Data owner:CMC.

SECTORS		PRODUCTION IN THOUSANDS €	% OF REGIONAL GDP
NAVAL REPAIR		320,000	0.8
PORT INFRASTRUCTURE AND SERVICES		1,080,000	2.7
MARITIME TRANSPORT AND SAFETY		480,000	1.2
FISHING		200,000	0.5
AQUACULTURE		160,000	0.4
SAILING RECREATION AND SPORTS		1,280,000	3.2
MARINE RENEWABLE ENERGY		400,000	1.0
MARINE BIOTECH		80,000	0.2
OFFSHORE AND SUPPLIES		320,000	0.8
MARITIME SERVICES		480,000	1.2
TOTAL	40,000 – 60,000 EMPLOYMENTS	**4,800,000**	**12**

The Canary Islands have 20% of the coastal zone of the state and important sectors of the economy such as tourism, fisheries, port activity, aquaculture, etc. which depend directly on marine and maritime sectors. From the Canarian business sector in general and especially from the ones linked to these sectors, this process is seen in an optimistic way and is fully aligned with the overall objectives of the Atlantic Strategy. The sea and its surroundings are one of the most promising options and careers in the Canaries. To convert all that potential into a reality, it is necessary to generate new knowledge and its transfer to society so that entrepreneurship based on innovation and the exploitation of new opportunities can be generated.

Economic activities related to the marine and maritime sectors are an engine for development, they generate a large number of direct jobs and they have influence on the rest of the economic sectors generating activity. PLOCAN is already contributing, and will do to a greater extent after entering the operation phase, to the development of these sectors. PLOCAN is promoting initiatives to bring together the scientific community, the business environment and entrepreneurs as well as training highly qualified workers for the sector

The objectives and strategies that the Oceanic Platform of the Canary Islands set in the scientific, technical and economic report submitted to the Singular Infrastructure Advisory Committee (CAIS) in 2009 are greatly specified and developed in this document, adapting to the current scenario and forecasts in the short and medium term. But these objectives in themselves and the strategies that lead to their achievement should be guided at all times by the mission and vision which are hallmarks of the organization.

PLOCAN bears in mind at all times the implications of social responsibility that an organization should have and this is becoming increasingly more evident and necessary in the current economic situation. For this reason, the platform aims to contribute to the success of the aforementioned policies, from regional to national and European levels.

Taking into account the marine strategy proposed in the previous section, PLOCAN is contributing to the growth of the marine and maritime sectors in the Canary Islands by developing its activities, even before the end of the construction phase scheduled for 2014.

Within the action plan to implement the Maritime Strategy for the Atlantic Ocean Area, the Commission proposed the creation of an Atlantic Forum, to identify priority actions and projects proposed for funding in the future that should contribute to job creation and sustainable growth in the Atlantic region, with the participation of Member-States, local authorities and other stakeholders. To support and contribute to the development of the initiative (whilst actively involved in the identification of priority actions), PLOCAN promoted the international meeting "Macaronesia contribution to the Atlantic Forum" in 2012, along with the administrations of the Azores and Madeira ports, the universities of Las Palmas de Gran Canaria and the Azores, the Madeira Tecnopolo, the Canarian Institute of Marine Science and the Regional Fund for Science and Technology of the Azores.

3.4.3. Conclusions

The Oceanic Platform of the Canary Islands is now, before even entering in operational phase, encouraging and mobilizing a knowledge-based economy, facilitating the work of researchers and companies and contributing to its technological developments intended to build and bring to the market new solutions and innovative services in the marine and maritime sectors. These achievements are still possible through close collaboration with companies, institutes and research centers, universities and public administrations.

Moreover, the construction of PLOCAN is a good example of public investment aimed at developing mechanisms that promote partnership actions between the science and knowledge and business sectors, with the aim of providing joint solutions to new challenges and opportunities in line with the concept of "Blue Growth" promoted by the European Union. The construction of the platform will boost PLOCAN's current activity, and lead it to become one of the landmarks on the of the Unique Techniques Scientific Infrastructure map.

3.5.Analysis of the facility's capacity and its openness to users

The openness of PLOCAN components and services, along with clear descriptions of their potential and limitations, are key to the establishment of an attractive and efficient access process. The main aim is to offer a well-defined and characterized scientific and technical service with the adequate equipment and quality for experimenting and operating at sea. User needs and requirements of new services are also incorporated as a key police to improve and evolve these services in future.

The technical areas, i.e. the observatory, the test site, the training centre or instruments and related facilities and services, will be accessible by scientific and industrial entities and communities (public and private) through different mechanisms. The PLOCAN infrastructure and its access process are analysed and described, starting with the basic principles, followed by the physical and remote

access modalities, the necessary data policy, including public outreach and dissemination, and finally costs policy.

PLOCAN has been conceived and developed as an infrastructure that is destined to provide mainly services to both the research community and the business community. Therefore, the aim of the organization is to offer most of its capacity to attend the users needs. PLOCAN will open more than 60% of its capacity to external users and the research community will drive the research agenda together with societal needs. In contrast, other large infrastructures were born with a clearly marked research profile and for this reason have their own staff of researchers. The regulations for Spanish ICTS require that only 20% of the capacity of the facility should be open to external users.

Although the platform is currently in the construction phase and the operational phase will not officially begin until early 2015, some infrastructures have already begun to operate partially in order to test, both operational procedures and management and organization models. These tests are also being conducted in all aspects related to the conditions that will regulate users' access to infrastructures and services. Different models and access procedures are currently being designed and tested. These will serve to define the final model and protocols that will be submitted for approval to the governance board of PLOCAN before the beginning of the operation phase.

3.5.1. Basic principles

PLOCAN responds to a diverse range of scientific needs, in the region and for the Atlantic Ocean at large, providing the tools for ocean science and innovation, as well as unprecedented spatiotemporal observing capacity from shallow to deep waters. Innovation interests are several, ranging from biotechnologies to renewable energies and the related new equipment necessary to operate at sea with greater cost and resource efficiency. Main scientific interests in terms of observation are the continuous and real-time or near real-time monitoring of global change and ocean acidification, water-column and deep-sea ecosystems, ocean biogeochemistry and geophysics. The tools and services that will be made available will follow and, where possible or desirable, adapt to the needs of the users, whether they be from the industry or public initiatives and organisations. The test site will ease the process of testing new developments at sea, mainly through the use of an increasingly controlled space, including support tools and services, that will be made available at less cost than if a user had to go through the overall test and consenting process on its own. The observatory will provide the means that ensure technological integration (i.e. easy development, exchange, testing, shared use of deployed resources and deployment procedures).

The test site consists of a marine area of 40 km^2 for the testing of new marine technologies. To illustrate the potential services that the test site can provide and the adaptability of PLOCAN to society's new or emerging needs, one of the thematic lines PLOCAN has included in its strategic plan is the technologies related to marine renewable energies. To support and accelerate new related developments, PLOCAN is in the process of installing an underwater electrical grid which will enable the offshore testing at sea of different marine energy converter prototypes under development. The grid will allow the evacuation of power generated offshore to the land transmission network and

contribute to the analysis and monitoring of performance and effectiveness of devices under test, by building a Monitoring, Control and Communication Centre on land.

The observatory, which will also contribute to the test site activities, in particular the monitoring of environmental characterization and impacts, consists of four systems or components that contribute to a broad range of coastal (incl. test site) and regional (e.g. ESTOC) sampling missions and services:

- The Cabled Observing System: this coastal component is currently at definition stage. Design, implementation and deployment are planned for 2013-2014.
- The Mobile Observing System.
- The Fixed Open-Ocean Observing Station: a refurbishment of the ESTOC station.
- The Offshore Platform Observing System.

Machines are a core component of the above services.

PLOCAN infrastructures will have a common service-oriented data infrastructure and provide a common backbone to the environmental knowledge base, monitoring tools and services. The overall system will integrate as one service infrastructure through interoperable procedures and technologies applied from the physical to data presentation layers, easing discoverability and accessibility from external users, human or machine.

3.5.2. Modalities of access

Three modalities of Access (MoA) are proposed:

A. Access to data, e.g. archived environmental or observational data,
B. Access to an operational facility or service, e.g. to operate an ocean observing mission, have access to laboratory and platform space and human resources
C. Access to a testing facility or service, e.g. for the testing of new ocean technologies in the test site area.

Modality A is mainly a PLOCAN data or data product request, whose relationship is documented in the data catalogue of PLOCAN. Data will be available in standard format and administrative and technological support will be provided, where necessary, in order to meet the scientific or technical needs of the user. PLOCAN can provide derived data products, such as preparing data for assimilation into models. The PLOCAN general Data Policy is described in a following section in this chapter.

Modalities B and C require users to consult available dates for each facility on PLOCAN's website, where request of access application forms and the related protocol will be available. In the request application, the user specifies the type of infrastructure, the necessary time with tentative dates and minimum requirements or equipment necessary to perform the relevant mission. Once the access is granted and therefore the time of use, the user will contact the operator for the necessary arrangements. As a general rule, all components described in the former section are accessible to

scientists, public and private entities, and the general public. Access preparatory work may include test of equipment at the PLOCAN shore-side and offshore facilities, support on the interfacing, cruise preparation meetings. The teams involved in access would participate in the deployment and in the recovery cruises.

3.5.3. Access to data

PLOCAN generally has a full and open data policy. For greater efficiency, broadest compliance and use from the scientific community and society, the data services and data formats will generally be based on open standards[31]. Data will also be made available real-time whenever feasible or with minimal delays. This section covers several key aspects of the PLOCAN data policy, with a focus on data services, data access, data formats including metadata, and data quality. Finally, The PLOCAN Data Policy will comply with the European Directive on Infrastructures for Spatial Information[32] and the GEOSS Data Sharing Principles[33].

Generic data

Full and open access to generic data shall be made available with minimum delay to the public. This in particular applies to data requested for risk assessment in real-time and delayed mode. The delay may be a function of the time needed for quality control (QC) to ensure data errors are properly identified and corrected or removed, and the uncertainty of measurements are properly assessed and documented. For real-time services, data quality control will be automated and limited to simple criteria, like those typically attributed to instrument failures, communication gaps etc. Improvements in real-time QC procedures will be implemented progressively as they become available.

On user request, a period of non-disclosure of data may be granted, which may not exceed six months for data meant to be publically accessible. Minimal handling fees may be charged to users for special basic requests. Data products needing special data post-processing services may also be made available on request in exchange of fees that will be estimated as a function of the resources needed to make the data fit for purpose. Data of demonstrated commercial value will generally be handled on a case by case basis.

Data format and metadata

As mentioned above, in order to warrant data discoverability and traceability, data formats and metadata will be based on open and globally adopted standards, wherever applicable.

Data quality

Data quality control (QC) and sensor-related metadata including sensor quality assurance (QA) procedures and history are mandatory and documented based on open standard practices when available. QA/QC is a requirement for data release and the responsibility of the principal investigator or owner of the system, instrument or sample collector that acquired the data.

[31] "Open standard" refers to the European Union definition. See http://en.wikipedia.org/wiki/Open_standard
[32] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
[33] Global Earth Observation System of Systems Data Sharing Principles: http://www.earthobservations.org/geoss_dsp.shtml

Data Archival

All data are secured on a long-term archiving system. Data are stored in an open and self-descriptive format.

3.5.4. Outreach and dissemination

PLOCAN will promote access to its facilities, user-groups and communities, including users from countries or regions where similar facilities are required but not available. Access opportunities will be published widely through the web, mailing lists and through other public access media. The target audiences for outreach within the ocean and maritime communities will also include organisations involved in ocean technology design and development as well as prospective users of the technology. The database of stakeholders will be expanded as outreach extends further into the target communities. The communication plan will focus on two-way dialogue, providing information to the communities and systematically collecting feedback. User communities will be engaged through workshop participation where major challenges and requirements will be addressed. The workshops will also be used to identify additional members of the stakeholders network for long-term engagement with the infrastructure. Interest in the infrastructure will be maintained through publications and presentations at international conferences. The communication strategy will remain flexible, taking into consideration statistical information on website and social media usage, survey responses and other feedback mechanisms such as workshop discussions. Internet tools will include an attractive and well maintained website, social networking such as LinkedIn, and introductory articles in specialised audience magazines.

3.5.5. Selection process

When access is granted free of charge or at minimal cost, e.g. through support programmes (such as FixO3, National Call for Glider Use), a selection process will be initiated. Users will be provided with all the necessary information to prepare proposals that are of high scientific and technical standards and that are fully compatible with the capacity of PLOCAN facilities. Benefits to users, detailed modalities of access, data policy and access logistics will be provided. Examples include electrical and mechanical characteristics, maintenance schedules (in particular for open-ocean access), local practical and administrative arrangements, scientific and technical support, detailed information on complementary support offered to users.

After the closing date of each call, proposals will be transmitted to the access committee, which shall be composed of experts from PLOCAN and external entities. Currently, due to the fact that the construction phase has not been completed yet, the access committee and protocol are still being defined. Proposal evaluation and selection will be based on advertised evaluation criteria, following rules of transparency, fairness and scientific merit. Outcomes of the evaluation will be relayed to infrastructure owners/operators and users groups to make final arrangements. In the first call, feedback on scientific, technical and logistic aspects, as well as on the implementation of access, will be requested (mandatory) via an online form. The outcome of this will be used to optimise future

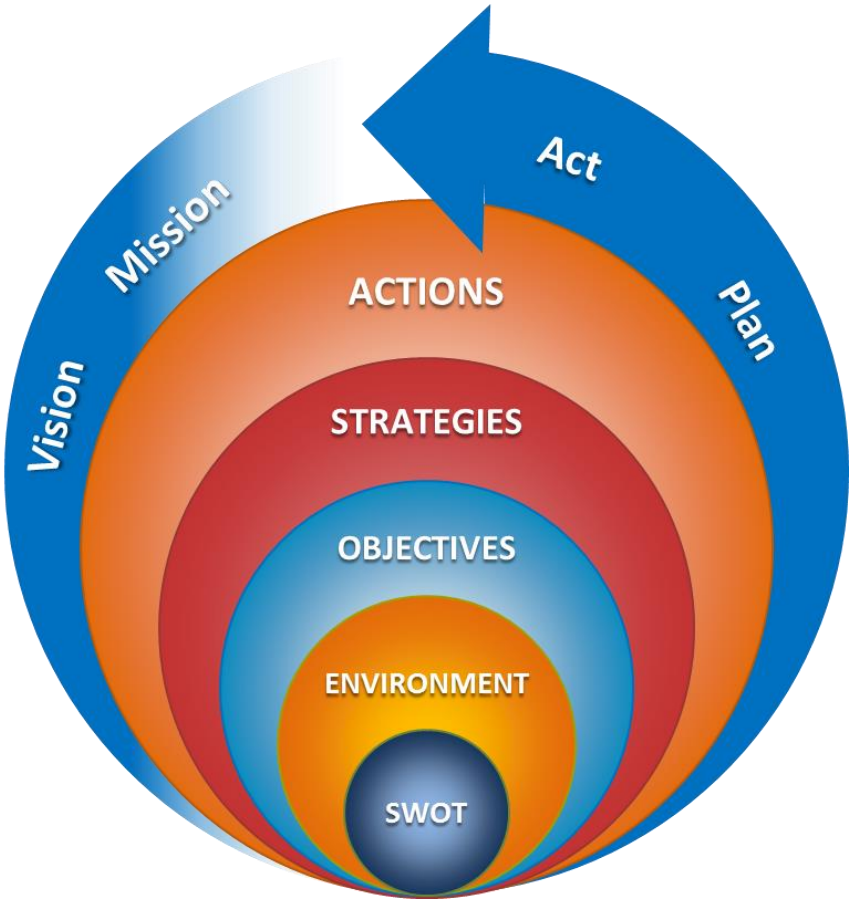
calls and the access to PLOCAN infrastructures at large. Relevant comment on the access will be captured in a Recommendations and Guidelines document in order to improve the service.

3.5.6. Costs policy

The PLOCAN access cost policy puts cost-efficiency as its leading criterion. This is in agreement with the consideration that PLOCAN is meant to be an infrastructure which serves ocean science, technology development and innovation, which reduces current obstacles, whether financial or logistical, in accessing the marine and maritime space. Both free and paid access is envisaged. Free access may be provided to scientists through the use of funds that PLOCAN and associated partners and entities will accumulate as complementary support to the operation and maintenance of the infrastructure. These funds may come from private or public initiatives. For instance, free access to PLOCAN is already possible through currently available European Commission support programmes, such as the Integrated Infrastructure Initiatives (I3) and could be further enhanced through the support projects that will be harnessed as part of PLOCAN's participation in the upcoming European Research Infrastructure Consortia (ERIC) which PLOCAN is already involved in (I3/FixO3 – under negotiation; ERIC/EMSO, ERIC/ICOS, ERIC/GROOM at preparation phase). Paid access will otherwise be available, in which case the policy is to cover PLOCAN's costs incurred by the access, including operational costs (personnel, consumables, and other logistics) and depreciation of active assets utilized in the preparation and operation of the access period. An additional fee may be charged for managing external support, such as outsourced products and services.

4. Objectives 2013-2016

Once an updated analysis of the elements that make up the organization and the characteristics and the state of its setting has been made, it is now time to pose the goals that during the period 2013-2016 will allow strengthening the organization's position and fulfilling its mission. These goals should always be based on its vision as an essential element of the character of the organization The aforementioned goals are planned and developed through objectives that aim to be achievable, practical and realistic; through strategies which are ways to achieve those objectives; through actions that are specific and located in time and through resources that will bring the goals to a good end.



4.1.Description of the objectives

PLOCAN´s overall objective is to provide the most efficient access to the scientific and technological infrastructures that speed up cutting edge multidisciplinary research, development and innovation of international excellence, necessary for paving the way to exploration, understanding and use of the marine-maritime environment at increasing depths under sustainable conditions.

This overarching objective leads to a series of general objectives which can be understood as goals. The achievement of these goals is the reason for PLOCAN´s creation, and the origin of the expected accomplishments. These objectives should be clear, realistic, consistent, measurable and achievable. The general objectives that are set out for the 2013-2016 period, follow the guideline settled in the scientific and technological project of 2009 and will guide the actions to be executed, summarized in the following list:

1. **To complete the development of the observatory and initiate its operation**, understood as a set of new infrastructures, tools and conditions to foster observation, exploration and understanding of the marine environment in new conditions of higher resolution and quality, not only temporal but also spatial. The observatory includes the physical infrastructures of the oceanic platform, the cabled ones that will be located in the observation nodes of the test site, the ESTOC time series station at the North of Gran Canaria, the mobile equipment and Lagrangian vehicles, the sensors and the entire ICT infrastructure that enables integrated data management, from data collection to making data available online to the scientific community, including the virtual interaction space and collaborative work with users throughout the whole process.
2. **To finalize the implementation phase and initiate the operation stage of the test site,** understood as the set of new infrastructures, tools, controlled physical environment and conditions that enable efficient testing of new concepts, equipment, devices, sensors, materials and technologies in the marine environment and their application scope. The test site will include a monitored marine area of 40 km^2 located around the oceanic platform; the electrical and communication infrastructure (IECOM), with an electricity discharge capacity of 15 MW max.; an underwater transformation infrastructure (ETS); equipment for environmental monitoring during simultaneous operation of new marine power generation prototypes; a continuous observation and environmental monitoring programme over the concentration of power generation devices and specific test laboratories at the oceanic platform and at PLOCAN´s headquarters . Finally, the actual structure of the oceanic platform constitutes in itself a test site for the study of the behavior and evolution of the materials used for its construction, in direct contact with the marine environment.
3. **To complete the acquisition and development of the base of vehicles, underwater instruments and machines (VIMAS)** as well as its entire operational development. The base is currently made up of boats[34], gliders[35], ROVs, laboratories[36], an operational control room[37], workshops, testing tanks and diverse instrumentation.

[34] http://www.plocan.eu/es/gliders-en-plocan/instalaciones/embarcaciones.html

2013-2016 is the expected period for the commissioning of the oceanic platform test tank, the workshops and the laboratories that will support VIMAS, for the acquisition of three ROVs capable of operating at average depths of 2000 m, for the acquisition of 4-8 gliders and/or new generation autonomous vehicles, as well as device deployment and recovery instruments and tools specially adapted to PLOCAN´s needs and deep sea diving support equipment (including a decompression chamber). The required agreements for the following; joint management and/or use of heavy boats and complex equipment as an outsourced fleet, both national and international, in the public as well as in the private sector, are also expected to be accomplished

This objective specifically includes fostering the development of models for joint management of technological equipment with other institutions, the development of access protocols for innovative equipment coordinated with other ICTS as well as providing common services to the national and international community through specific calls for infrastructure. The VIMAS base is an important catalyst for encouraging and supporting technological development, exploration and sustainable exploitation of the marine environment, both coastal and offshore, and of maritime activities (shipping, port facilities, etc.).

4. **To develop and promote and area for excellence in innovation,** a meeting point and the promotion of projects and initiatives between the public and private scientific-technological community in the marine-maritime environment. The ICTS should be one more of the elements that make up a science/technology/society system which promotes innovation, technology transfer, regional development and, in general that serves public policies in order to create and develop the conditions that will allow economic and social development based on knowledge and innovation**.**

   The marine and maritime field is a sector with a huge growth potential in Europe and has played a key role in the economic and social development of the continent throughout its history. This sector is also closely related to the local level, since its activity promotes both employment and local development. Therefore, this strategic plan should incorporate and recognize this facet, specifically adding and formulating goals designed to boost an economy based on innovation, intended to promote business and the attraction of investment, facilitate and promote a culture of entrepreneurship, encourage technology transfer, the creation of innovative companies, international cooperation and clustering, etc.

5. **To activate and drive the creation of a unique space for specialized training.** The concentration of scientific and technological resources around the infrastructure provides unique opportunities for education and training. This objective includes the development of new and innovative models of cooperation with public and private institutions for implementation of training. Training will be organized and promoted primarily by specialized external agents, to whom the infrastructure will be offered as a competitive element to provide products of excellence. This includes all kinds of activities compatible with the activity and regulation of PLOCAN, from internships, seminars, short courses at different

[35] http://www.plocan.eu/es/gliders-en-plocan/flota-de-gliders.html
[36]http://www.plocan.eu/es/gliders-en-plocan/instalaciones/laboratorio-glider.html
[37] http://www.plocan.eu/es/gliders-en-plocan/instalaciones/sala-operacional.html

regulated educational levels, to graduate training programmes, specific programs for technicians, specific training in equipment handling and operation activities related to the Platform, etc.

6. **To complete the development and continuous improvement of an innovative organization model,** which is efficient in the use of the invested resources, effective in the compliance, competitive and excellent in the management of scientific and technological infrastructures at the international level

   The deep and prolonged economic crisis, which we have experienced since May 2013, is affecting public budgets for science and technology in Spain, this situation is similar in other public sectors in many countries. One of the most obvious answers to this situation is to restructure and innovate in organizational aspects, increasing cooperation in all fields among related institutions, nationally and internationally, joining services, developing shared applications, creating networks that facilitate the flow of knowledge, staff mobility, etc. Talent management is essential for the success of PLOCAN's organizational model. Human resources are the essence of success in the field of scientific excellence and technical innovation.

   The staff needed for the management and operation of a sophisticated and highly expensive infrastructure must be highly qualified, undergo an ongoing process of improvement and updating of knowledge. PLOCAN's staff must be aware of the latest trends and development in knowledge, technologies and the application of instrumentation and equipment at its service. Furthermore, it is also important that the staff acts proactively to promote technology transfer, innovation, competitive fundraising, etc. Therefore, it is essential that the personnel receive encouragement and motivation, and that their work is adequately compensated and recognized.

   Within an increasingly competitive international framework, the usual governance models for public administration require exceptional, separate treatment in order to allow ICTS to carry out their mission successfully. Therefore, the success of this project relies on a suitable and unique organizational model.

Next, specific objectives will be described in more detail. These targets, though arising from and directly related to the general objectives, can serve several of them simultaneously since the multi-disciplinary and multi-purpose nature of the design and operation of the platform allows the exploitation of synergies and peculiarities of its many capabilities.

4.1.1. Description of the specific objetives

The specific objectives are organized according to a structure similar to that proposed for the program of activities in PLOCAN's Scientific and Technical Project. According to that structure, listed

1. Construction of infrastructures, equipment acquisition and operation
2. Environmental sustainability
3. Scientific and technological objectives
4. Organizational and operational development
5. Socio-economic impact

below are the headings of the objectives:

4.1.1.1. Construction of infrastructures, equipment acquisition and operation

This includes specific objectives related to the construction, acquisition, commissioning and the initiation of the operational phase of services related to the ICTS. The expected outcome of these objectives is to ensure satisfactory access of the scientific and technological community to each infrastructure services and to the generated data, in the most favorable conditions within an international framework. It is a primary objective of PLOCAN to provide access to its unique infrastructures and facilities which are currently (May 2013) in different development stages: under construction (oceanic platform), within a tendering process (test site) or in acquisition (scientific equipment). In the same vein, it is also necessary to complete capabilities and validate the processes to facilitate public access conditions to facilities as well as generated data (public access protocols), in an effort to provide the best possible service to the greatest number of users. Thus, the priority for the next three years is the successful conclusion of the necessary actions for the implementation of the infrastructure during 2013 and 2014, to begin its full operational phase in 2015.

The specific objectives in this section are:

4.1.1.1.1. To complete the construction work of the Oceanic Platform and to put it into operation. The platform design is based on a "caisson type" solution of precast concrete that could facilitate a possible expansion in the future. This design will enable the location of a building used for workshops, laboratories and general services, space for containers, a trial tank (eg area for scientific and technical tests embedded in the platform) with access to the sea, a crane for handling loads, a quay and an area for machines and services. The total surface exceeds 1100 m^2. The main deck of the platform will be located at least 3 meters above the highest equinoctial high tide and it will have a clear and uncovered area of at least 400 m^2, that will be accessible by the crane and will be protected from the dominant winds and waves. The ground floor of the platform will have the necessary protective measures to ensure the operation and maintenance of the platform under the prevailing marine weather conditions. The completion of the construction work and commissioning is scheduled for 2014 and the beginning of operations in 2015.

4.1.1.1.2. Deployment and commissioning of the IECOM. This objective includes the design, procurement, installation and commissioning of the marine electrical and communication infrastructure necessary for PLOCAN to offer services in the field of marine renewable energy. The IECOM will enable the connection of devices and experimental prototypes to the grid. The infrastructure will initially evacuate up to 15 MW at medium voltage, distributed in various positions for connecting wave converters and offshore wind turbines. The IECOM project consists of the following elements: an hybrid cable (underwater altenating and continuous electrical current and optical cable), an underwater junction box and connectors along with auxiliary equipment and devices. It also includes an onshore infrastructure, which provides an electrical-optical cable,

electric power transformation elements, a manhole for the transition of marine and terrestrial cables and auxiliary devices and equipment. Associated tenders are planned for 2013, while its installation and commissioning are programmed for 2014, thus allowing the beginning of the operational phase in 2015.

4.1.1.1.3. To start up the ETS The object is the tender, procurement, installation and commissioning of an underwater transformer station for the connection of multiple marine production devices and the acquisition of advanced equipment for the environmental monitoring of the operation and interaction of the concentration of generation devices. This infrastructure will serve to promote and accelerate the development of marine renewable energy converters, in particular where space is a limitation, and in environmentally sustainable conditions, laying the scientific and technical grounds to initiate the certification processes with social acceptance. Tenders are planned for 2013, while the installation and commissioning is scheduled for 2014, allowing the starting of operations in 2015.

4.1.1.1.4. Conditioning and planning of the maritime area of the test site and around the oceanic platform. This objective aims to characterize the space and provide public access to the information generated by observations of various kinds such as *in situ* oceanographic instrumentation. A specific project will be carried out in order to develop a programme for observation and environmental monitoring of the concentration of power generation devices in the PLOCAN test site (POTEMA). This action will conclude in 2015, with data available and accessible from PLOCAN's web portal.

4.1.1.1.5. Providing data and facilitating access to users. This includes the design, procurement, installation and commissioning of a data management and query service based on hybrid cloud computing technologies through which datasets, generated at PLOCAN's test site and observatory, can be uploaded, certified and managed. This infrastructure must be scalable and flexible to adapt to most potential needs. This goal is an intrinsic part of the operational capacity of PLOCAN and will position PLOCAN as a reference point in data management and processing. Conceptual developments are planned for 2013, while architecture development and testing are planned for 2014, allowing the start of operations in 2015.

4.1.1.1.6. To develop the public access system to the ICTS services. The aim is to develop and implement the system defined in section 4.5 and streamline routines for access to all the facilities and services of the infrastructure, for example, data, operational services and facilities, test site, training programs, etc. Access to each of the listed services and facilities must be controlled through traceable methods and optimized based on experience, taking into account the overall objectives, infrastructure constraints, the different types of users (public and private entities, companies, research centers, etc.), collaboration tools and / or available funding. To this aim, protocols based on principles of efficiency, equity and transparency must be endorsed by PLOCAN's governing bodies.

4.1.1.2. Specific objectives related to environmental sustainability

The objectives related to environmental sustainability are described herein, including environmental impact studies of the various activities related to the services, devices testing, projects and other foreseen operations. These cross-cutting objectives affect the rest of the areas, and are thus grouped under a single heading, to highlight the importance of environmental sustainability throughout the ICTS lifecycle, which will be strictly monitored. The process will moreover provide general knowledge and skills useful for the development of multiple concurrent applications in the marine space.

Specific objectives in this respect are detailed below:

4.1.1.2.1. Environmental monitoring. Definition and monitoring of environmental indicators and parameters to properly assess environmental impacts that may arise during the life cycle of the platform.

4.1.1.2.2. Study of the environmental impact of the oceanic platform and its operations. Carrying out environmental impact studies of the construction process and the monitoring of the environmental aspects of the construction and operation phases. The environmental impact assessment of the construction includes a comprehensive monitoring plan. The monitoring of environmental aspects of operations on the platform will be necessary and crucial, determining its environmental viability. The monitoring will be incorporated into the life cycle of the Oceanic Platform.

4.1.1.2.3. Study of the environmental impact of the test site and its operations. Conducting environmental impact studies of the test site, including the elements of power evacuation, moorings and in general any significant action that takes place in it. The environmental impact study of the systems for power evacuation, substations and other electrical elements will be particularly relevant. Each test or action to be carried out in the test site will have an environmental impact assessment associated, which will be included in the lifecycle of the test site and will determine its environmental viability.

4.1.1.2.4. Study of the environmental impact of VIMAS base. Conducting environmental impact studies of the VIMAS equipment and infrastructures. The studies will specify the environmental characteristics of vehicles, moorings, machines and other devices used in PLOCAN's operations. The studies will be included in the lifecycle of the infrastructure.

4.1.1.2.5. To develop an environmental policy. Developing and implementing a sustainable environmental policy for the operation of the ICTS. Considering the nature of the ICTS' activities and the inclusion of environmental sustainability as a core element of the platform's objectives, it is

important to prepare and implement an environmental policy, which may also be used as a reference to other similar infrastructures.

4.1.1.2.6. Study of the environmental impact of muti-use offshore platforms. The aim is the study of environmental issues, particularly environmental impact, of multi-use ocean platforms. This topic stems from the European Commission program "The Ocean of Tomorrow"[38], for which the ICTS leads one of three projects awarded in 2011 (TROPOS[39]). The main infrastructure of the ICTS is a platform that is a precursor for future designs of floating platforms aimed at the simultaneous exploitation of several ocean resources, such as marine energy, aquaculture, related transport services, etc. The work will explore environmental aspects and potential impacts of these multipurpose platform designs.

4.1.1.2.7. Environmental impact of the deep exploration and mining. The environmental characterization of devices, technologies and actions which are associated with the exploration and exploitation of mining resources in the ocean depths is one of the limiting factors which are critical for the future development of submarine mining. The activity will neither develop nor will receive the necessary momentum to reach an operative commercial phase unless exhaustive environmental studies and necessary environmental guarantees are available, as established by the precautionary principle. The European Commission has revealed in its communication on raw materials[40], in the Maritime Strategy for the Atlantic Ocean Area[41] and in the work proposal for the next European Framework Programme "Horizon 2020"[42] (among others) the urgent need to promote, both on land and in the ocean depths, more intelligent and sustainable technologies for mining development; to ensure the supply of critical elements to maintain technological development in the next decades.

Underwater robotics and sources of minerals associated with the ocean floors will play a key role in future innovative, intelligent and sustainable exploitations. Hence, the ICTS will work in collaboration with other international agents to establish methodologies and reference tests in the area, favouring the use of its test site and observatory to provide useful information in the relevant aspects of the topic; such as deep ocean observation, processes related to the conservation and sustainable use of the ocean floor, the comprehensive study of life cycles, etc. In the same vein, PLOCAN will offer the opportunity to use its facilities in fields related to the exploration of mineral and organic (methane hydrates) resources

4.1.1.2.8. To progress in the knowledge and development of methodologies for environmental impact assessment. PLOCAN will encourage the systematic and detailed study of environmental impacts related to the interventions in the ocean environment (aquaculture, energies, resources

[38] http://ec.europa.eu/research/agriculture/ocean/ocean2010/index_en.html
[39] http://www.troposplatform.eu/tropos-european-collaborative-project/What-is-Tropos-for
[40] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0025:FIN:EN:PDF
[41] http://ec.europa.eu/maritimeaffairs/policy/sea_basins/atlantic_ocean/documents/com_2011_782_en.pdf
[42] http://ec.europa.eu/research/horizon2020/pdf/proposals/com(2011)_811_final.pdf

exploitation, vehicles, infrastructures, etc.). This knowledge will allow the establishment of feasibility of actions, how to carry these out, what are the limits or load capacities, how to control and monitor in an efficient mode, etc. It will address the issue of improved environmental management, in order to provide accurate information and facilitate the minimization of risks whilst working in the environment. Overall it will open up new possibilities for sustainable business, economic activity and employment with adequate environmental guarantees.

PLOCAN's test site will be a unique environment which has been observed and studied in-depth, providing optimal conditions to research specific environmental impacts. In particular and as an example, the construction activities and those generated in the platform itself will undergo a meticulous systematic control in order to study in detail their interaction with the environment, generating a knowledge to guarantee the environmental sustainability in future actions. Another specific example is the study of corrosion of the platform structure (caisson) in the marine environment throughout its life cycle.

Likewise, the R&D projects that will take place on the platform will themselves contribute to provide valuable information related to the generation of knowledge on environmental sustainability. In the same way, the acoustic contamination generated by the platform operation and the experiments within it will be specifically studied in a systematic mode. The objective is knowledge advancement and the optimization of technologies that will permit the evaluation of relationships between the acoustic quality of the environment and changes in wildlife occupation. Aligned with this, work will be carried out in other experimental facilities, as those foreseen for aquaculture for both submerged and at surface installations. These will be used to undertake systematic studies of the deposition of nutrients and biochemical changes in the water column.

4.1.1.3. Specific scientific and technological objectives

These goals especially affect the momentum and flourishing of ideas that PLOCAN should bring about in the scientific community in order to generate new paradigms and knowledge of excellence. This will be achieved through the access to its infrastructures and data, its associated services and the related specific activities. The activity in the ICTS will be open to any approach or scientific topic compatible with its regulation and targets, therefore contributing to the correspondence with the National Research Plan targets and other international strategic plans in the next Framework Program Horizon 2020 and favoring a holistic, multidisciplinary, integrative vision. It will also stimulate R&D in the marine and maritime environment aimed at providing answers to the challenges presented by our society.

PLOCAN's essential technological aim is to accelerate the development of new devices, instruments, vehicles, converters and sensors for application in the marine and maritime sectors, etc. Especially noteworthy is PLOCAN's potential role as a test site for new concepts and experimental devices to extract energy from sea (wave) or at sea (offshore wind) in a sustainable and commercially viable way. Also relevant are the technologies that are being developed in the field of underwater robotics, since much of the activity that will take place in the ocean in the coming years will be measured by drones or remotely controlled robotic devices. PLOCAN's main contribution to the development of these technologies is the efficient

access to the tests, facilitating the development of prototypes and technologies derived from actual experience using these. PLOCAN also plays an important role as meeting point for different technologies, applications, multidisciplinary teams, etc. that may contribute to innovation that stems from knowledge or experience derived from other fields which usually have little or no contact with each other.

The main priority in order to advance in the development of these technologies is the conclusion of the test site and the oceanic platform. Furthermore, in previous years, work has been carried out in various communities to define more precisely the specific demand that exists in these areas, which has allowed ratification of initial assumptions and the refinement of technological objectives for the 2013-2016 period. Specific aspects are detailed below:

Next, the most outstanding specific targets of this section are broken down:

4.1.1.3.1. To contribute to the understanding, modeling, predicting and mitigating of processes related to global climate change. This process is extremely complex, since it requires a multidisciplinary approach and experimental information integrated on a global scale. PLOCAN will offer its infrastructures, especially the permanent mooring at ESTOC and the fleet of gliders, to the institutions and national and international research groups interested in studying processes associated with the Atlantic Ocean area. PLOCAN will also contribute with the necessary means to develop observations in new space-time frameworks; providing localized measures in the Central Atlantic Ocean which will be on-going, systematic and of high-resolution, thereby contributing to the knowledge of processes such as the evolution of the oceanic circulation, the biogeochemical processes in this ocean and the part it plays in the global processes.

4.1.1.3.2. To study ecosystems and biogeochemical cycles. PLOCAN will mainly provide observation structures and means for the experimentation and testing of new concepts in the characterization of organisms, their variability and their interactions with the environment. It will especially seek to mobilize the research community working in the study and understanding of the mechanisms involved in the growing threats and changes that affect marine ecosystems and the natural biogeochemical cycles. Aligned with the priority actions at national and international levels, PLOCAN's observatory will actively participate in the study and monitoring of ocean acidification, flow of aerosols and associated nutrients, giving primarily support to the long-term sampling (time series) at sea level. Such determinations will be of great value to be contrasted with those that are measured in altitude in the Canary Islands (Izaña, Pico de la Gorra), in order to identify the transport and the local influence, which have direct regional implications.

4.1.1.3.3. To promote the characterization of the regional environment (the Eastern Central Atlantic Ocean) and its contribution to the global processes. PLOCAN will contribute intensively and in an unprecedented way to the characterization of the regional environment, which is in many aspects specific to the Canary Islands Archipelago It will progressively spread this study to the Atlantic oceanic basin where the islands are located. All the above will lead to an improved

management of tourism and transport in the marine environment, in land planning as well as uses and activities planning, the prevention and the mitigation of disaster scenarios, and in general it will help to develop the maritime potential of outermost regions and islands[43]. The activities that will be carried out concerning the ESTOC, the test site and the integration of regional data, among others, are outlined in this section.

4.1.1.3.4. To promote the study and development of renewable energy in the marine environment. In the field of renewable energies in the marine environment, in addition to the technological objectives discussed in the following section, PLOCAN will support the study of sustainable energy resources (wind and waves), including basic knowledge and principles associated with new concepts or technologies.

4.1.1.3.5. To contribute to marine and chemical bioprospecting of marine natural products. As occurs on land, the seabed next to the Canaries offers a unique biodiversity and endemisms. For this reason, PLOCAN will contribute, in collaboration with local and foreign institutions, to the exploration the seabed in search of new species, molecules and compounds as well as the development of their potential applications. This performance will be synergistic with the actions developed in the region by the Institute of Natural Products and Agrobiology (*Instituto de Productos Naturales y Agrobiología* (IPNA/CSIC)[44]) which already has a long history of extraction and synthesis. PLOCAN will provide infrastructure for bioprospecting and characterization of the natural ecosystem of such organisms, for research groups and companies, interested in the richness and marine biodiversity of the region.

4.1.1.3.6. To encourage the development of offshore aquaculture. The Canaries have undergone significant development in aquaculture in recent decades as a result of research conducted in the field by the IEO (Spanish Institute of Oceanography), universities and the ICCM. PLOCAN will provide its infrastructure to this sector to address some of the scientific challenges, such as the study of new species and procedures for offshore aquaculture[45]. In particular, preliminary work is underway with companies interested in innovative ocean farming procedures, where renewable energies are also combined.

4.1.1.3.7. To support the improvement of the integrated management of the oceanic and coastal zones. PLOCAN will be a support infrastructure for the development of integral management of the coastal and oceanic zones and particularly their interaction, as a prototype for integration and management of information, developing new sensors and automatic determinations, facilitating the development and testing of new indicators for environment management, etc. All measures

[43] DICTAMEN del Comité Económico y Social Europeo sobre la "Comunicación de la Comisión al Consejo, al Parlamento Europeo, al Comité Económico y Social Europeo y al Comité de las Regiones - Hacia una política marítima de la Unión Europea: Perspectiva europea de los océanos y los mares" COM(2006) 275 final

[44] http://www.ipna.csic.es/

[45] M. Skladany, R. Clausen, y B. Belton, "Offshore Aquaculture: The Frontier of Redefining Oceanic Property," *Society and Natural Resources* 20, no. 2 (2007): 169–176.

aimed at the sustainable management of the oceanic space, arising from the marine strategy[46], will have special relevance. It is noteworthy that this strategy establishes a specific subregion in the Atlantic Ocean for the waters surrounding the Azores, Madeira and the Canary Islands (Macaronesian subregion). For this area, it will be necessary to set out, before 2020, which processes, environmental objectives, indicators, procedures and techniques will be used to define, monitor and evaluate the well-being of the marine environment. The use of PLOCAN as an experimental laboratory during the preparation and implementation of this strategy is particularly relevant, given that the region is not covered by the OSPAR[47] convention. In the same vein, work regarding the future directive for an integrated coastal zone management and marine spatial planning[48] will be undertaken.

4.1.1.3.8. To improve the understanding of marine mammals. An important line of work is the surveillance, configuration and continuous monitoring of acoustic pollution and its impact on marine wildlife. Continuous monitoring will ideally be ensured to capture episodic events that may be subsequently related to specific biological or ethological facts.

4.1.1.3.9. To improve knowledge, evolution and management of geological risk and resources. In the seabed surrounding the Canaries, the presence of submarine canyons, with steep slopes, especially in areas close to the African continental shelf and in full outcrop area, it is of particular interest to study sites of possible landslides due to eddy currents.

4.1.1.3.10. Marine structures and substructures. PLOCAN aims, in this matter, to encourage the development of new structures and substructures viable from the technological, environmental, social and economic standpoint for the exploitation of marine resources. The sustainable use of the marine environment requires new structures, construction processes and operation logistics suitable for this hostile environment from the physical, chemical, biological, geological, etc. points of view. Especially in the field of the use of marine and offshore wind energy, it is necessary to develop a new generation of cheaper structures with low operating costs in order to maximize the resource that is being exploited, whilst competing with other sources of energy production. PLOCAN is intended to contribute to the testing of new prototypes during the entire life cycle of the product, in the phases of evaluation of the concept, operation and decommissioning. In this area, new ideas are also included to improve operating costs such as the design of multipurpose platforms, floating structures or logistics for the co-location of devices.

Offshore wind power at depths up to 50 m is in full commercial development, especially in the North Sea area, where it is expected[49] that by the year 2020 more than 6,000 devices with a total capacity exceeding 30 GW will be deployed. However, most of the offshore wind energy is located

[46] M. Skladany, R. Clausen, y B. Belton, "Offshore Aquaculture: The Frontier of Redefining Oceanic Property," *Society and Natural Resources* 20, no. 2 (2007): 169–176.
[47] C. de Medio Ambiente y J. Cachón, "UN NUEVO COMPROMISO AMBIENTAL EN LA AGENDA DE LA UNIÓN EUROPEA: EL MEDIO MARINO," *ambienta* (2008): 30.
[48] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0133:FIN:EN:PDF
[49] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0768:FIN:EN:PDF

in areas with depths greater than 60 meters (80% in Europe, but more than 97% in the Atlantic area[50]).

To exploit these resources in deep waters it is necessary to develop floating technologies at competitive prices. Currently there are several prototypes (Hywind, Windflo, etc.) but they are still at the experimental stage. PLOCAN aims to contribute to the development and evolution of these technologies by providing a test pilot position with the possibility of power evacuation. Initially, this position will be able to accommodate nacelles with up to 5 MW each one, from 2014.

4.1.1.3.11. To favor the development of new materials. PLOCAN aims to favor the development of new materials, technologies or manufacturing processes that are more efficient and resistant to corrosion and biological fouling. The marine environment is highly corrosive and very favorable to biological fixation, thus causing rapid deterioration of materials or loss of performance of the equipment, structures, vehicles, sensors, etc. causing enormous losses and operating expenses that, in many cases, limit or prevent the economic exploitation of the activity. In the coming years, the ICTS will lead and actively encourage projects and specific actions for the development of innovative solutions in this area, from the perspective of new materials, coatings enriched with new properties or chemical compounds, new surface microstructures designed to delay these processes, etc. Objectives related to the use of recycled materials for the manufacture of oceanic structures or vehicles are also included. Technological innovation will be closely linked to new uses and concepts of marine environment exploitation.

4.1.1.3.12. Marine Energy Converters, installation, maintenance and Marine Energy evacuation technologies. There are currently more than 200 different concepts for exploitation of wave energy. There is not to date (May 2013) a technology that is clearly advantageous above all others and which offers a commercial solution for its large scale development whilst able to compete with other renewable energies such as on-shore wind energy. Existing devices must be tested at sea for long periods of time and exposed to extreme conditions to assess their behavior and associated operating costs given that business model for this technology depends heavily on the number of costly repairs needed or service interruptions during the expected lifetime of the device, usually designed for a lifetime of 20 years or more.

4.1.1.3.13. To foster the development of sensors and marine technologies for detection and monitoring of the environmental state of the oceans. To foster the design, development and testing of new, multi-functional and multiplatform sensors for the physical and chemical monitoring of the oceans. Through the attraction of co-financed projects and industrial cooperation, the design, development and testing of new sensors should respond to the growing demand for more viable solutions in terms of performance, in particular the acquisition of relevant multidisciplinary data, of better quality and at a lower cost. A way of improving performance is to make new sensors multifunctional and install them on several types of platforms, from mobile autonomous systems of reduced size to fixed systems, such as benthic modules connected by

[50] http://www.orecca.eu/c/document_library/get_file?uuid=0ad7e296-4f5c-443f-8ba7-490a7344d2da&groupId=10129

cable. Optical and acoustic technologies have proven to be good candidates in this respect. Thus, fluorescence techniques, for example, substantially increase the number of measurable variables from a same transducer while passive acoustics are used to follow aquatic mammals or to measure natural and anthropogenic acoustic sources, as well as part of the impact of human activities on ocean wildlife.

4.1.1.3.14. To promote the use of advanced Information Technologies for the treatment of scientific and oceanic data. Technologies based on new methods of communication, information handling and computation have brought unprecedented opportunities and challenges for scientific endeavor as well as for society at large. Steadily improving scientific knowledge on the origin, functions and evolution of the universe and of life provides humankind with conceptual and practical approaches that profoundly influence its conduct and prospects as stated in the UNESCO's "Declaration on Science and the Use of Scientific Knowledge"[51]. For this reason, the use of advanced Information Technologies must play a key role in the treatment of data generated in oceanic infrastructure, whilst adapting to the rules laid down at the national level, according to the Network of marine ICTS, and at European level, according to the 2007/2/EC directive[52]. In addition, collaboration with other ICTS at the national level and within the RedIRIS framework in particular must be fostered.

4.1.1.4. Organizational and operational development

The ICTS must be a highly flexible and innovative structure, constantly evolving, able to adapt to the needs of society and the requirements of its users and oriented towards a demanding market, which is highly specialized and used to scientific and technological excellence and high quality standards. It should have a good knowledge of trends and prospects in the marine and maritime sectors, be highly connected and active in the interaction with actual and potential users as well as be able to participate and lead global initiatives, whilst mobilizing surrounding companies and ultimately fostering the creation of economic value and employment.

On the other hand, the organization must be very solid and structured in the management of its projects, its economic and financial resources, and also its human resources in a way consistent with the requirements of the public sector. Transparency principles in its actions, accountability, high standards and quality controls, sustainability and minimal environmental impact for all its interventions and the significant contribution to the principles of efficiency and effectiveness in public expenditures are a must.

PLOCAN's two main goals are, on one hand, to identify and provide the best and most innovative service to its users in a highly dynamic and flexible way (typical for research and development) and, on the other hand, to develop the activity in a regulated and structured manner according to the principles and rules that regulate the public sector subjected to the rigidity often found in the

[51] Declaracion sobre la ciencia y el uso del saber cientifico de la UNESCO: http://www.unesco.org/science/wcs/esp/declaracion_s.htm
[52] Directiva INSPIRE 2007/2/EC: http://inspire.jrc.ec.europa.eu/

administration. These main goals define the objectives to be attained by the ICTS and that must be reconciled and integrated to fulfill its function.

The following are a number of specific objectives for the period 2013-2016 in the field of organizational and operational development:

4.1.1.4.1. To promote, strengthen and consolidate a system of gender equality in all areas of the organization, based on non-discrimination and equal opportunities. PLOCAN will promote a management system designed to implement gender equity policies that promote rights and opportunities for women and men. By adopting the strategies that stem from this objective, access to employment without discrimination (currently the ratio women / men in PLOCAN's contracted staff is 49% / 51%) will be facilitated whilst developing permanent actions aimed at reducing the gender gap.

4.1.1.4.2. To improve the necessary strategies and actions for the recruitment and retention of talent adapted to the present context, whilst understanding that human resources are key to the success of the institution. The development of policies and regulations governing personnel-related aspects are a must. It is essential that by the end of 2013, there be a clear labor and wage framework in which all aspects, especially those related to the promotion, evaluation of productivity and performance, mobility, etc., are stated clearly and with legal assurances. The recognition of merit in the workplace is especially critical in this area where the motivation of highly talented and trained individuals is essential, taking into consideration the demanding selection levels, and continued performance in unique conditions of quality, excellence, capacity and international competition that are required.

PLOCAN's greatest competitive advantage can be found in its ability and effectiveness in attracting, developing, retaining, leading and managing people that match the nature of PLOCAN's activities and possess the necessary skills and abilities.

4.1.1.4.3. To promote and encourage cooperation with other ICTS. In order to maximize efficiency and optimize investments by taking advantage of the available resources, actions to share resources with other ICTS will be promoted. In addition, impetus will be given to further coordination actions aimed at promoting the exchange of experiences, protocols, procedures, etc., as well as the coordination of aspects of staff training, software deployment and all those strategies that allow a more efficient use of resources.

4.1.1.5. Specific objectives to improve social and economic impact

One of PLOCAN's main objectives is to contribute to industrial development, to innovation in firms, both technological SMEs and large companies, and to contribute overall to social and economic development. Therefore, there should be a highlighting of those objectives related to the promotion of innovation within a framework for greater collaboration between the public and private

organizations, which help to develop new funding opportunities, and respond to the challenges presented by society contributing to increase its scientific, technological and innovative culture.

In relation to companies and the industrial sector, the added value provided by the infrastructure generates multiple forms and areas that need to be developed jointly with industry, in an appropriate fashion, to refine and particularize these services and / or products in useful and suitable ways. As an example, testing of prototypes, either sensors or converters of renewable energy, needs to be carried out in conditions that allow the commercialization of the product, its market development or the development of an industry, beyond the knowledge or underpinning technology. In this sense, the availability of test sites, that are properly equipped and certified, are essential to address experimental stages of the manufacturing process (e.g. experimental renewable energy farms), including environmental or administrative regulatory aspects, which are often real bottlenecks for the development of the sector. In other cases, it is essential for companies to innovate their products in aspects related to installation in the marine environment, maintenance, reliability, strength, stability in extreme situations, etc. apart from the technological concepts underlying the function they perform. These areas are not always obvious, but completely necessary to leverage the investments needed to develop new sectors still in the initial stage, which confer a high potential for additional value to the ICTS.

The general public needs a greater knowledge and awareness of the importance of the R & D activity that is carried out using tax-payers money .This money should be used to reinforce the investment required to meet the pressing scientific and technological challenges that threaten our future. Not enough effort has been made in the area of spreading and dissemination of knowledge resulting in a society that is largely illiterate on scientific and technological issues. The general public is therefore largely without their own criteria and easily manipulated. There are even issues, such as climate change, where there is an overall scientific consensus on the subject but where there are large groups of the population with views that are far from those supported by overwhelming scientific evidence. Therefore, generically, in any scientific and technological activity, planning and implementing communication with society must be done, which in turn is also a form of transparency and accountability to the entire public sector.

The following summarizes a number of specific objectives related to this line of action:

4.1.1.5.1. To contribute to the development of legislation and to national and European policies. PLOCAN aims to use the information generated by the ICTS and its projects to contribute to the development of legislation in the marine and maritime fields. In particular, it will focus and prioritise on legislation and policies related to marine renewable energy, especially on issues related to permits. The test site will also promote its use for testing and evaluating the adequacy of the legislation.

4.1.1.5.2. Certification. The specific objective is to determine the processes and studies to be certified, the scheduling of these processes and the certification of those that can be addressed from the available budget. The studies and analysis will take place during the 2013 and 2014 and the implementation of certifications in 2015 and 2016. In this area collaboration with relevant sector entities, such as classification societies, technological platforms, venture capital companies,

etc. will be relevant. An example would be the certification of ships or marine and maritime activities and facilities, to meet the new needs raised by the Framework Directive for Marine Strategy[53]. In the same vein, the development of standards required for emerging industries such as those related to renewable energy in the marine environment (e.g. standards in the field of wave and current energy, environmental impact methodologies, certification, etc.) will be enhanced.

4.1.1.5.3. Contribution to boost research of excellence. This will be done by enhancing and accelerating research and the participation of national groups and centers in major international projects, initiatives and programs, by providing the scientific community unique, singular and cost-effective facilities and services and by favoring multidisciplinary capabilities, clustering and transferring and disseminating knowledge among public and private research groups. The forecast for the next four years is to provide services to a scientific community of over 600 researchers through direct access or through specific projects

4.1.1.5.4. To promote mobilizing projects and initiatives. The aim of PLOCAN in this area is to attract public and private investment for unique projects or initiatives whilst fostering public-private partnerships. The task is to identify possible projects based on new products, services, technologies and business areas in the marine and maritime sectors. For this, detailed studies and feasibility analysis will be developed, as well as a collaborative program with the appropriate agents to launch these projects in the appropriate spheres for their implementation. In particular, needs and possible extensions of the space for the testing and deployment of multiple marine devices will be taken into consideration. These endeavors are to be carried out in coordination with companies in the sector and with the administration, taking into account the existing or evolving regulations. This objective will be especially relevant in the field of marine energy and also for floating offshore wind energy. The goal for the next three years is to assess the needs, to plan and to search for the required collaboration and financial means.

4.1.1.5.5. To contribute to the identification and overcome of obstacles to the development of new sectors in the marine and maritime fields. The goal is to identify new opportunity niches, especially in the exploration and exploitation of those renewable marine resources that have been unexploited so far, as well as non-technological barriers that hinder the development of the sector.

4.1.1.5.6. To support the creation and / or implementation of new innovative companies in the marine and maritime fields. To promote the enhancement of the capabilities of the ICTS to foster the creation and attraction of innovative companies active in marine and maritime fields, in collaboration with agents related to entrepreneurship.

[53] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0056:ES:HTML

4.1.1.5.7. To contribute to the generation of a structured socio-economic fabric in the marine and maritime fields. To support and assist in initiatives aimed at building and strengthening the structure and activities of the sectors related to the marine and maritime fields where the ICTS could play a significant role, such as marine energy or underwater robotics, in collaboration with stakeholders of these initiatives.

4.1.1.5.8. To promote training. To promote the organization of masters, thesis, postdoctoral education and stays, together with local and international centers taking into account national and Canarian universities and maximizing the international network of contacts and collaborating institutions. In the same vein, PLOCAN should contribute to the professional qualifications in specific areas of the sector, improving the employability and career promotion, in a flexible and adaptable way to foster job creation and provide coverage of new demands in the marine environment. In particular, specific actions in pilot training, qualifications of divers, etc. will be developed.

4.1.1.5.9. Dissemination. PLOCAN aims to ensure greater openness, communication and dissemination of its activities to the general public, fostering more awareness and active involvement in social and technological challenges that have to be faced in the coming decades, particularly in the marine and maritime fields.

The outreach and dissemination of scientific knowledge and the making available of innovation that may arise to society, is the responsibility, both of those who investigate and of the institutions and organizations that promote or facilitate such research. Effective dissemination will contribute to the democratization of knowledge, to the promotion of innovation and to the development of missions that result from social responsibility. PLOCAN aims to foster more inclusive social development, emanating from a society that is more informed and aware of issues such as environmental challenges and sustainability or the role of the oceans in the planet´s life support system.

4.2.Strategies to achieve the objectives

4.2.1. Description of the strategies

Strategies attempt to define the planning of actions required to successfully achieve objectives, using the available means. Although there is a direct relationship between strategies and objectives, in many occasions the same strategy develops the aims laid out in several different objectives, or to complete successfully a specific objective is necessary to implement various strategies. Therefore, it has been decided to list here the strategies, following a similar structure to that used in the organization of the specific objectives, although correspondence may not be one-to-one. Thus, the strategies presented here are organized according to the following structure:

1. Construction of infrastructures, equipment acquisition and operation
2. Environmental sustainability
3. Scientific and technological objectives
4. Organizational and operational development
5. Socio-economic impact

4.2.1.1. Strategies related to the construction of the infrastructure, the purchase of equipment and its operation

The conclusion of the construction work, the procurement of equipment and the start-up are priorities for the period 2013-2016, as has been previously established. Strategies should also be considered at both internal management level and external actions level to accelerate reaching the ultimate goal, which is to put into operation the ICTS using the resources efficiently and meeting the objectives effectively. The strategies to achieve this are the following:

4.2.1.1.1. To strengthen institutional collaboration with government and the administration bodies to speed up administrative issues that could delay the construction, such as those relating to environmental permits, energy evacuation or supervision of of tender documents . Interagency cooperation has always been needed, and is needed even more so in present times of economic crisis.

4.2.1.1.2. To accelerate the public tendering process and pending acquisitions, by adopting standard and symplyfied procedures and templates (fast tracks), avoiding unnecessary administrative paperwork, standardizing, and minimizing the resources required for their execution and management.

4.2.1.1.3. To foster the development of the special conditions laid down in the spanish legislation for tenders related with R&D&i in the public sector. The spanish law on contracts for the public sector includes a number of exceptions and specificities to facilitate the signing of contracts related to R&D&i. Its purpose is to simplify procedures, to adapt them to the specific features of this activity and to promote innovation, but it is almost unexplored and hardly used by public research body. This option is supported by European law that considers the promotion of research and development as one means of strengthening the scientific and technological bases of European industry.

4.2.1.1.4. To strengthen external support contractuals to provide on-time resources and service when it would be required to speed up acquisition and tuning-up of equiments. Given the high workload that will accumulate especially during the years 2013 and 2014, support services for processing and management may need to be reinforced as required, prioritizing the hiring of site management and technical consultancies as necessary.

4.2.1.1.5. To focus ICTS list of services. Identify clearly the services initially provided by the ICTS (2015), the conditions under which they are provided, especially in terms of quality as well as the system to determine the degree of user satisfaction (complaints, suggestions, opinions, etc.). The list of services is a key element for moving into operation of the ICTS, for implementing and monitoring quality programs and for planning. The list should be highly dynamic and flexible, especially in the early stages, evolving according to user experiences, user needs, the scientific and technological context, budgetary conditions, etc.

4.2.1.1.6. To consolidate the operations of the VIMAS base, for the testing and development of new underwater vehicles, instruments and prototype machines, etc., as well as giving support to the demand for services by potential external users (companies and institutions). Upon completion of the construction work and the acquisition of the necessary equipment, those processes that are needed for the development of services and also a strategy for maintenance and operational logistics, s contingency plan, etc. will be precisely planned. Finally, after testing the services with individual users, it will be possible to implement and consolidate a first complete version of services and operations for the VIMAS base. In particular, it is necessary to complete the fleet of unmanned autonomous vehicles and surface systems (e.g. gliders, ROVs and AUVs) as well as a range of accessory equipment related to their operation (e.g. LARS, hyperbaric chamber, etc.)

4.2.1.1.7. To consolidate the observatory operations. In line with the previous section, once the acquisition of equipment is complete, we will address operation plans, to determine the optimal location and the means to carry this out. Later on, the equipment will undergo the necessary tests, including calibration of the sensors, management of the generated information, etc. On completion of this phase, and in close coordination with strategies related to IT infrastructure and the data portal, the exploitation phase of the observatory will start.

4.2.1.1.8. To design, test and develop services, procedures and operations with standard users. This strategy includes a set of actions that relate to the services to be provided by the ICTS in its operational phase. Services will comply with adequately studied and tested procedures, at the ICTS headquarters on shore, on the platform, in the test site, at the oceanic observation nodes and where vehicles, machines and instruments (VIMAS) will operate. Services will be tested to improve their design and set their associated costs, including the time invested in own resources. Actions will include the design of service marketing, legal and regulatory aspects, the adequacy of internal procedures, quality assurance, environmental impact, health and safety, etc. During the year 2013 various services related with glider operations to ESTOC and for standard users will be tested.

4.2.1.1.9. To consolidate the headquarters on land. The signing of agreements with the Canary Islands Government should be speeded up, in order to incorporate the facilities of the Canarian Institute of Marine Sciences (ICCM), as well as the collaboration that will be maintained with the scientific-technological park of the ULPGC. This will allow significant synergies not only in science and technology, but also in the transfer of technology and promotion of technology-based entrepreneurship in the marine and maritime sector.

4.2.1.1.10. To consolidate the IT infrastructure for data management. It is fundamental to have the necessary IT infrastructure to consolidate, centralize and standardize all observational data, converting them to a common format, and to ensure data security. To this end, a series of tools and resources, which have been agreed on by the ICTS marine workgroup3 (GT3) and which are widely used by the international scientific community, will be used.

4.2.1.1.11. To consolidate a unified data portal as interface with users. The publication and access to data generated by the ICTS will be achieved through a web portal that will be fully operational in 2015. Data will include metadata and international standards will be used. This user service channel will integrate all services, including data visualization tools.

4.2.1.2. Strategies related to sustainability

4.2.1.2.1. To promote and reward the staff awarenesss of sustainability related issues. Recommendations wil cover operations and technologies pointed at reducing energy, water and waste, reducing carbon emissions, improving staff health and comfort, dropping operating and maintenance costs. Sustainability will be included as basic pillar of the strategy and action plans.

4.2.1.2.2. To speed up the design and implementation of environmental policy by appointing a set of specialized staff teams. Operational teams will be designated for this matter, performance procedures and routines will be introduced, as well as staff training initiatives to raise awareness and facilitate the implementation of the environmental policy, incorporating incentives related to

sustainability issues in the staff evaluation. A special section aimed at reviewing performances will be included in annual reports and planning, and the results communicated openly.

4.2.1.2.3. To prioritise the implementation an environmental monitoring plan before starting the operational phase. Both the test site area and the oceanic time series station (ESTOC) will be started to be sampled systematically during the preoperation phase using vessels of opportunity and gliders. This will provide a valuable database with enriched information for test site users and. In order to take advantage of synergies of the various infrastructure components, the devices that are being tested at the test site are equipped with meteo-oceanographic monitoring systems, which will provide valuable ongoing information during the experimental phase, also helping to improve the characterization of the test areas. Namely, a support initiative will be developed for the ESTOC station to implement the strategy of continuous observation by transects to be carried out on a seasonal basis in a regional, national and international context from 2013 onwards.

4.2.1.3. Strategies related to the specific scientific and technological objectives

4.2.1.3.1. To foster greater involvement of the Scientific Committee. The increase of new members and the of the Scientific Committee will be studied, considering the incorporation of experts on specific niche topics not included. Moreover, more experts will be involved in working groups and subcommittees to study specific subjects. Greater interaction between the Scientific Committee and the communities will be promoted, in order to facilitate the identify projects, users needs and new services within the priority working areas. The Scientific Committee will also provide advise on those aspects related to the assessment and traceability of the scientific data generated by the ICTS.

4.2.1.3.2. To actively participate in the international scientific arena, in committees, networks, observation programmes and international associations. In particular, it will be promoted the active collaboration with international networks such as ESFRI infrastructures EMSO, ICOS and all those in which it is feasible to participate, considering the budget and technical staff required for an effective contribution. Specifically, the participation in projects focusing on the coordination of international research activities and/or infrastructure management will be fostered.

4.2.1.3.3. To disseminate results through specific science and technology information channels. The promotion of the scientific and technological activities carried out in the ICTS enhances the organization's visibility and constitutes the best publicity and recommendation for the recruitment of new users and for developing scientific and technological collaborations. The participation in those channels will be carried out by increasing the contribution with presentations, posters in relevant scientific or technological international events, and through publications and contributions to scientific and/or technological journals.

To involve the ICTS on international scientific & tecnological projects to help our users to leverage public and private funds. The participation in public calls of structural funds, projects and in collaboration with other national and international scientific/technological infrastructures and networks will be encouraged. The ICTS has staff experienced in developing technological surveillance and with the appropriate knowledge for designing, preparing and evaluating international projects. The design of relevant multidisciplinary projects in which the ICTS can provide to the partners a greater added value will be specially fostered. National and international coordination is essential, especially regarding the next framework programme (HORIZON 2020), although other sources of funding such as the structural funds, international tenders, European Investment Bank, private entities, etc., will also be explored. A programme for ongoing technological surveillance and staff training regarding all aspects of project management (presented later on), is also included, as well as the motivation of the ICTS' staff for the participation in specific processes, such as the development and evaluation of national and international programmes, etc.

4.2.1.3.4. To attract experiments and tests of international relevance. In this sense, an active strategy to promote the inclusion of the ICTS as an international node of observation and as a test site for the experiments of global relevance is being developed. During 2013 the ESTOC station, managed by the ICTS, will be included again in the EUROSITES network, through the FIXO3 project, which is in its final stage of negotiation. In the same vein, some agreements have been reached pertaining to the MESOCOSM[54] initiative in order to carry out tests envisaged for oligotrophic waters in the ICTS during 2014 (KOSMOS 2014 Gran Canaria)

4.2.1.3.5. To encourage new roles of associate researchers, temporary positions, PhD students and interships. This role will be played by researchers that collaborates with PLOCAN on subjects such as implementing specific projects, developing specific tests, assisting in the generation of services, ensuring the dissemination of information, etc. The ultimate goal is to promote synergies with users (researchers from the public and private sector) to fulfill the functions of the ICTS, specially scientific and technological excellence. The opening of new posisitions for PhD students and interships pursue the same idea. The regulation and implementation of this strategy will be conditioned by current Spanish legislation.

4.2.1.3.6. To develop new alliances to power innovative open labs (virtual, living) working together with other institutions to create, design and implement initiatives, projects, services, events…. The target is to open new spaces for collaborative work among groups, companies and institutions in the field of marine and maritime technology, producing solutions to the demands of society and providing knowledge and experience in marine technologies and their integration. This strategy will also have an impact on the visibility and social and economic impact.

[54] http://mesocosm.eu/kiel

4.2.1.3.7. To implement an environmental monitoring plan of the oceanic platform. An integrated work plan for the environmental monitoring that includes the installation of specific sensors from 2015 onwards will be established. The oceanic platform is a unique element of the infrastructure, which itself is a structural element for testing in the marine environment. It will provide valuable experimental information about corrosion processes, biofouling, the impact on the surrounding environment, etc. Moreover, its location is an ideal spot to measure a range of environmental variables used in many scientific and technological fields, besides directly serving ongoing monitoring of the sea area in which it is located. The meteorological and oceanographic time series generated in this platform will be of great value in the coming years.

4.2.1.3.8. To organize and structure efficient and competitive services in the test site. The attraction of trials, technologies and devices to the test site, depends on several factors, including aspects related to the possibility of accessing the test site all year round, costs, environmental conditions, available shipyards, onshore space for specific actions, logistic and port infrastructures, permits, auxiliary services in the area (available boats, qualified and experienced staff, ease of access, qualified divers, etc.). These elements are present and available at the marine and maritime cluster that is linked to the port of Las Palmas de Gran Canaria, although it is necessary to structure and provide guidelines for processes and interactions, organize information, guide potential users through an effective marketing process, etc.

4.2.1.3.9. Annual Plan for technical publications. This annual plan will gather those actions that are envisaged to generate manuals, technical reports or any other valuable technical information, especially for the ICTS user community. Efforts will be made to seek cooperation with other ICTS and institutions with expertise in the relevant field by a principle of efficiency and technical relevance (excellence) of the produced material. The publication of these contents will be a recognized merit for the personnel of the ICTS involved in its elaboration.

4.2.1.3.10. To actively participate in alliances, networks, programs and strategies for national and international cooperation. The evolution from individual scientific endeavors to research groups organized in collaboration with institutions and countries based on research networks that are heterogeneous and transitional in time has produced a substantial increase in scientific productivity. The specialization and integration of ideas, resources, activities and capabilities not only generates higher efficiency, but also synergies that increase the quality and quantity of scientific production. In this sense, large scientific infrastructures represent a further step in this process, enabling the development of research that otherwise would not be possible, whilst at the time serving as natural meeting point for multidisciplinary scientific teams, experts and technologists that in turn facilitate the generation and development of new ideas, projects, and/or specific collaborations. The collaborative process in multidisciplinary distributed networks is, however, complex and requires investment in time, labor and resources to develop its full potential. To activate the process, it is necessary to focus goals and driving force activities (although unexpected new ones may subsequently arise), develop a dynamic community of interest (in evolution), develop services of added value for this community, etc. Moreover, PLOCAN

will act as an Operations Center (hub) based on infrastructure and services in the marine and maritime fields, focusing its attention on areas such as observation and monitoring of the marine environment, the study and sustainable exploitation of its renewable resources or underwater robotics.

4.2.1.4. Strategies related to organizational and operational development

This section includes strategies that will be implemented to achieve the objectives laid down in the homologous section. Listed below are the most significant.

4.2.1.4.1. To promote a gender culture. PLOCAN will develop permanent and sustainable actions aimed at promoting the goals of gender equity. Gender equity, non-discrimination and non-violence, are legal imperatives and at the same time principles and commitments made by PLOCAN that will act as themes cross-cutting their actions.

PLOCAN will actively promote equal opportunities and non-discrimination in all its employment processes, as well as promotion based on merit criteria. It will also promote an organizational model that will help to eliminate practices of harassment or discrimination and encourage at all times the reconciliation of family life and work.

4.2.1.4.2. To develop corporate identity and a set of personnel rewards. As already mentioned, for PLOCAN the personnel are the organization's main internal resource; therefore it is necessary to develop a concept of corporate identity, which entails rights and duties, responsibility, motivation, attitude, skills, values, and job satisfaction achieved through the carrying out of excellent, high quality work. The personnel reward system should include not only economic rewards for achievements and productivity, but also the development of professional career opportunities, facilities and encouragement for professional development, as well as developing personal and interpersonal skills. Other intangible elements will be also developed such as creating compatibility between the family, private life and work and being part of an innovative, cutting edge, pioneer project in a world of global relationships, and the existence of a challenging work atmosphere in which for each individual may continue developing further, etc.

4.2.1.4.3. To foster organizational culture. Values and organizational culture are essential elements for the success of an organization. They constitute the principles that develop the organization's vision and that govern how things are carried out, how internal relations are conducted as well as the working environment at all times. They contribute to the image of the organization, exhibited in the daily interaction with users and providers, other organizations, etc. Therefore people-centered philosophies will be encouraged, such as integrity, participation, initiative promotion, etc. As far as ICTS's activity is concerned, the essential principles are continuous innovation, orientation towards excellence, quality of the services provided and team

work; all favoring an environment that is sustainable and aware of the social responsibility that all public entities should have.

4.2.1.4.4. To encourage and promote the internal knowledge management. The ICTS is a knowledge-based organization with an international vision that acts in numerous sectors, disciplines and contexts. The management of knowledge, of the information within the organization, its accessibility and the motivation inherent in collaborative work are priority axes for the effectiveness in reaching targets and the efficiency of investment carried out. During the next three years it is essential that the staff of the ICTS significantly uses and contributes to the internal knowledge management through using these tools. Internal conferences and coordination meetings will also be promoted, which shall be carried out in five week blocks, to propitiate coordination and a fluid management of knowledge within the organization. All the members of the organization must be aware of and use the intranet and the tools developed within to transmit information in their daily activity.

4.2.1.4.5. To develop methodologies and procedures for the usual operations performed by PLOCAN. To promote the development and testing of new technologies by improving conditions and competitiveness of services in an international framework, in order to ensure the greatest cooperation and complementarity with other infrastructures. Nevertheless, the development of procedures must be compatible with the flexibility that the organization must have at any time in order to adapt to user's needs and the evolution of the working area since the essence of the activity of research and innovation is always undergoing a continuous process of change and evolution.

4.2.1.4.6. To resolutely and progressively implement the certification processes of the ICTS' specific products and services. The strategy is based on gradually improving the quality of services as well as their added value for the users. These services should be accredited by means of certifications of recognized international prestige, this being the level in which the ICTS carries out a relevant part of its activity. All the above will contribute to improving the organization's governance, management, auditing and accounting processes, as well as to the image, prestige and, ultimately, the framework of guarantees that the ICTS users receive.

4.2.1.4.7. To progressively implement e-administration. To examine in more depth the use and integration of management and administration systems, promoting the improvement of the service efficiency and quality, as well as knowledge management. To involve the organization in this challenge (as part of its organizational culture) and, as far as possible, also involve users and suppliers, which are mostly related to the fields of the research, development and innovation.

4.2.1.4.8. To promote ongoing staff training. To achieve highly qualified, technical training, by promoting multidisciplinary and multi-sector interaction through the creation and continuous

updating of training programs both generated within PLOCAN and in cooperation, within a national and international framework, with enterprises, universities and R&D centers. Priority will be given to training in languages, project management and those skills that are key to offering a better service to users.

4.2.1.4.9. To prepare an annual Action Plan that allows the implementation in detail of guidelines, objectives, strategies and actions gathered together in this document. This plan will be specific and adapted to the corresponding annual period, allowing the aforementioned flexibility, as well as the mitigation or correction of the deviations that may result. From the year 2016 onward it will be published in English.

4.2.1.4.10. To prepare an annual Report of Activities. This will be structured according to an organization concordant with that set out in this document. It will be used as reference material for a more innovative dissemination of the ICTS' activities, especially through the web. From the year 2016 onward it will be published in English, to promote its international circulation, whilst bearing in mind that most of these activities and a very significant proportion of ICTS' users are from abroad. Moreover, it is impossible to seek international excellence and not have comprehensive documentation in English.

4.2.1.5. Strategies related to socio-economic impact

4.2.1.5.1. To adapt the services offered to the segmentation of demand, especially to the public and private sector, to local, national and international users. Each segment has its own constraints and it is necessary to generate specific services that fit the needs of each sector. The experience gained so far, coupled with that that will be acquired until the entry into operation will allow an improved analysis of this segmentation that will in turn result in a more specialized and efficient service.

4.2.1.5.2. To foster greater involvement of the socio-economic Committee. To do this the Committee will be asked for advice and support on specific aspects, such as those associated with fund raising, improved visibility, detection of new opportunities for service, etc. Furthermore, the creation of technical subcommittees and *ad-hoc* groups, formed by experts on specific topics that can prepare reports and recommendations on priority aspects, will be proposed.

4.2.1.5.3. Contribute to regional, national and European policies. Based on the experience gained and the public results of research projects carried out in the ICTS an active contribution to policies at these levels will be made, both proactively through the provision of specific information as well as responding to public consultations on matters related to the marine and maritime fields.

4.2.1.5.4. To improve the management and interaction with users. Increase the efficiency in the management of users to generate more added value to relational capital, especially its suppliers and users, attempting to improve the interaction and identify new opportunities to provide new services, projects and initiatives, and ultimately create added value for the users.

4.2.1.5.5. To incorporate a project management system. To develop a project management system using project portfolio tools and solutions that offer comprehensive functionality and flexibility for integration with other management applications. This project management system is defined from the preparation, implementation and evaluation of an Integrated Project Management Methodology.

4.2.1.5.6. To develop mechanisms and incorporate tools for the traceability of research results and produced data. Traceability will not only be used as an objective criterion for socioeconomic impact and return on investment, but also as an indicator on who uses what knowledge, technology, products, services, data, etc. generated at the ICTS, thus allowing ongoing evaluation, planning and decision making, based on reliable and objective indicators.

4.2.1.5.7. To create and develop user communities (public and private, national and international), understood as a permanent forum for interaction and debate on the design of projects, the detection of business opportunities, market niches, design and improvement of products and services, etc. This action will be carried out in close cooperation with technology platforms and national and international clusters related to the marine and maritime environments. The nature of the participants, their spatial location, the nature of their targets need to be taken into consideration thus the specific organizational structure of these user communities will be differ and be flexible according to each case.

4.2.1.5.8. To increase cooperation among institutions and international strategic alliances. The cooperation with other ICTSs is essential in order to offer coordinated services, to increase the information exchange, processes, procedures and methodologies, to facilitate coherence and interoperability of data and technologies, or to coordinate services and purchases, among others. In the same vein agreements and partnerships with other international organizations will be developed, to enhance international positioning and to gain access to new users in appropriate conditions.

4.2.1.5.9. To organize challenges and competitions. The organization of competitions in the field of underwater robotics, marine renewable energy and related technological aspects can have a great social and media impact, contributing to dissemination and to a greater knowledge of the infrastructure. At the same time, this also leads to the generation of scientific vocation in students and to the social awareness both on specific topics such as the protection and conservation of the environment and in the assessment of capabilities and national and European scientific institutions.

There will be an effort to involve both local institutions (in this case to encourage young people living in the Canary Islands) and other prestigious international organizations. This in turn will serve to facilitate the dissemination of information in this area.

4.2.1.5.10. To organize international events. To arrange meetings, workshops and presentations to promote the diffusion and dissemination of the ICTS' capabilities, while serving to broaden the number of researchers and technologists who will collaborate in the preparation of new initiatives.

4.2.1.5.11. To participate in fairs and related events. To encourage active participations in fields related to the marine and maritime environment, particularly focused on renewable energies, observation and underwater robotics, in an effort to create a unique brand image associated with the characteristics of the ICTS, as well as to the quality and efficiency in the service offered.

4.2.1.5.12. To increase the dissemination of information to society. The promotion of the services and activities of the ICTS has been tested through several traditional media, such as written press, radio, television and web, but also suitable content has been prepared for distribution in YouTube, Twitter and other social networks.

4.2.1.5.13. To organize specific courses related to scientific and technological areas in response to specific demands by the users or in specific areas in which the PLOCAN infrastructure may pose a special added value to the practical components of courses.

4.2.1.5.14. To collaborate with investors. To prepare agreements with venture capital companies, local investors and business angels[55] to assist in the financial leverage which allows the testing of new products / services in the ICTS and / or the evolution of these in pre-commercial or commercial stages. This added value service will be offered in collaboration with local venture capital entities, such as SODECAN (Investment corporation of the Canary Islands Government)[56] and other public and private entities.

[55] http://www.businessangelsinnoban.es/
[56] http://www.sodecan.es/?lang=en

4.3. Planned actions

Actions planned within strategies are presented using the same structure used previously for the description of objectives and strategies. The relationship between strategies and actions is not always unambiguous and cannot be described here exhaustively . The comprehensive details of the actions and their links with the strategies will be implemented in annual action plans (along with budget reports). Thus, the development of strategies will be organized as follows:

1. Infrastructure construction, equipment and preparing the operational phase
2. Actions related to sustainability
3. Actions related to the specific scientific and tecnological objectives
4. Actions related to organizational and operational development
5. Actions related to the social and economic impact

Actions can be classified into two main time periods, the first related to construction phase, equipment and preparation of methodologies. This time period covers 2013-2014. The second time period will be the beginning of the operational phase and the every day activity of the platform itself which will cover the period 2014-2016.

4.3.1. Description of the actions

4.3.1.1. Actions related to infrastructure construction, acquisition of equipment and preparing the operational phase

4.3.1.1.1. To prepare and/or assist consent processes for permits and/or licenses. The main tasks forecast are set out below (a more detailed list will be produced as part of the annual action plan)**:**

- Processing of the environmental authorisation for the "Power Grid for the testing of new marine technologies in the test site of the Oceanic Platform of the Canary Islands (PLOCAN) with connection to the Jinámar power plant" project (Canary Islands Government, 2013).
- Processing of the administrative authorisation for the electrical and communications infrastructure for the test site (Ministry of Industry and Canary Islands Government, 2013).
- Processing for the environmental authorisation for the "Construction of the Oceanic Platform of the Canary Islands" project (Canary Islands Government, 2013).
- Processing of the administrative authorisation for the "Construction of the Oceanic Platform of the Canary Islands" project (Canary Islands Government, 2013).

- Resolution of the exemption to PLOCAN of the constitution of the guarantee requested in RD 1995/2000 (2013).
- Consideration of uniqueness by the Ministry of Energy for the processing of access and grid connection procedures (2013).
- Processing for the connection to the power transmission grid (2013).
- Processing for the access to the power transmission grid (2013).
- Processing of the marine reserve area (exclusive occupation of publicly owned seafront) of the oceanic platform and the test site (DG for the coast and sea sustainability (MAGRAMA), 2013).
- Processing of permits for the installation of offshore wind turbines:
  - Environmental authorisation (Canary Islands Government, 2013).
  - Effect on aeronautical easement (Spanish Air Safety Agency (AESA), 2013).
- Processing for the assignment of the electrical and communications infrastructure to the Special generation regime (2013).
- Authorisation for the installation of sea cages in the Mesocosm project (Canary Islands Coastal Demarcation (MAGRAMA) and Canary Islands Government, 2013).
- Processing of the Class T (20 miles) registration for the "PLOCAN UNO" vessel (2013).
- Processing to expand the navigation range to 60 miles for the "PLOCAN UNO" vessel (2014).

4.3.1.1.2. To establish and implement the agreement regulating land-based facilities. This agreement signed with the Canary Islands Government stipulates the assignment of PLOCAN's land based facilities.

4.3.1.1.3. To supervise and control the construction of infrastructures. The action will be enforced until the successful conclusion of the construction in 2014. It will be carried out in collaboration with with specialized external contractors and using knowledge from comparable large infrastructures already in existence in national and international scenario.

4.3.1.1.4. To implement the process of acquisition of pending equipment: Acquisition of the required equipment is a priority action. The following list is an example of the most relevant equipment to be acquired during the period 2013-2014:

- Hyperbaric chamber
- Completion of fleet: 4 Gliders to, able to operate in water depths of up to 1000 m.
- ROV (Remote Operate Vehicle) for inspection, able to operate up in depths up to 1000m.
- LARS (Launch and Recovery System) for training purposes on the platform
- Junction box module sensors, for monitoring nodes at the test site.

4.3.1.1.5. To prepare and resolve the pending tenders in accordance with the scheduled equipment acquisition and construction. Examples of relevant tenders are listed here:

- Technical assistance for the site management of the oceanic platform (2013).

- Site management of the electrical and communication infrastructure (2013).
- Technical assistance for the site management of the electrical and communication infrastructure (2013).
- Acquisiton and installation of cables, connectors and umbilicals of the electrical and communication infrastructure 2014
- Acquisition of the "PLOCAN UNO" vessel.
- Acquisiton and installation of the underwater electrical substation of the ETS-FEDER project
- Acquisition of a ROV for environmental monitoring within the ETS-FEDER project.
- Acquisition of a hyperbaric chamber for the environmental monitoring during simultaneous operation of new marine power generation devices within the ETS-FEDER project.
- Acquisition of equipment for the deployment of divers and monitoring devices for the environmental monitoring during simultaneous operation of new marine power generation devices within the ETS-FEDER project.
- Acquisition of a profiler glider device for environmental monitoring during simultaneous operation of new marine power generation devices within the ETS-FEDER project.
- Acquisition of two surface autonomous mobile devices for marine observation within the PERSEUS and ETS-FEDER projects.

4.3.1.1.6. To prepare ESTOC[57] for international access. ESTOC will be opened for international access during the year 2014, in accordance with the grant agreement for the FIXO3 project. The action plan established within this project will be implemented from 2013-2014 to guarantee international access from 2015-2017.

4.3.1.1.7. To develop methodologies for each unit and their associated operating manuals: The manuals will contain policies, procedures and work instructions that set out how operational activities should carried out in each unit: the platform, the land-based facilies, VIMAS base, the observatory and the test site.

4.3.1.1.8. To implement data servers and protocols. The data server and its associated protocols allow, among other functions, requests to be made and the extraction of geo-referenced data in different formats. The implementation of standard monitoring services and real-time control of sensors will take place through the implementation of services such as Sensor Web Enablement of OGC.

4.3.1.1.9. To initiate proposals for open access to equipment and test sites. These will follow the methods and procedures worked out and approved by the CR. Coordination with other infrastructures will be carried out, both at the national and international level.

[57] European Oceanic Station for Times Series, Canary Islands

4.3.1.1.10. To carry out technical studies related to the construction/consenting process. Listed below are the most relevant:

- Technical Project for the construction of the oceanic platform (2013).
- Environmental Impact assessment of the construction of the oceanic platform (2013).
- Marine reserve area (exclusive occupation of publicly owned seafront): Technical report and annexes (2013).
- Installing of offshore wind turbines: Environmental Report (2013).
- Authorisation for the expansion of a power cable to increase power in the electrical and communication infrastructure: Technical project (2013).
- Authorisation for the installation of sea cages in the Mesocosm project: Study of oceanographic and meteorological conditions (2013).
- Environmental characterization of the test site: Seasonal environmental characterization, environmental inventory and descriptive document of data availability (2012-2016).
- Projects within the PLOCAN test site: Environmental impact assessment and implementation of the monitoring the plan (2012-2016)

4.3.1.1.11. To prepare and implement a maintenance plan for infrastructures and equipment. This action will be carried out during the year 2014 and enforced from 2015 and hereafter. It will include the operational details compatible with the requirement of services and constraints imposed by the maritime environment.

4.3.1.2. Actions related to sustainability

A relevant proportion of the activities needed to achieve the sustainability objectives are included within the environmental impact assessment studies associated with the construction and/or deployment of any relevant device. Another portion of the implementation actions to assure sustainability are incorporated in mechanisms, processes and procedures for equipment operation, rewarding of staff or corporative values. Besides, additional activities will be carried out to ensure sustainability goals.

4.3.1.2.1. To implement environmental monitoring of the test site. Seasonal characterization of the test site will be carried out during the period 2014-2016 to ensure the environmental status of the area. Fixed and mobile platforms will be used to increase the sampling effort.

4.3.1.2.2. To carry out an annual environmental inventory. This is the basis for the impact assessment analysis but will be also used for planning purposes such as the identification of opportunities for habitat rehabilitation or enhancement. Annual updates and reviews will be carried out.

4.3.1.2.3. To implement environmental management systems. These will be sequentially introduced in operational units, starting with the oceanic platform and the test site during the period 2014-2016.

4.3.1.2.4. To measure the associated indicators for assessing water good environmental status. The waters within the test site will be monitored using procedures established within environmental regulations.

4.3.1.2.5. To prepare a guide for environmental impact assessment (EIA) for developers. The relevant aspects for maintaining sustainability of the test site will be included, taking into account official documents published by environmental authorities and international standards

4.3.1.3. Actions related to the specific scientific and technological objectives

4.3.1.3.1. To participate actively in European forums. Participate in events related to the Horizon 2020 programme, especially in the fields of renewable energy, marine robotic vehicles and information technology.

4.3.1.3.2. To contribute to scientific & technical forums. At least 10 contributions are foreseen during 2013, but this indicator ought to rise during the next few years; up to 20 by 2016.

4.3.1.3.3. To implement the following projects:

- GROOM (Gliders for Research, Ocean Observation and Management), 2012 - 2015.
- COST Action ES0904 EGO (Everyone's Gliding Observatories), 2011 - 2014.
- INNPACTO WAVE ENERGY, 2010 - 2013
- TROPOS (Modular Multi-use Deep Water Offshore Platform Harnessing and Servicing Mediterranean, Subtropical and Tropical Marine and Maritime Resources), 2012 - 2015.
- EURATHLON (Support Action for a Targeted Intelligent Autonomous Robotics Contest: The European Roboathlon), 2013 – 2015.
- MARES (Macaronesian Research Strategy), 2009 -2013.
- IECOM (Marine electrical and communication infrastructure or the PLOCAN test site), 2012 - 2014.
- ETS (Underwater transformation station infrastructure and equipment for environmental monitoring during simultaneous operation of new marine power generation devices), 2012 – 2015.
- POTEMA (Programme for observation and environmental monitoring of the concentration of power generation devices in the PLOCAN test site), 2012 – 2015.
- UNDIGEN (Functionality of wave energy generation systems), 2011 – 2013.

- NetBiome-CSA (Strengthen European research cooperation for smart and sustainable management of tropical and subtropical biodiversity in Outermost Regions (ORs) and Overseas Countries and Territories (OCTs)), 2013 - 2016.
- PERSEUS (Protection of European seas and borders through the intelligent use of surveillance), 2013 - 2014.
- FIXO3 (Fixed Point Open Ocean Observatory Network), 2013 - 2017.
- NEXOS (Next generation, cost-effective, compact, multifunctional web enabled ocean sensor systems empowering marine, maritime and fisheries management,) 2013 - 2017.
- OCEANERA-NET (The coordination of national research activities of Member States and Associated States in the field of Ocean Energy (ERA-NET)), 2013 -2017.
- ESTRAMAR (Marine and maritime R&D strategy in the Macaronesia), 2010 – 2013.
- MACSIMAR (Incorporation of an integrated system of meteorological and oceanographic monitoring of the Macaronesia in the European marine and maritime research strategy), 2010 – 2013.
- CANAUTIC (Canary Islands - Cape Verde cooperation platform in nautical sports. Socio-economic and environmental diagnosis in relation to nautical activity and proposed planning of nautical sports), 2013 – 2014.
- LEANWIND (Logistic Efficiencies and Naval architecture for Wind Installations with Novel Developments), 2013 - 2017.

4.3.1.3.4. To organize and host internationally relevant R&D events. This will focus on key subjects of interest for the public and private marine science and technology community e.g. harnessing oceanic resources, underwater robotics, marine technology and oceanology, among others. Such events have been trialled during the last few years, i.e.

- European glider meeting (2012)
- Eurocast (2013)
- EUROCEANS (2013)

4.3.1.3.5. To participate in international relevant R&D events. The goal is to contribute to a minimum of 30 major events annually, including conferences, seminars and workshops related to selected priority areas.

4.3.1.3.6. To develop research and technological initiatives, especially together with the new European Commission work programme (2014-2020) and other national and international programmes. As an example, a minimum of 5 projects will be prepared as part as of the annual applications for funding during the period 2014-2016, working together as much as possible with potential users and other infrastructures.

4.3.1.3.7. To develop communities and/or working groups at the request of users and in accordance with their needs, in the following key specialised areas

- Multiuse offshore platforms
- Offshore aquaculture
- Marine energy
- MSP and ICZM
- Oceanic observatories
- Atlantic circulation
- Underwater robotics

Several workshops will focus on these subjects in order to cluster together relevant scientific and technological groups and to develop a range of initiatives, especially international projects. The choice of the areas is a demand driven process, where users identify the communities in a bottom up approach taking into account funding opportunities. Collaboration with other ICTS will be also promoted.

4.3.1.3.8. To collaborate actively in national and international R&D networks. The following is a non-exhaustive list of target international networks:

- EMSO (European Multidisciplinary Seaflor Observatory)
- ICOS (Integrated Carbon Observation System)
- EUR-OCEANS (European research on Ocean Ecosystems under Anthropogenic and Natural forcings)
- European association of marine energy
- Spanish association of marine energy
- Spanish maritime technological platform
- European Waterborne technology platform
- Marine technology Society
- International Network of innovative marine territories

4.3.1.4. Actions related to organizational and operational development

4.3.1.4.1. To prepare and implement rules and regulations for the operation and access to ICTS. This is a basic requirement for initiating operations before 2015. It establishes the conditions for the access as well as the rights and obligations inherent to the use of the infrastructure, including terms of reference, confidentially, service fees and so on. It also provides the information needed to improve economic sustainability and future planning. This regulation provides a legal security framework for the infrastructure users, from the technical and economical point of view, and that needed for investing in testing users devices and concepts.

4.3.1.4.2. To implement a citizen´s charter. This is the expression of commitment of the organization with the users, in addition to the continued improvement of services offered (quality, efficiency, transparency, etc.). This will be available during 2015.

4.3.1.4.3. To develop a cost accounting system. This will integrate and track cost information related with produced services. Implementation will start during 2015 and will be operational from 2016. It requires a precise determination of the set of activities performed in the organization and the services provided therein. Thus, it will be worked out based on the services involved in the citizen´s charter, the development of protocols for processes and those related to the development of infrastructure.

4.3.1.4.4. To incorporate a CRM. It has been established that the ICTS is a service oriented towards its users and is intended to provide customers with the highest value. It is therefore necessary to develop a system of on-going customer care, combining personalized tools and interaction. Relational capital and on-going interaction with users are key factors of the ICTS strategy. This relationship will serve to assess the quality of services, innovate them and implement new ones, generating initiatives and joint projects, and also to acquire knowledge to carry out tactical actions, among others.

4.3.1.4.5. To implement the ISO9001 certification process. The Glider School will be used as a test unit for the rest of the organization. The implementation of the quality certification (ISO9001) will be sequential, starting in 2013 with the preliminary definition of the required process flow chart and the threads. The target is to have the certification for 2014 and maintain that quality accreditation in successive editions.

4.3.1.4.6. To train staff in PRINCE2® (Projects in Controlled Environments). The goal is to accredit 20 staff members at the basic level (Foundation) and 10 at the advanced level (Practitioner) by 2014. Hereafter, advanced training will be provided to newly recruited staff, especially those focusing on project management.

4.3.1.4.7. To implement a tool for Project Portfolio Management (PPM - Project Portfolio Management, Daptiv®). Several professional tools have been evaluated, and Daptiv has been selected. During 2013 the tool will be implemented with testing purposes and it will be fully operational by 2014.

4.3.1.4.8. To design and implement a Project Management Methodology based on Daptiv®. A project management methodology will be worked out and implemented using Daptiv as a tool. The integration with other administrative tools of the organization (accounting system, CRM, etc.) will be performed, taking into account experiences from other larger infrastructures.

4.3.1.4.9. To optimize a monitoring system for ongoing projects (portfolio) and operational programs. This will include scope, program objectives, leading indicators and additional

information related to performance. Effective, integrated and simple monitoring and assessment of project progress is one of the main goals of the system.

4.3.1.4.10. To develop and update tools for document management. The tools selected are Alfresco and Google. These tools have already been introduced for testing, but they will be fully integrated within the operational procedures during 2013 and 2014.

4.3.1.4.11. To set up new digital services. New operational web services such as corporative intranet, job portal or digital signature will be implemented.

4.3.1.4.12. To introduce new items within the annual evaluation of staff performance. These elements will be related to the objectives and strategies, such as international projects, participation in international boards, forums, evaluation panels, and so on.

4.3.1.5. Actions related to the social and economic impact

4.3.1.5.1. To contribute to national and international public consultation processes related to the marine and maritime fields. Examples are the contribution to the Research and Innovation Smart Specialisation Strategy (RIS3), the Atlantic Strategy, the EC Framework Programme, marine and maritime affairs, integrated management of the coastal and marine spatial planning, and so on.

4.3.1.5.2. To participate in cooperation and coordination of research activities carried out at international, national or regional levels. PLOCAN will be actively involved in ERA-NET (e.g. NET-BIOME, OCEANERA-NET, and so on), SEAS-ERA, JPI-OCEANS and other actions related to the marine and maritime fields (e.g. COST actions). Special priority will be given to actions facilitating coordination and collaboration among marine infrastructures, including transatlantic programs, within the Horizon 2020 programme (2014-2020).

4.3.1.5.3. To promote detection, creation and collaboration with entrepreneurs and technology-based SMEs. Specific agreements will be carried out with venture capital, technology parks, private foundations and similar institutions to promote detection and investment in marine related enterprises related to PLOCAN's activity. An action plan will be implemented for the period 2015-2016.

4.3.1.5.4. To improve and strengthen communication. The communication and marketing of the ICTS will be intensified over the next three years using the construction of the platform, milestones and pilot projects as focal points for media engagement during the next period 2013-2016.

Participation in competitions, training courses, open lecture programs or open centres for lifelong learning (in collaboration with the university) will be also included within these plans.

4.3.1.5.5. To organize technological competitions for students at several levels. The goal is to promote at least one competition annually at university level and another involving high schools in collaboration with the university.

4.3.1.5.6. To promote alliances and inter-institutional relations. Agreements will be worked out with universities and research centres. These will include information exchange, resources sharing (i.e. equipment), temporal mobility or exchange of staff, among others. Some relevant partners for these alliances are:

- IEO (Spanish Oceanographic Institute, Spain)
- SOCIB (Balearic Islands Coastal Observing and Forecasting System, Spain)
- ULPGC (University of Las Palmas de Gran Canaria, Spain)
- ULL (University of La Laguna, Spain)
- UV (University of Valencia, Spain)
- UPM (Polytechnic University of Madrid, Spain)
- UP (University of Porto, Portugal)
- INNOVAMAR (Technological Institute for the Development of Maritime Industries Foundation, Spain)
- RED ELECTRICA, Spain
- REDIRIS, Spain
- CENER (National Centre for Renewable Energies, Spain)
- NOCS (National Oceanography Centre Southampton, UK)
- MARUM (Centre for Marine Environmental Sciences, Germany)

4.3.1.5.7. To implement a communication plan. Diffusion and communication will be greatly enhanced during 2014 and following the initiation of the operational phase. Updated presentations, brochures and newsletters will be produced for the operational phase. Diffusion will include usual media (press, radio and TV) and web and social networks. Graphic material, including videos, will be produced and disseminated. The staff will be actively involved in these actions, but expert outsourcing will be also used. Joint dissemination plans in collaboration with other ICTS will be carried out.

4.3.1.5.8. To implement an open lecture program. Monthly open lectures, with the main purpose of training employees but that will also be made available to the general public will be given by qualified speakers. The lectures on marine and maritime matters will be followed by an open discussion to stimulate interaction and brainstorming .

4.3.1.5.9. To implement an internship program. This will focus on marine and maritime matters. It will involve around 15 students annually. These students will remain on site for an average of three months with a daily exclusive dedication.

4.3.1.5.10. To implement highly specialized technological programs. The training program will cover 4 years and a final project, focusing on technical (theoretical and practical) topics of interest in the marine and maritime fields related to the ICTS. It will mainly address the training and preparation needed to produce qualified technicians for marine infrastructures. The program has been tested for the last 2 years and will be operational by 2014 with a target of 2 to 4 students (depending on budget availability).

4.3.1.5.11. To organize training courses: The focus will be key subjects of interest for the marine science and technology community (public and private). Below are some examples:

- PLOCAN Glider School, annually from 2013 to 2016.
- COST-EGO Seminars: "ADCP on Gliders" 2013.
- Scientific computing and processing large amounts of data, in collaboration with local universities and international companies (Microsoft, Intel, HP, etc.), in 2014.

4.4.Resources

4.4.1. Human Team

It is no coincidence that the human factor is the first in the enumeration of the resources available within the organization, to carry out the tasks which will help reach the goals that have been described above. In the Oceanic Platform of the Canary Islands the human factor is considered to be the most valuable factor of the organization's resources, and its greatest strength, as indicated in the SWOT analysis.

At the end of 2012 the staff at PLOCAN was composed of 38 people, three being assistant scholars and 35 hired staff. Within the recruited personnel, 15 have a technical certificate or are technical engineers, 9 are graduates and 10 are postgraduates holding PhDs. As far as the type of contracts that have been extended to the 35 people recruited is concerned, 16 have signed an indefinite contract, which represents 45.7 % of the total.

As already mentioned in several sections of this document, it was forecasted that the scientific-technical project envisaged for 2011 in PLOCAN would include a workforce of 56 employees. An adaptation to the administration's budgetary circumstances has led to the limitation of PLOCAN's contract employees to 35 at the end of the year 2012. This figure represents only 62.5% of the staff initially proposed.

In the light of these supervened circumstances, PLOCAN has had to functionally adapt its staff to the imposed economic reality and search for solutions, such as the creation of the associate researcher figure. This role includes researchers in their relevant fields of specialization pertaining to research centers, who collaborate with the ICTS in the detection of new opportunities, in the application of research to developments according to the business demands, etc. In this sense, PLOCAN has already signed a Collaboration Agreement with the University of Las Palmas de Gran Canaria, so that its most outstanding researchers be able to provide advice to the Platform.

4.4.2. Material Resources

As described in section 2.3.2, the land headquarters and the oceanic platform alongside with the set of infrastructures that will complement its capabilities, are the main facilities that make up the ICTS and which enable the objectives to be carried out:

Headquarters on land

- Land area

  Office Buildings, laboratories, workshops, conference hall, multipurpose rooms, containers area, machinery park, etc.

- Port area:

  Berth for the "Taliarte" oceanographic vessel and storage warehouses.

Platform

The platform itself is in the construction phase. The tender of the project and construction of its central structure has been already awarded, the project has been approved and it is now undergoing the process of authorisation by the environmental authority; it is foreseen that it will be completed by 2014.

As elements of the infrastructure in the platform area, PLOCAN has the test site, the VIMAS base and the observatory, which rely on the equipment indicated below.

Table 7 Current and foreseen equipment

	PURCHASED EQUIPMENT	PLANNED EQUIPMENT
TEST SITE	• In design phase	• Connection to ground (discharge cable for power and data originated by testing marine renewables) • The instrumentation belongs to the observatory and the vehicles to the VIMAS base
VIMAS BASE	• Submarine Glider: Slocum G2 • Submarine Glider: IRobot SeaGlider. 1K • Support vessel: QUER-40 • Deck unit: Benthos- UDB-9000-M • ROV: Bleeper-AT	• VIMAS from national and international institutions and companies, for operational testing and training of personnel • Specific technological developments • Three operative ROVs to mean depths of 2000 m • Between 4 and 8 gliders and/or autonomous new generation vehicles • Instrumentation and tools for deployment and recovery of experiments, specifically adapted for PLOCAN, and to support deep diving • Support vessel • Heavy duty and complex vessels outsourced from public and private fleets, from both the Canary Islands and at national level
OBSERVATORY	• Extra anchoring Buoy: Balizamar 1600S. • Oceanic ODAS Buoy	• Integrated set of the most advanced state-of-the-art sensors, for each of the parameters measured at the bottom, the land-water interface, the water column, the ocean-atmosphere interface and the atmosphere.

4.4.3. Economic Resources

As the Oceanic Platform of the Canary Islands is an ICTS co-financed by the Spanish National Government and the Regional Government of the Canary Islands, the main funding for PLOCAN comes primarily from contributions made by the central and the autonomous governments. The activity that is already being carried out to optimize the platforms facilities, procedures and operations, also constitutes a major source of funding, despite the fact that the infrastructure has not yet entered into the operational phase. Hence, throughout the financial year 2012, PLOCAN received € 2,472,927.39 from the consortium formed by the Ministry of Economy and

Competitiveness and the Canary Islands Government (MINECO + Canary Islands Government = € 549,750.00 + € 1,923,177.39), and € 1,248,812.50 in revenues from projects and provided services.

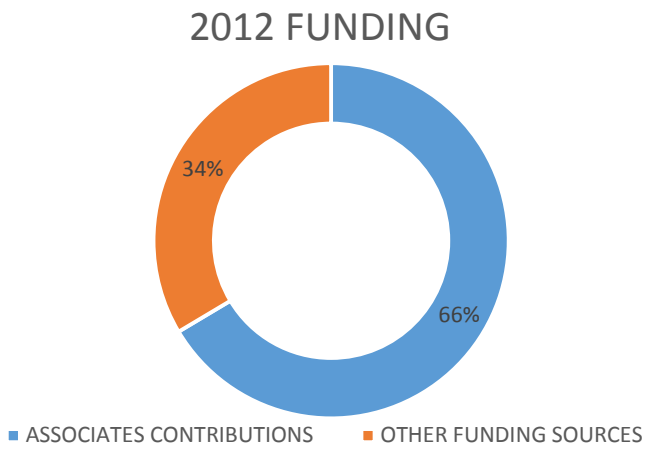


Figure 16 Funding sources in 2012

The income forecast for the coming years has been set out in the resolution of December 31, 2012 from the Directorate-General for Innovation and Competitiveness (MINECO), which published the agreement with the Autonomous Government of the Canary Islands (CAC) for the modification of the Collaboration Agreement to create the Consortium for the Design, Construction, Equipment and Exploitation of the Oceanic Platform of the Canary Islands[58]; it includes the provision of the fixed contributions that MINECO and CAC will make to the Consortium, which will be distributed according to the following table:

Table 8 Income forecast fixed by MINECO and CAC for the next few years

	2007	2008	2009	2010	2011	2012	2013	2014
MINECO	2,412,000	1,900,500	2,212,500	2,212,500	2,212,500	549,750	1,147,500	1,170,450
CAC	2,000,000	2,312,500	2,212,500	2,212,500	2,212,500	1,125,000	1,147,500	1,170,450
Total	4,412,000	4,213,000	4,425,000	4,425,000	4,425,000	1,674,750	2,295,000	2,340,900

	2015	2016	2017	2018	2019	2020	2021	Total
MINECO	891,994	868,117	843,762	818,920	793,582	767,736	741,374	19,543,186
CAC	1,193,859	1,217,736	1,242,091	1,266,933	1,292,271	1,318,117	1,344,479	23,268,436
Total	2,085,853	2,085,853	2,085,853	2,085,853	2,085,853	2,085,853	2,085,853	42,811,622

Plocan also counts among its resources with the following projects partially funded by ERDF.

58 http://www.boe.es/diario_boe/txt.php?id=BOE-A-2013-2155

Table 9 Relevant ERDF projects funded within the period 2013-2016

NAME	FUNDING
Electrical and communication infrastructure (IECOM)	€ 4.5 M (€ 3.1 M supported by ERDF)
Infrastructure for the underwater electrical transformer and equipment for the environmental control of power generation devices (ETS)	€ 2.7 M (€ 1.89 M supported by ERDF)
Marine observation program and environmental control of the test site (POTEMA)	€ 0.8 M (€ 0.56 M supported by ERDF)

In relation to economic resources raised for the period 2013-2016, relevant consolidated funding is shown below (information updated in May 2013).

Table 10 Consolidated funding raised from ongoing projects

CODE / ACRONYM	TOTAL FUNDING (€)	FUNDING FOR PLOCAN (€)
WELCOME (PSE- Spanish)	2,090,400	1,158,900
MARES (PCT-MAC- European)	467,266	280,500
WAVE ENERGY (INNPACTO- Spanish)	5,678,889	1,546,205
UNDIGEN (INNPACTO, Spanish)	2,260,510	614,466
GROOM (FP7- European)	3,500,000	117,799
TROPOS (FP7- European)	4,877,911	672,880
MACSIMAR (PCT-MAC, European)	645,468	48,981
ESTRAMAR (PCT-MAC- European)	383,000	110,968
PERSEUS (FP7- European)	27,847,579	377,256
FIXO3 (FP7- European)	9,644,011	631,126
LEANWIND (FP7- European)	9,986,308	142,440
NEXOS (FP7- European)	5,989,349	509,924
OCEANERA-NET (FP7- European)	2,300,000	144,239
EURATHLON (FP7- European)	1,649,996	111,066
NETBIOME CSA (FP7- European)	999,615	88,574
TOTAL	78,320,302	6,555,324

During this period (2013-2016), new funding is expected from national and international programs

4.4.4. Other Resources

The organization considers that in addition to human capital, infrastructures and funding sources, other factors should also contribute to the achievement of objectives. These would be collaboration with institutions and research centers, joint plans and agreements with other ICTS or with the national or international networks which PLOCAN is part of.

Therefore, even before entering its operational phase, PLOCAN has already 573 stakeholders belonging to institutions or companies, 68% of them being international. In addition, 44 agreements have been signed so far, mostly for cooperation with companies, institutions and research centers. This data shows the growing interest that PLOCAN is awakening within both the national and

international community, and that this constitutes, on one hand support for work being carried and, on the other hand, a tool for developing planned actions.

The following are among the initiatives designed to promote the joining of forces with other research centers. PLOCAN is a member of the European observatory network EMSO (European Multidisciplinary Seafloor Observatory) and is the Spanish node of this network. The ICTS also belongs to the robotics and automatics group, and to the maritime safety group of the Spanish Marine Technology Platform.

Furthermore, PLOCAN is a member of the Spanish Association for Standardization and Certification (AENOR) through its Subcommittee AEN/206/SC114. (Marine energy: waves and current converters) and is a member, of the Association of Renewable Energy Producers (APPA) and the European Grid Initiative Task Force[59].

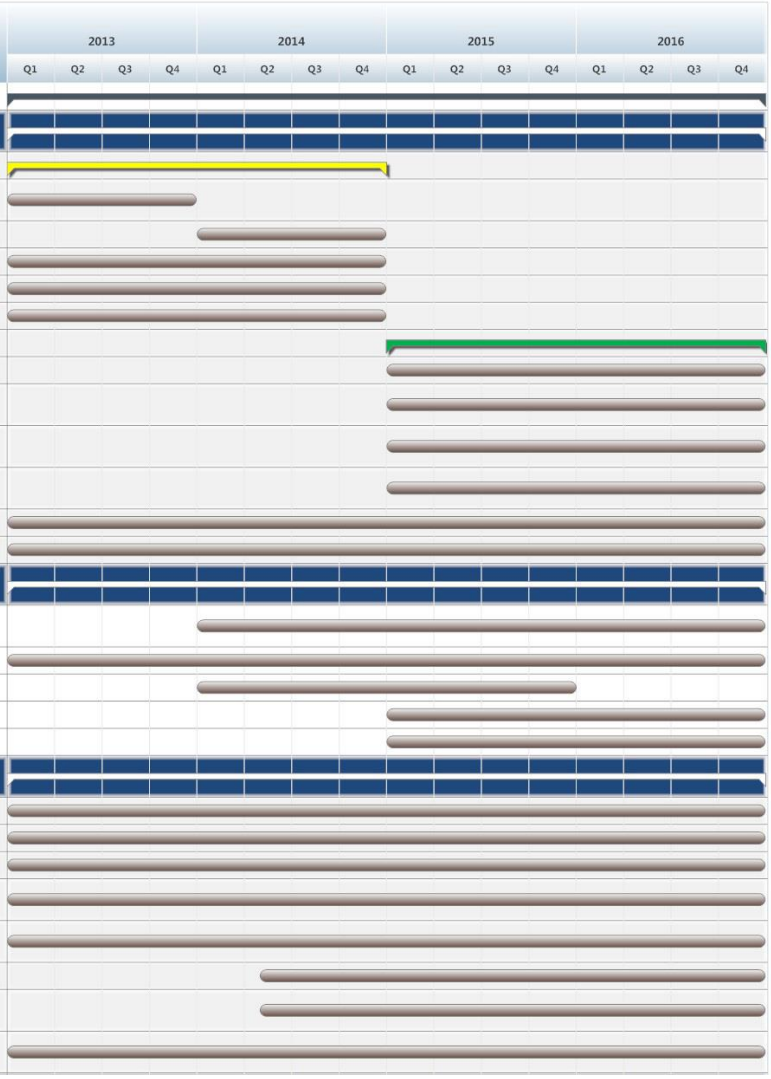
In order to promote cooperation between the ICTS, PLOCAN has been part of the Marine ICTS Network leading the GT2 working group, whose aim was to identify and coordinate the needs of the different ICTS in terms of equipment and instruments, hardware and software, communication and systems integration. Another example of cooperation between ICTS is PLOCAN's membership of the IRIS Network and its coordination of the Working Group on Infrastructures as a Service.

[59] https://wiki.egi.eu/wiki/Fedcloud-tf:Members

4.5.Schedule and monitoring

4.5.1.Schedule

	Task	Start	End
	Strategic Plan 2013-2016	1/1/13	30/12/16
1	**Construction, acquisition and Operations**	**1/1/13**	**30/12/16**
1.1	<Construction Phase>	1/1/13	31/12/14
1.1.1	Authorizations, Permits & Licenses	1/1/13	31/12/13
1.1.2	Land Based ICTS agreement	1/1/14	31/12/14
1.1.3	Construction Supervision	1/1/13	31/12/14
1.1.4	Equipment acquisition	1/1/13	31/12/14
1.1.5	Tendering Processes Mgmt	1/1/13	31/12/14
1.2	<Operational Phase>	1/1/15	30/12/16
1.2.1	ESTOC: International Access	1/1/15	30/12/16
1.2.2	Operational Guides of Infrastructures	1/1/15	30/12/16
1.2.3	Data infrastructure accessibility and protocols	1/1/15	30/12/16
1.2.4	Open Tender Process: Test site and equipment	1/1/15	30/12/16
1.3	Technical Studies	1/1/13	30/12/16
1.4	Maintenance Plan	1/1/13	30/12/16
2	**Foster Marine and Maritime Sustainability**	**1/1/13**	**30/12/16**
2.1	Environmental Monitoring of the Test Site	1/1/14	30/12/16
2.2	Annual Environmental Inventory	1/1/13	30/12/16
2.3	Environmental Mgmt System	1/1/14	1/1/16
2.4	GES Monitoring Implementation	1/1/15	30/12/16
2.5	Test Site EIA guidelines	1/1/15	30/12/16
3	**Development of Scientific and Technological Objectives**	**1/1/13**	**30/12/16**
3.1	European Forums	1/1/13	30/12/16
3.2	S/T Forum Contributions	1/1/13	30/12/16
3.3	S/T Projects Execution	1/1/13	30/12/16
3.4	International relevant R&D events Organization & Hosting	1/1/13	30/12/16
3.5	International relevant R&D events participation	1/1/13	30/12/16
3.6	R&D Projects Preparation	1/5/14	30/12/16
3.7	Working Groups and Communities	1/5/14	30/12/16
3.8	Dynamize National and International R&D Networks	1/1/13	30/12/16



	Task	Start	End
	Strategic Plan 2013-2016	1/1/13	30/12/16
4	**Internal Organization and Operational Development**	**1/1/13**	**30/12/16**
4.1	ICTS access and operation Regulations	1/7/14	30/12/16
4.2	Launch the Citizen´s Charter Initiative	1/7/14	30/12/16
4.3	Cost Accounting System Implementation	1/1/15	30/12/16
4.4	CRM implementation	1/4/15	30/12/16
4.5	ISO9001 Certification Process	1/1/13	30/12/14
4.6	PRINCE2 Training	1/1/13	30/12/16
4.7	Project Management Methodology	1/7/13	30/12/14
4.7.1	PPM Tool Implementation	1/7/13	30/12/14
4.7.2	Project Reporting System Implementation	1/7/13	30/12/14
4.8	Documentation Management Tool Implementation	1/1/13	30/12/14
4.9	New Digital Services creation	1/1/15	30/12/16
4.10	Addition of new Staff Performance Criteria	1/1/16	30/12/16
5	**Foster the Socio-Economic Impact**	**1/1/13**	**30/12/16**
5.1	Public Consultation Process Contribution	1/1/13	30/12/16
5.2	International R&D Coordination Actions	1/1/14	30/12/16
5.3	Foster knowledge and technology based SMEs	1/1/15	30/12/16
5.4	Improve and Strengthen PLOCAN dissemination and community outreach	1/1/13	30/12/16
5.5	Student Technological Challenges Organization	1/1/13	30/12/16
5.6	Foster inter-institutional alliances and relationships	1/1/13	30/12/16
5.7	Communication Plan Implementation	1/1/13	30/12/16
5.8	Open Lecture Program Implementation	1/1/13	30/12/16
5.9	Internship Program Implementation	1/1/13	30/12/16
5.10	Highly specialized S/T Programs Implementation	1/1/13	30/12/16
5.11	Organization of Training Courses	1/1/13	30/12/16
5.12	Improve PhD and Master thesis development conditions	1/1/13	30/12/16
5.13	Support the External use of PLOCAN infrastructures for specialized training programs.	1/1/13	30/12/16

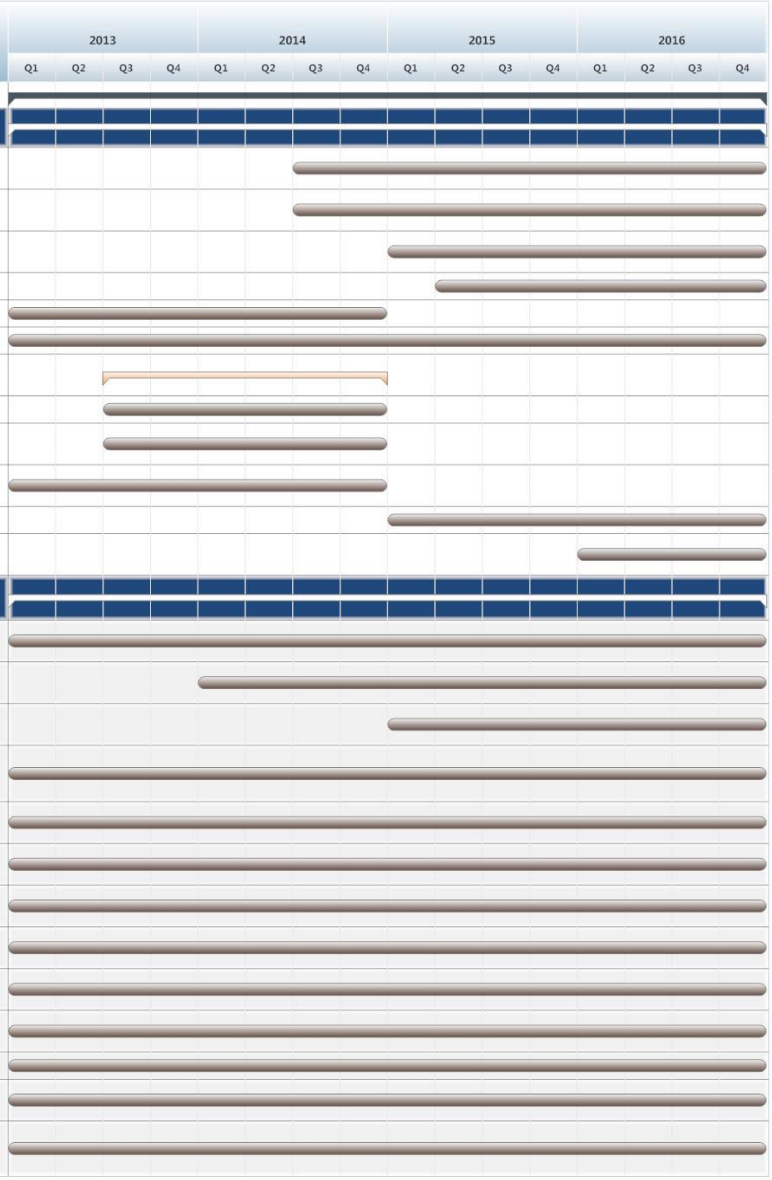


Figure 17 Schedule

4.5.2. Monitoring

Although this strategic plan provides a basic reference which shall guide the actions of the Organization in the coming years, it should not be understood as a closed document, but as an element in the continuous process of evolution and improvement. For this reason follow-up and periodic review processes are established, along with the plan.

On the one hand, indicator-based monitoring will allow the establishment of the degree of compliance with the plan, the achievement of the objectives, the correct use of the available resources and the detection of any incidence or deviations from the established milestones at any time. On the other hand, a periodic review of the strategic plan, will allow its adaptation to changes in the environment as well as to the needs of the Organization and its users.

To measure the achievement of the objectives several qualitative indicators will be used such as the degree of implementation of the specific actions listed in this plan, the compliance with their estimated schedules and most of all the compliance with the milestones established for the beginning of the operational phase (list of services, regulation for access, public fees, manuals and user guides for instrumentation, procedures for services...)

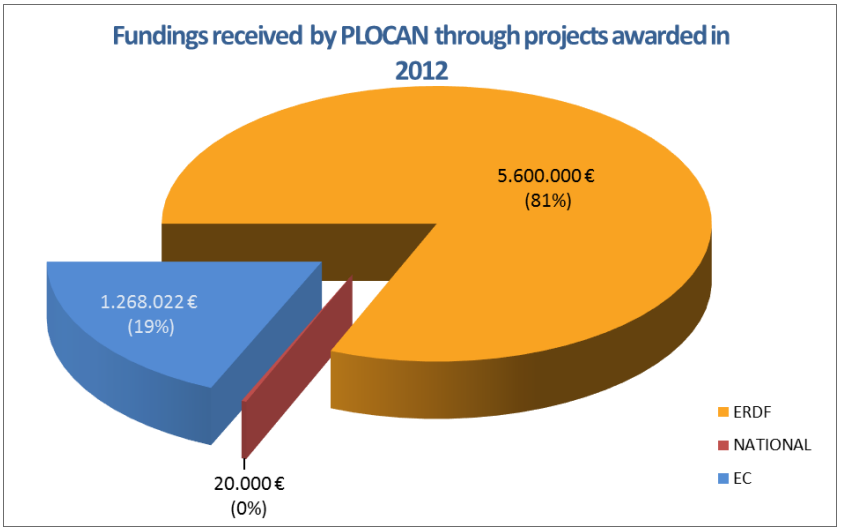


Figure 18 Fundinggs recived through projects awarded will be used as an indicator

As for the selection of quantitative indicators, the basic indicators requested by the Ministry of Economy and competitiveness to each ICTS, together with the corresponding strategic plans will be monitored and also the indicators presented yearly by the Organization in its Action Plan will be used to measure the fulfillment of the objectives.

In a similar way, data provided in the annual budgets and especially those in the associated explanatory reports will also be used as indicators.

In order to facilitate the monitoring of compliance through quantitative indicators, PLOCAN's annual report shall submit clear and structured information of measurable factors such as the state of development of the infrastructure, meetings and decisions of the bodies of government, relations with the economic and business environment, agreements of collaboration with institutions, communication, dissemination and training actions, active projects, budgets, human resources, etc.

Previous experiences that have already been carried out in some of the areas of activity of PLOCAN in order to tune up services offered to users and the information obtained during the early stages of the platform's operational phase, will allow the accurate setting of quantitative values of the indicators that will mark the optimum development of the plan. Economic adjustments suffered by the Spanish public sector also affect the initially planned development of the platform and hinder the establishment of accurate quantitative indicators.

As already noted in the section referred to the critical analysis, the analysis of the reality of the environment as well as that of the Organization itself must be done periodically in order to adapt it to the changes that may occur. The determination of the degree of compliance or deviation from the goals, based on qualitative and quantitative indicators along with a periodic review based on the analysis of the situation should be the tools that will allow the adaptation of the strategic plan to the circumstances in order to achieve a better implementation.

5. Annexes

5.1.Main acronyms and abbreviations

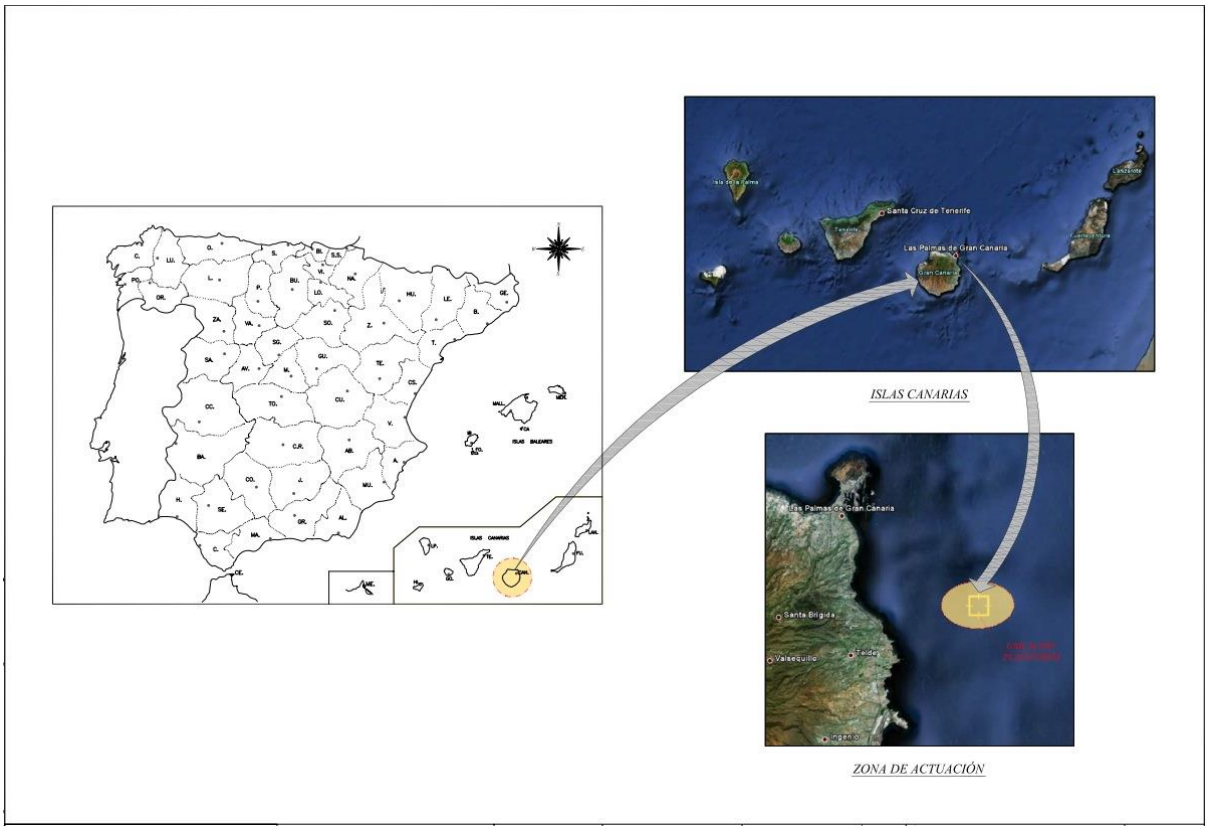
ADCP	Acoustic Doppler Current Profiler
AENOR	Spanish Association for Standardization and Certification (*Asociación Española de Normalización y Certificación*)
AESA	Spanish Air Safety Agency (*Agencia Española de Seguridad Aérea*)
AUV	Autonomous Underwater Vehicle
CAC	Autonomous Government of the Canary Islands
CASE	Socioeconomic Activities Advisory Committee (*Comité Asesor de Actividades Socioeconómicas)*
CENER	Spanish National Centre for Renewable Energies (*Centro Nacional de Energías Renovables*)
CMC	Canary Islands Maritime Cluster (*Cluster Marítimo de Canarias*)
COCI	Scientific and Technological Advisory Committee (*Comité Asesor Científico y Técnico)*
CRM	Customer relationship management
CSIC	The Spanish National Research Council (*Consejo Superior de Investigaciones Científicas*)
EC	European Commission
EIA	Environmental Impact Assessment
EMEC	European Marine Energy Centre
EMSO	European Multidisciplinary Seas Observation
EOOS	European Ocean Observing System
ERA-NET	European Research Area Network
ERDF	European Regional Development Fund
ERIC	European Research Infrastructure Consortium
ESFRI	European Strategic Forum for Research Infrastructure
ESONET	European Seas Observatory NETwork
ESTOC	European Station for Time Series in the Ocean (*Estación Europea de Series Temporales Oceánicas de Canarias*)
ETS	Underwater Transformation Station infrastructure and Equipment for environmental monitoring during simultaneous operation of new marine power generation devices
EU	European Union
EURATHLON	EU FP7 Project acronym: "*Support Action for a Targeted Intelligent Autonomous Robotics Contest: The European Roboathlon*"

EUROCAST	European Conference on Computer Aided System Theory
EUROCEANS	European research on ocean Ecosystems under Anthropogenic and Natural forcings
EuroSITES	European oceanic observatory network. EuroSITES
FIXO3	EU FP7 Project acronym: "*Fixed Point Open Ocean Observatory Network"*
GAS	General Administration of the State (*Administración General del Estado*)
GEOMAR	Helmholtz Centre for Ocean Research Kiel
GEOSS	European Directive on Infrastructures for Spatial Information
GME	European Earth monitoring programme
GPD	Gross Domestic Product
GROOM	EU FP7 project: "*Gliders for Research, Ocean Observation and Management*"
HCMR	Hellenic Centre for Marine Research
ICCM	Canarian Institute of Marine Sciences (*Instituto Canario de Ciencias Marinas*)
ICES	International Council for the Exploration of the Sea
ICOS	Integrated Carbon Observing System
ICTS	Large Scientific and Technological Facility (*Instalación Científica Técnica Singular)*
ICZM	Integrated coastal zone management
IECOM	Marine Electrical and Communication infrastructure
IEO	Spanish Institute of Oceanography (*Instituto Español de Oceanografía*)
IFREMER	Institut Français de la Recherche pour l'Exploitation (France).
INNOVAMAR	Technological Institute Foundation for the Development of Maritime Industries (*Instituto Tecnológico para el Desarrollo de las Industrias Marítimas*)
INNPACTO	Spanish programme to finance public-private partnership (projects) between research organisations and enterprises, to perform R&D&i projects addressing demand driven product development
INSPIRE	EU directive. Aims to create a European Union spatial data infrastructure to enable the sharing of environmental spatial information
IPNA	Institute of Natural Products and Agrobiology (*Instituto de Productos Naturales y Agrobiología)*
JGOFS	Joint Global Ocean Flux Study
JPI-OCEANS	Healthy and Productive Seas and Oceans
KOSMOS	The Kiel Off-Shore Mesocosm for future Ocean Simulations
LARS	Launch and Recovery System
MAGRAMA	Spanish Ministry of Agriculture, Food and Environment (*Ministerio de Agricultura, Alimentación y Medio Ambiente*)
MARES	Project acronym: "Macaronesian Research Strategy"- Programa de Cooperación Transnacional Azores - Madeira - Canarias (PCT-MAC)
MARUM	Centre for Marine Environmental Sciences (Germany)
MINECO	Spanish Ministry of Economy and Competitiveness (*Ministerio de economía y competitividad*)

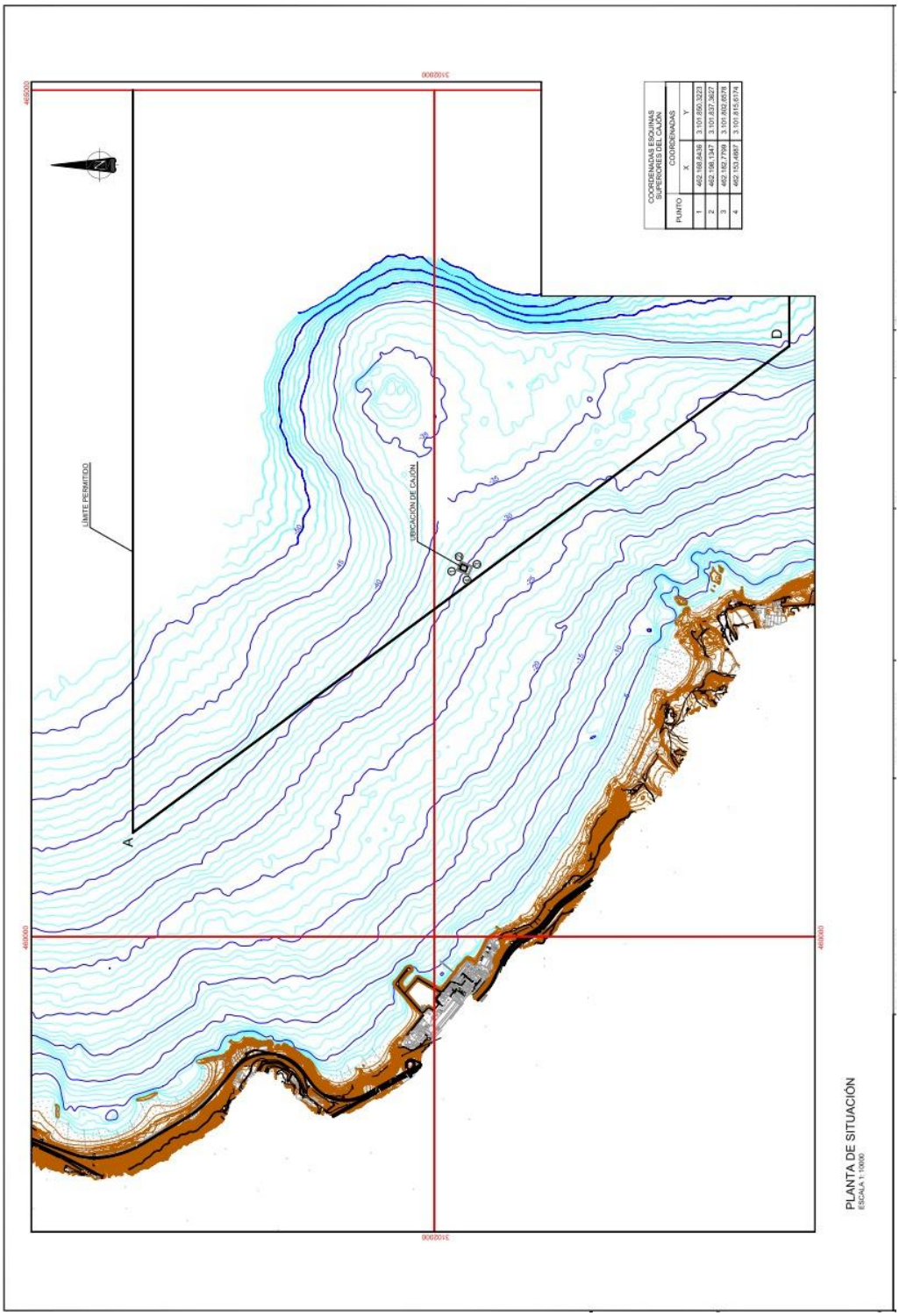
MSFD	Marine Strategy Framework Directive
MSP	Marine Spatial Planning
NERC	Natural Environment Research Council
NetBiome	EU FP7 Project acronym: CSA (Strengthening European research cooperation for smart and sustainable management of tropical and subtropical biodiversity in Outermost Regions (ORs) and Overseas Countries and Territories
NEXOS	EU FP7 Project acronym: "*Next Generation, Cost-effective, Compact, Multifunctional Sensor Web Enabled Systems Empowering Ocean Marine, Maritime and Fisheries Management*".
NOAA	National Oceanic and Atmospheric Administration
NOCS	National Oceanography Centre Southampton
NoE	Network of Excellence
OCEANERA-NET	EU FP7 Project acronym: "*Supporting the coordination of national research activities of Member States and Associated States in the field of Ocean Energy ERA-NET"*
ODAS	Buoy deployment as part of the ESTOC observatory
OGC	Open Geospatial Consortium
OSPAR	Oslo/Paris convention (for the Protection of the Marine Environment of the North-East Atlantic. It is the mechanism by which fifteen Governments of the western coasts and catchments of Europe, together with the European Community, cooperate to protect the marine environment of the North-East Atlantic
PCT-MAC	Transnational Cooperation Programme Madeira-Açores-Canary Islands
PERSEUS	EU FP7 Project acronym: "*Protection of European Borders and Seas through the Intelligent Use of Surveillance*"
PLOCAN	The Oceanic Platform of the Canary Islands (*Plataforma Oceánica de Canarias*)
POGO	Partnership for Observation of the Global Oceans
POTEMA	ERDF project acronym: "*Programme for observation and environmental monitoring of the concentration of power generation devices in the PLOCAN test site*"
PPM	Project Portfolio Management
QA	Quality Assurance (data quality)
QC	Quality Control (data quality)
R&D	Research and Development
RDPMT	Exclusive Reserve of the Publicly Owned Seafront (*Reserva Exclusiva de Dominio Público Marítimo Terrestre*)
RE	Transmission grid manager and main carrier functions for the Spanish system (*Red Eléctrica*)
RIS3	Research and Innovation Smart Specialisation Strategy
ROV	Remotely Operated Vehicle
RV	Research Vessel
SEAS-ERA	EU FP7 Project acronym: "*Towards Integrated Marine Research Strategy and Programmes"*
SOCIB	Balearic Islands Coastal Observing and Forecasting System (*Sistema de Observación Costero de las Islas Baleares*)
SODECAN	Investment corporation of the Canary Islands Government (Sociedad para el Desarrollo

	Económico de Canarias)
SWOT	Strengths, Weaknesses, Opportunities and Threats analysis
TROPOS	EU FP7 Project acronym: "*Modular Multi-use Deep Water Offshore Platform Harnessing and Servicing Mediterranean, Subtropical and Tropical Marine and Maritime Resources*"
ULL	University of La Laguna (*Universidad de La Laguna, Spain*)
ULPGC	University of Las Palmas de Gran Canaria (*Universidad de Las Palmas de Gran Canaria, Spain*)
UNDIGEN	Project acronym: "*Functional Electrical Generation Systems Undimotriz*" supported by Spanish Ministry of Science and Innovation (INNPACTO 2011)
UP	University of Porto (Portugal)
UPM	Polytechnic University of Madrid (*Universidad Politécnica de Madrid, Spain*)
UV	University of Valencia (*Universidad de Valencia, Spain*)
VIMAS	Acronym used to name: "*Vehicles, devices, equipment and underwater machines*"
WOCE	World Ocean Circulation Experiment

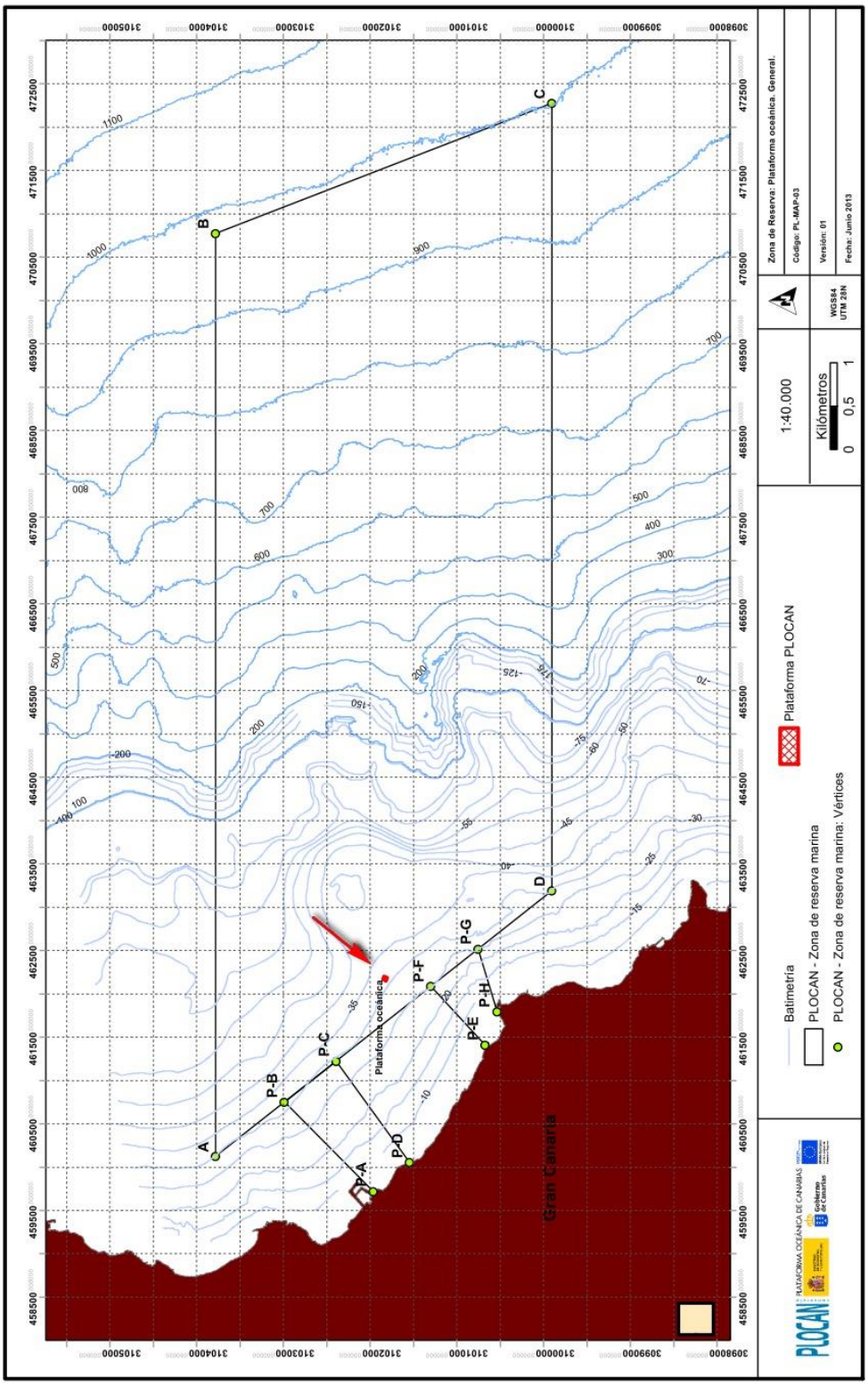
5.2.Location of the platform and the marine reserve area



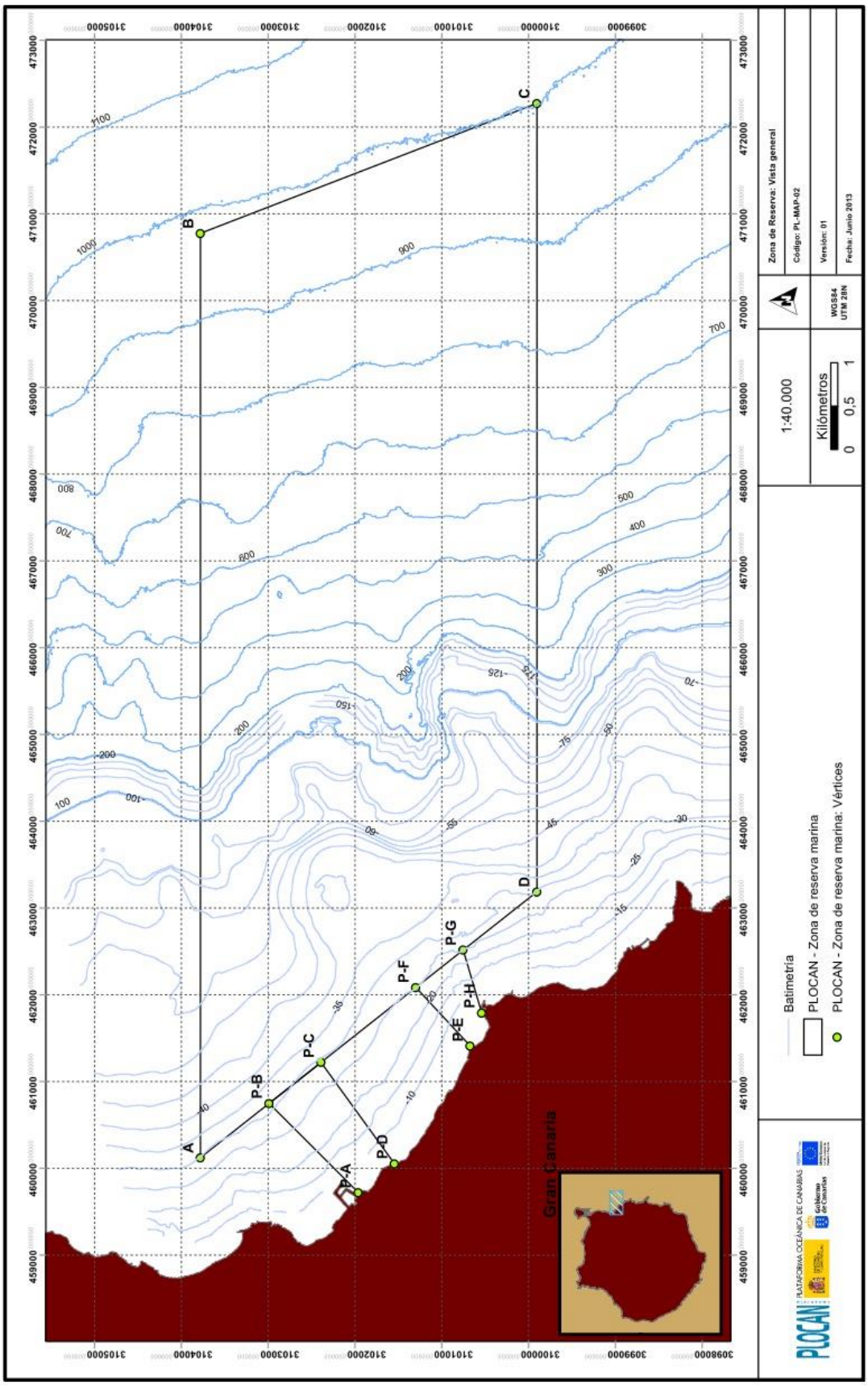
Planned location for the platform



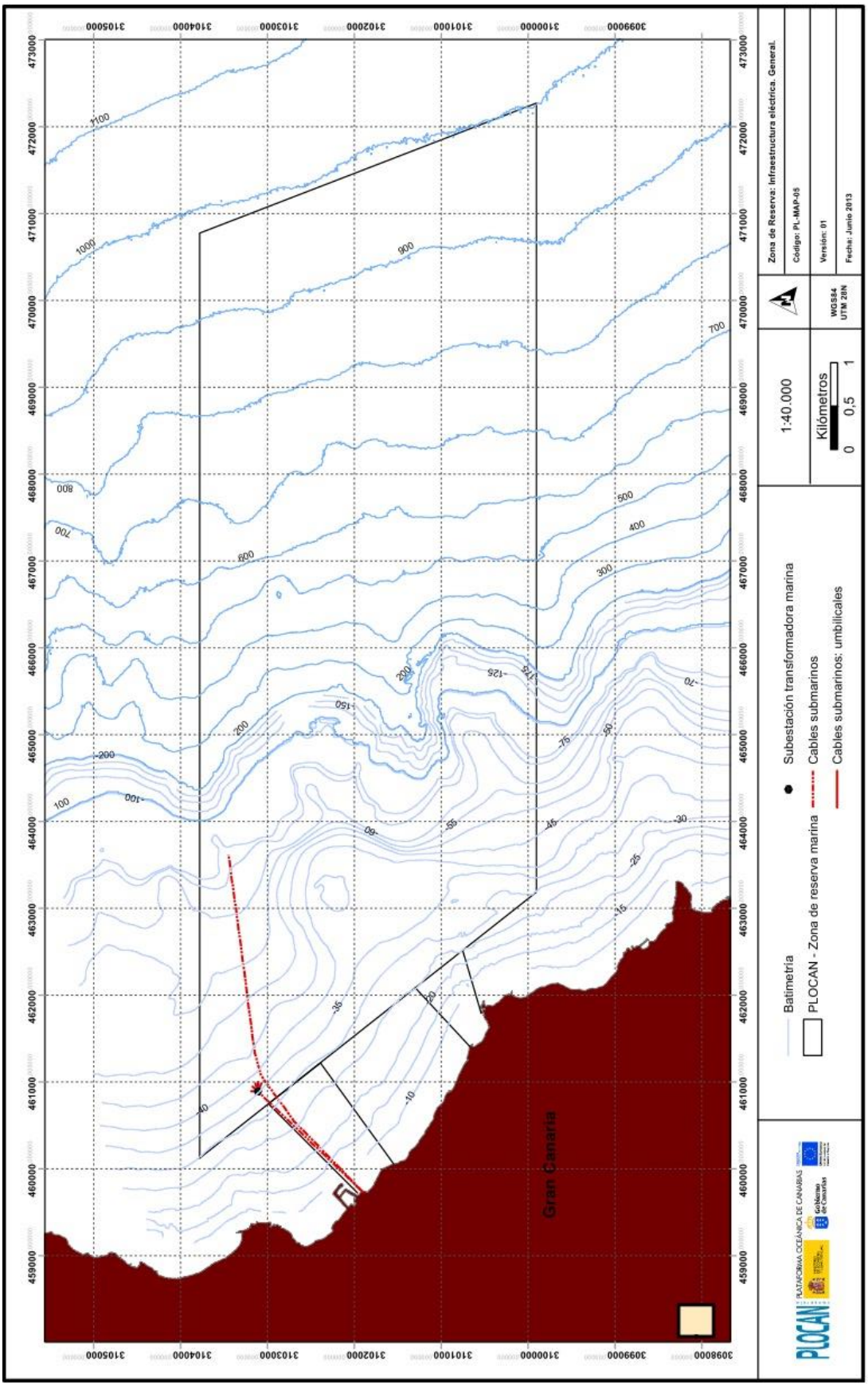
Planned location for the platform



Planned location for the platform



Planned location for the marine reserve area



Planned location for the underwater transformation station infrastructure and the cable

5.3.Main renewable energies test sites

International test sites

	FORCE
Location	Canada
Services	Is an Ocean Research Centre for Energy at Bay of Fundy (FORCE). It is Canada's leading research centre for in-stream tidal energy, located in the Bay of Fundy, Nova Scotia.
Facilities	FORCE provides a shared observation facility, submarine, cables, grid connection, and environmental monitoring at its preapproved test site.
Technical characteristics	Now they are using a turbine, also called a tidal current turbine, that works a lot similar to a underwater windmill. Is designed to accommodate three turbines at this time (or up to five megawatts in total).

	HINMREC
Location	Hawaii
Services	Hawaii National Marine Renewable Energy Center has 4 Tests Sites 3 of them for wave energy and one for test OTEC system components.
Facilities	Testing site for commercial size wave power systems.
Technical characteristics	Four wave energy conversion devices in the 300 to 500 KW range.

European test sites

	EMEC
Location	Scotland
Services	EMEC provides developers of both wave- and tidal energy converters. It is the first and only centre for its kind. They offer 14 full-scale tests berths.
Facilities	EMEC is an ideal test base, because of the excellent oceanic wave regime, strong tidal currents, grid connections, sheltered harbour facilities and the renewable, maritime and environmental expertise that exists within the local community.
Technical characteristics	At the test-site there is a subsea cable. They also gather weather, wave and tidal data from each site. It is possible to view these data live in their data dashboard. The power output from the test devices is measured.

	WAVE HUB
Location	England
Services	Wave Hub allows developers of wave energy devices to test new wave energy technologies.
Facilities	The company has a lease for 8sq km of sea, for 25 years. The seabed is connected to the grip by a 11/33kv subsea cable. Every developer will be allocated a berth of 2 sq km.
Technical characteristics	Wave Hub is connected to shore via an armoured subsea fibre cable. Each developer will be connected to the Wave Hub. One-half of the connector is fitted to the cable tail, and the second part will be connected to the Wave Hub customer.

	BELMULLET
Location	Ireland
Services	Developing Ocean Energy in Ireland. Full-scale wave energy test-site.
Facilities	The average power of the waves in Europe is highest near the West of Ireland. The wave power is nearly 76kW occurring the Irish coastline. The test-site is 100km from the shoreline. • SCADA-system • Cable laying • Grid connection • Interface between the on shore and offshore workers. • Performance test.
Technical characteristics	It will be installed four submarine cables, minimum one metre under the seabed.

	METCENTRE
Location	Norway
Services	It is a test centre for wind and marine energy. The METCentre provides concessions, infrastructure and services required for testing.
Facilities	The deep-water (200m depth) test-site is located 10km from the shoreline. The offers transport, mechanical steel and aluminium operation and maintained services.
Technical characteristics	12km 15MW submarine cable laid at depth of 200m. Connections for 22kV power at land.

	SEM-REV
Location	France
Services	Renewable marine-energy research, development and innovation.
Facilities	The site is connected to the power grid with a high-tension cable, with a total capacity of 8MWA-20kV, which can connect four prototypes simultaneously.
Technical characteristics	At the test-site there is a subsea-cable buried in the seabed. It is possible for the cable to connect to four prototypes at the same time. The output of the prototypes can then be monitored, and the electricity sold. The mean wave energy is 12kW/m and the mean wind velocity is 6.5m/s (10m).

National test sites

	BIMEP
Location	Spain
Services	Wave energy test centre and research centre
Facilities	20 MW of total power. Several WECs connection points. Ease of installation, testing, testing and operation. Research Centre Associate.
Technical characteristics	4 Input lines of 13 kV and 5 MW. Network connection to a line of 30 kV. Transformer 13/30 kV 20 MW. Electrical measurement systems for each line input

	IREC
Location	Spain
Services	Offshore deep-sea wind turbine testing plant and research centre
Facilities	ZÈFIR *Test Station* Research Centre Associate.
Technical characteristics	Phase1: 40m water depth. Phase2: 100m water depth Phase1: 3Km from coast. Phase2: 30km from coast Phase1: 20 MW. Phase2: 50 MW

5.4.Main centres using autonomous underwater vehicles

International Centers

	MBARI
Location	USA
Services	MBARI is a centre for advanced research and education in ocean science and technology, and does so through the development of better instruments, systems, and methods for scientific research in the deep waters of the ocean.
Facilities and Technical Charac.	The primary function of Marine Operations is to support the operation of three ships, two remotely-operated vehicles (ROVs), autonomous underwater vehicles (AUVs), and oceanographic instrumentation on local and Equatorial Pacific moorings.

	WHOI
Location	USA
Services	The Woods Hole Oceanographic Institution is dedicated to research and education to advance understanding of the ocean and its interaction with the Earth system, and to communicate this understanding for the benefit of society.
Facilities and Technical Charac.	R/V Atlantis (83 meter) - R/V Knorr (84.5-meter) - R/V Tioga 60-foot R/V Neil Armstrong scheduled for completion by 2014. NDSF Vehicles: **» HOV Alvin » ROV Jason » AUV Sentry** HOV DEEPSEA CHALLENGER, James Cameron 10000 meters HROV Nereus AUVs: » REMUS » SeaBED » Sentry » Spray Glider » Slocum Glider Towed Vehicles: » CAMPER » SeaSoar » TowCam » Video Plankton Recorder

	JAMSTEC
Location	JAPAN
Services	**Towards a New Maritime Nation** JAMSTEC envisions that their country will become an entirely ocean-based nation in the future. **Research and Development Challenges and Approaches** An integrated understanding and prediction of global environmental changes. **Towards an Integrated Research Institution of the Ocean, Earth, and Life** JAMSTEC personnel from various fields will continue to conduct a wide range of research and development into the future, using their free and flexible thinking.
Facilities and Technical Charac.	Research Vessel NATSUSHIMA, Research Vessel HAKUHO MARU, Research Vessel KAIYO, Deep Sea Cruising AUV URASHIMA, 3,000 m Class Remotely Operated Vehicle HYPER-DOLPHIN, Deep Ocean Floor Survey System DEEP TOW 7,000 m Class Remotely Operated Vehicle KAIKO 7000II Others

European Centers

	NOCS
Location	UK
Services	NOCS focuses on providing capability to meet the needs of the whole of the country's marine research community, including Royal Research Ships, deep submersibles, advanced ocean sensors and instruments.
Facilities and Technical Charac.	**Marine Autonomous and Robotic Systems** **Autosubs - Gliders – ROVs** Total of 11 gliders in the fleet. **Research Ship Management Group** RRS James Cook and RRS Discovery.

	MARUM
Location	GERMANY
Services	MARUM aims at understanding the role of the oceans in the Earth's system by employing state-of-the-art methods. It examines the significance of the oceans within the framework of global change, quantifies interactions between the marine geosphere and biosphere, and provides information for sustainable use of the ocean.
Facilities and Technical Charac.	Sea floor drill rig (MeBo) (ROVs) - the 1000 m ROV CHEROKEE and the 4000 m ROV QUEST (AUV) - MARUM operates a 5000 m rated AUV MOVE The mobile instrument platform MOVE!

	IFREMER
Location	FRANCE
Services	IFREMER, through its research work and expert advice, contributes to knowledge of the oceans and their resources, to monitoring of marine and coastal environments and to the sustainable development of marine activities. To these ends, Ifremer conceives and operates tools for observation, experimentation and monitoring, and manage the oceanographic databases.
Facilities and Technical Charac.	1 593 Ifremer employees and 372 Genavir employees 5 centres: Channel/North Sea, Brittany, Atlantic, Mediterranean and French Polynesia 26 sites spread along the coastline of metropolitan France and French overseas regions 8 research vessels (including 4 ocean-going ships), 1 manned submarine, 1 remotely-operated vehicle for deep sea explorations (- 6000 m) and 2 AUVs (Autonomous Underwater Vehicle)

	IFM GEOMAR
Location	GERMANY
Services	GEOMAR Helmholtz Centre for Ocean Research Kiel is one of the world's leading institutes in the field of marine sciences. The institute investigates the chemical, physical, biological and geological processes of the seafloor, oceans and ocean margins and their interactions with the atmosphere.
Facilities and Technical Charac.	Two open ocean research vessels JAGO, a three ton research submersible A remotely operated underwater vehicle, **ROV KIEL 6000** An autonomous underwater vehicle, AUV ABYSS, ROV PHOCA, a new 1.5 ton ROV with an operational working depth of 3000 meters.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