



# ANNUAL REPORT 2013



The background features a large, abstract graphic composed of three concentric circles in varying shades of blue, creating a sense of depth and motion.

# ANNUAL REPORT 2013



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# 1. LETTER FROM THE DIRECTOR

One of the things established by the addendum to the agreement between the MINECO and the CAC signed 28th December 2012 was a modification to the deadline for commissioning the platform, estimating that the construction phase would be complete by the end of 2014. This addendum changed the planning for the construction of the oceanic platform itself and the activities focused on the infrastructure. Even so, in line with what has been done since the agreement was signed in December 2007, the Consortium continues to implement a large number of actions, interacting with many companies, institutions and entities. The objectives of these activities make them worthwhile in themselves and they also enable us to validate the relevance of the objectives of the Consortium and will accelerate the efficient roll-out of the infrastructure.

The Strategic Plan 2013-2016 was presented at the end of June. This sets forth the specific actions, objectives and strategies that will act as guidelines for managing the organisation in the years to come, until such time as the plan can be drawn up with the platform in operation. This Strategic Plan reviewed the Consortium's strategic objectives bearing in mind the changes that have occurred in recent years, set against a backdrop of economic crisis. PLOCAN's mission however has been reinforced by the importance that the European Commission places on seas and oceans as drivers of the European economy (blue growth) due to their potential for innovation, growth and for generating jobs.

In the course of this year, the organisational structure of the Consortium has been readjusted to bring it in line with today's socio-economic

circumstances and the organisation's real needs, by attempting to enhance efficiency and by initiating the process of adapting to the operational needs of the infrastructure.

PLOCAN (together with Flanders, Belgium; Lower Silesia, Poland and Marche; Italy) was one of the four examples presented as benchmarks of EU smart specialisation in the conference "Regions as motors of new growth through smart specialisation" held on the 8th of November in the European Parliament in Brussels, where the main event was chaired by the President of the European Council, Herman Van Rompuy.

An international conference was held last November in the PLOCAN offices, entitled "A changing ocean", sponsored by the EUR-OCEANS consortium and the French Institute of Research and Development. The conference discussed the progress and prospects of fields of knowledge considered urgent and which will guide the interests and the needs of marine sciences in the coming years, with the participation of almost one hundred scientists and technologists from institutions and universities from Europe and the United States.

As can be seen from the information included in this report, the infrastructure is starting to effectively show the opportunity and efficiency of its philosophy, as a tool for guiding, facilitating and accelerating scientific and technological activities, both public and private, in an oceanic environment in Europe.



# 2. THE PLATFORM

## 2.1. MISSION

PLOCAN's mission is to ensure that the best technological research, development and innovation come to market as fast as possible to create economic growth and jobs by offering efficient access to the ocean at increasing depths and in an environmentally-sustainable fashion.

## 2.2. VISION

The vision is to be a more efficient infrastructure in the international context, in the field of maritime and marine science and technology, acting as a meeting point between public and private R+D+i.

## 2.3. OBJECTIVES

PLOCAN's general objective is provide the scientific-technological community with the conditions and the most efficient means for conducting observations, experiences and trials at increasing depths in the international context.

- **One of the best international test beds.**

Provide the business community with the best, and often the only test bed for activities in the deep ocean with sufficient environmental guarantees.

- **Submarine vehicle and instrument base.**

Provide a permanent operating base for vehicles and instruments working in the deep ocean, for all tasks that require these devices.

- **A scientific-technical environment of excellence.**

Offer a unique meeting place between the very best and most dynamic of the public scientific-technical community and the most innovative businesses in providing access to understanding and the use of the deep ocean.

- **Highly-specialised training.**

Offer a set of training programmes from vocational training to post-PhD, including specific education and training in the use of working facilities and devices and access to the deep ocean.

- **Organisational model.**

Test an innovative and enterprising public scientific-technical organisation capable of efficiently managing highly qualified teams of people, complex and expensive instruments and their relations with innovative firms and public and private socio-economic institutions.



# 3. INFRASTRUCTURE

The Oceanic Platform of the Canary Islands Consortium (PLOCAN) has the following marine-maritime and land-based facilities and infrastructure for attaining its goals:

## OCEANIC PLATFORM

Oceanic Platform presently under construction, located in the sea at a depth of 30 metres. This will be commissioned in 2015.

## OFFICES ON LAND

Offices on land provided by the Autonomous Community of the Canary Islands, located in Taliarte (Telde) in the former facilities of the Canary Islands Institute of Marine Sciences, with meeting rooms, assembly halls, workshops, operations control room, submarine vehicle workshop (LT1), calibration tank for submarine vehicles, laboratories (dry and wet) and class rooms.

## DOCKS AND WAREHOUSES

Docks and warehouses in the scientific port of Taliarte.

## TEST BED

Test bed covering an area of 23 km<sup>2</sup> for testing and monitoring marine energy devices, equipped to monitor meteorological-oceanographic parameters.

## ELECTRICAL AND COMMUNICATIONS INFRASTRUCTURE

Electrical and communications infrastructure for evacuating energy and data from devices on trials in the test bed to land

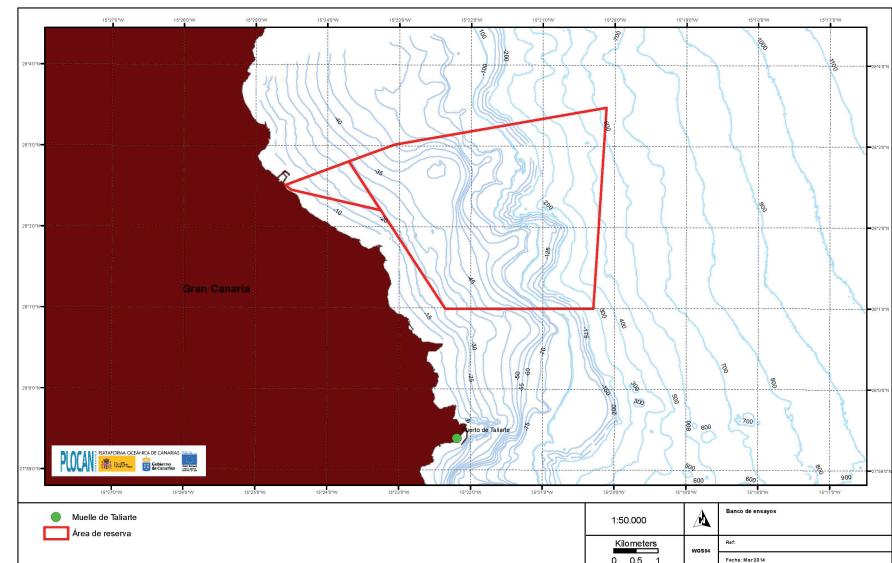
◀ Figure 1. Computer generated image of the platform

## OCEANIC OBSERVATORY

Oceanic observatory comprising the ESTOC station (European Oceanic Time Series Station in Canaries), the sensors that monitor the test bed and the gliders that operate in both sites from time to time.

## SUBMARINE VEHICLE AND INSTRUMENT BASE

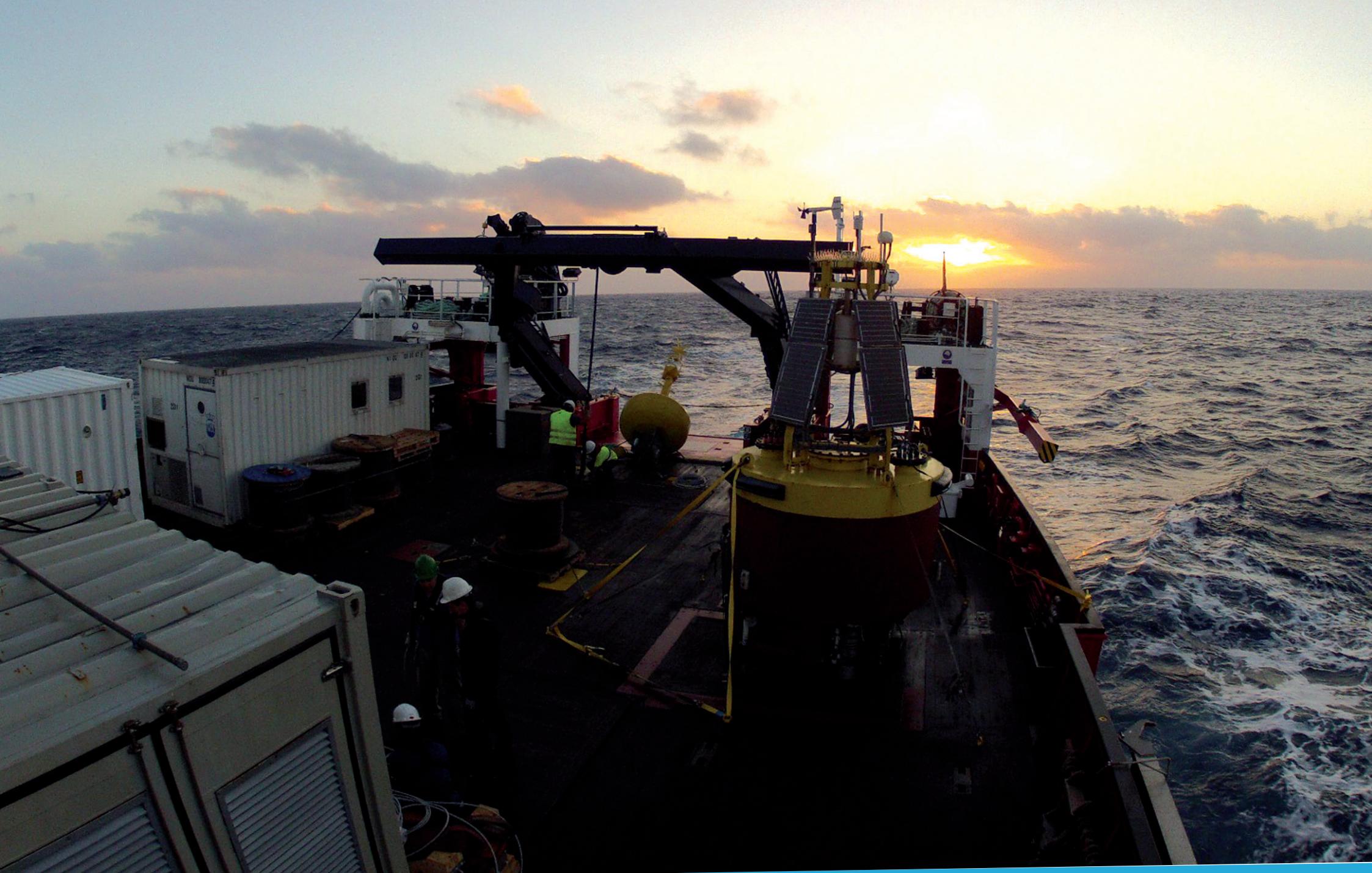
Submarine vehicle and instrument base made up of glider-type submarine vehicles and ROVs (Remotely Operated Vehicle) and a light QUER-40 vessel.



▲ Figure 2 Test bed reserve area



◀ Figure 3. Offices on land and  
Taliarte docks





# 4. STATE OF DEVELOPMENT

After the presentation of the building project by the construction company and its approval in 2013, work started on processing the administrative and environmental permits for setting out on site.

An environmental report on the project was presented in June, including an environmental surveillance programme of the construction work. The environmental authorities decided that the project did not require an assessment regarding the impact in the environment, but a surveillance plan for this issue has been drawn up.

Concerning the test bed, in 2013, progress was made in the process of putting the marine part of the electrical and communications infrastructure out for tender and for filing for the pertinent reserve area, including all the environmental procedures.

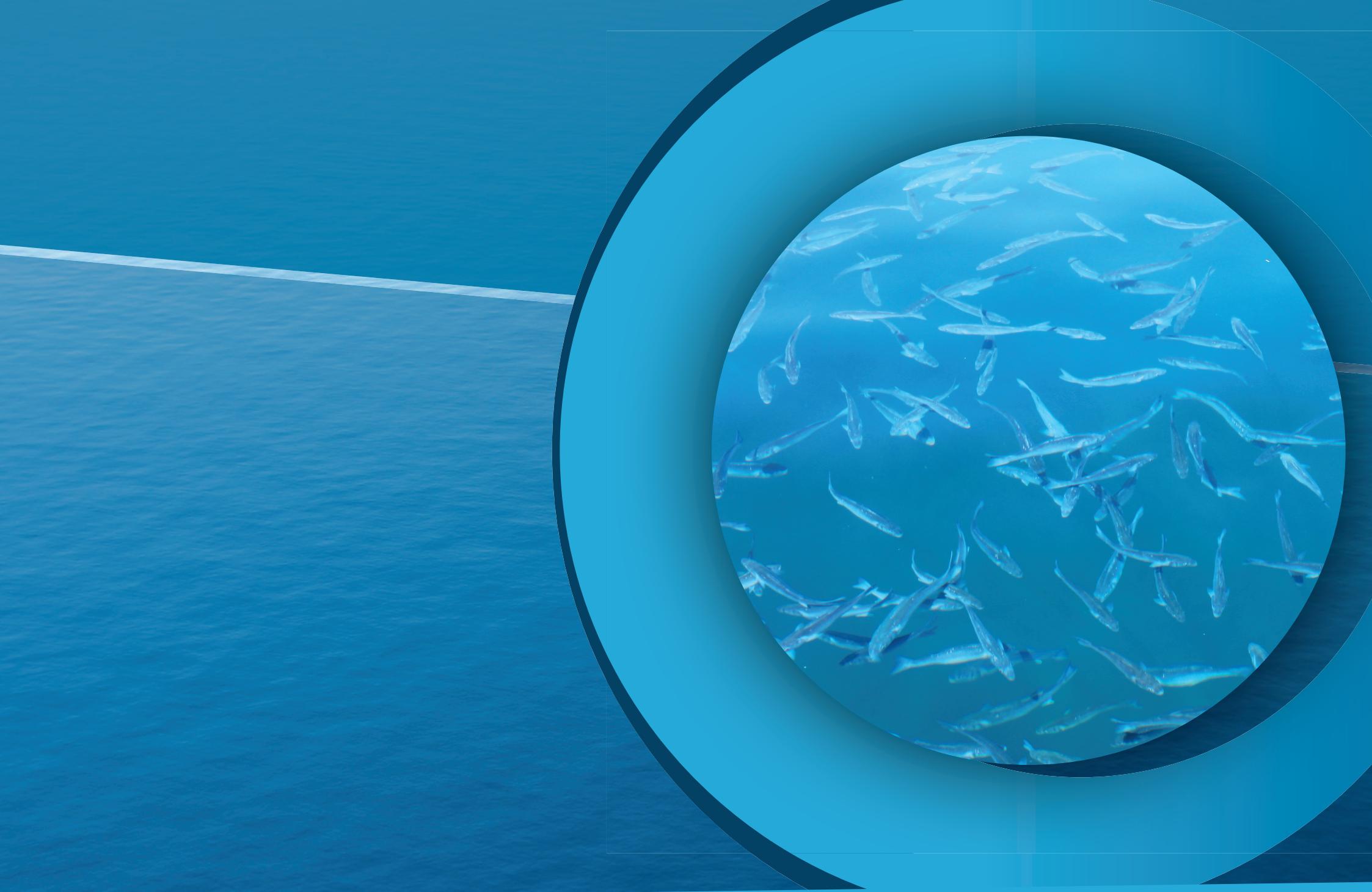
The timeline below shows the PLOCAN work programme that appears in the scientific-technical plans that organises the Consortium's activities in five blocks and by four-month periods.

## 4.1. TIMELINE

	2007			2008			2009			2010			2011			2012			2013		
Four month periods	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
A. Construction of the Platform																					
A.1. Definition of needs																					
A.2. Competition opened																					
A.3. Finalisation of the competition																					
A.4. Construction of the platform <sup>1</sup>																					
A.5. Installation of the Equipment and testing																					
B. Environmental Sustainability																					
B.1. Definition and studies prior to installation																					
B.2. Definition and study of area of installation																					
B.3. Works Impact Study																					
B.4. Post-work and operating studies																					
C. Scientific and technological projects																					
C.1. Initial scientific and technological proposal																					
C.2. Definition of elements with influence on the construction																					
C.3. Consolidation of initial projects																					
C.4. Regular consolidation of projects																					
C.1/C.4. Promotion of public R+D+i projects																					
D. Organisational and Operational Development and Equipment																					
D.1. Prior definition																					
D.2. Setting up of the First Nucleus; Basic operational definition																					
D.3. Setting up of the Second Nucleus; Consolidation of operational definition																					
D.4. Setting up of the Third Nucleus; Maturation of the operational organisation																					
D.5. Functional organisation																					
D.1/D.5. Dissemination																					
D.2/D.5. Promotion of convergence between public and business R+D+i																					
D.2/D.5. Acquisition, testing and installation of the equipment																					
D.3/D.5. Staff Training Programme for own staff and users																					
E. Socio economic project																					
E.1/E.2. Initial business and institutional nucleus																					
E.1/E.2. Initial business and institutional nucleus																					
E.3. Development of the socio economic project																					
E.4. Operational testing																					
E.1/E.4. Promotion of projects of business R+D+i																					

1. Project, administrative authorizations processing and platform construction. The delivery of the project was carried out in January 2013, date from which the necessary administrative procedures were initiated. The start of the construction is planned for 2014.





# 5. ORGANISATIONAL STRUCTURE (CR, CE, COCI, CASE)



▲ Figure 4. Organisational structure of the Consortium

## STRATEGIC COUNCIL

The Strategic Council is the highest authority for managing and directing the Consortium. It is made up of the Chair, the Deputy Chair and the Members. The Chair and Deputy Chair rotate and the office is taken on alternatively for a period of two years by MINECO (Ministry of Economy and Competitiveness) and the CAC (Canary Islands Autonomous Community). The board members represent the MINECO and the CAC (four representing each institution). The secretary, appointed by the Board of Governors, attends the meetings, as does the director of the infrastructure.

The powers of the Strategic Council include the power to set out guidelines and the general framework for drawing up the project, for setting the rules, guidelines and general criteria for the Consortium's actions and operations, approving the management style to ensure the fulfilment of its purposes and approve the Consortium's annual budget, proposed by the Executive Committee, the annual accounts and how the last budget has been spent.

The Strategic Council meets in ordinary session twice a year and in extraordinary session at the request of the Chair, or whenever one of the institutions represented requests it. The Chair of the Strategic Council is the highest representative of the Consortium.

At its last meeting, held in 2013, the Strategic Council was made up as follows:

**CHAIR**

Mrs María Luisa Castaño Marín  
Director General of International Co-operation and Institutional Relations of MINECO

**DEPUTY CHAIR**

Mr Juan Ruiz Alzola,  
Director General of the Canary Islands Research, Innovation and Information Society Agency (ACIISI)

**MEMBERS**

Mr José Ignacio Doncel Morales  
Deputy Director General of Scientific and Technological Infrastructure Planning at MINECO

Mr Antonio Figueras Huerta  
Deputy Chair of Scientific and Technical Research at the State Council of Scientific Research (CSIC)

Mr Eduardo Balguerías Guerra  
Director of the Spanish Oceanographic Institute (IEO)

Mr Jesús Velayos Morales  
Deputy Minister of the Treasury and Planning of the Canary Islands Regional Government

Mr Jorge Marín Rodríguez  
Deputy Minister of the Office of the President of the Canary Islands Regional Government

Mrs María Antonia Moreno Cerón  
Director General of Industry and Energy of the Canary Islands Regional Government

**EXECUTIVE BOARD**

The Executive Board is a governing body created to monitor and implement the Consortium's activities, comprised of four representatives of the CAC, at least one of which must be a member of the Strategic Council, and four representatives of MINECO, at least one of which must be a member of the Strategic Council. The Chair and Deputy Chair of the Committee rotate in the same way as in the Strategic Council, bearing in mind that the Chair of both bodies cannot be held by the same institution at the same time.

The Executive Board is the body tasked with presenting the budget, the annual accounts and the liquidation of the previous budget to the Strategic Council for their approval, together with an Annual Action and Project Plan and the scientific programme to be implemented in the facilities.

The Executive Board meets in ordinary session at least once a quarter and in extraordinary session whenever it is convened by the Chair, or whenever either of the institutions represented on it so request.

At the last meeting held in 2013, the Executive Board was made up of the following people:

**CHAIR**

Mr Juan Ruiz Alzola  
Director General of ACIISI

**DEPUTY CHAIR**

Mr José Ignacio Doncel Morales  
Deputy Director General of Scientific and Technological Infrastructure Planning at MINECO

**MEMBERS**

Mr Javier Querol Carceller  
Co-ordinator of the Area of Natural Resources at CSIC

Mr Eladio Santaella Álvarez  
Advisor Member to the Spanish Oceanographic Institute

Mrs Ana Aricha Yanguas  
Head of the environmental division of the Department of Scientific and Technological Infrastructure Planning

Mr Arturo Melián González  
Director General of Planning and Budget of the Canary Islands Government

Mrs Patricia Escobar Díaz  
Head of Research Support Services of the Canary Islands Research, Innovation and Information Society Agency (ACIISI)

Mr Antonio Lopez Gulías  
Director of Innovation of the Canary Islands Research, Innovation and Information Society Agency

**CHAIR**  
Mr José Regidor García  
Chancellor of ULPGC (University of Las Palmas de Gran Canaria)

**MEMBERS**  
Mr Rafael Rodríguez Valero  
Director General of the Merchant Navy

Mr Andrés Hermida Trastoy  
Director General of Fisheries Planning

Mr Vicente Marrero Domínguez  
Chair of the Canary Islands Maritime Cluster

Mr Miguel Montesdeoca Hernández  
Chair of the Canary Islands Engineering Cluster

Mr Fernando Redondo Rodríguez  
Chair of the Canary Islands Economic and Social Committee

Mr Antonio Sánchez Godínez  
Rear Admiral Engineer, Director of naval constructions at the Ministry of Defence

**SECRETARY**  
Mr Arturo González Romero  
Director General of the INNOVAMAR Foundation

**SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE (COCI)**  
The Scientific and Technical Advisory Committee (COCI) is the other advisory body to the Consortium. Its objective is to advise on PLOCAN's scientific and technological activities, programmes and plans, propose future actions that could enhance the quality and the scope of the work and set out and propose modes of access for external scientists to the platform and to make the final selection of these.

#### **SOCIO-ECONOMIC ACTIVITIES ADVISORY COMMITTEE (CASE)**

The Socio-Economic Activities Advisory Committee (CASE) is an advisory body to the Consortium that advises on PLOCAN's scientific and technological activities and plans and proposes future actions that can focus the Consortium's work to make a contribution to the sustainable socio-economic development of oceanic activities.

The CASE is made up of a group of people of repute in the socio-economic fields related to the aims and activities of the Consortium. The functions of the CASE include drawing up an advisory report every four years on the future opportunities, prospects and capacities of the centre. This report is presented to the Board of Governors to help to orient the strategy of the centre.

In 2013, the composition of the CASE was as follows:

The COCI is made up of people of international repute in fields related to the aims and activities of the Consortium. Its members were appointed by the Board of Governors, at the proposal of the institutions that form part of the Consortium. The fourth meeting of the COCI was held in Madrid on 27th of May 2013.

The functions of the COCI include drawing up an advisory report every four years on the future opportunities, prospects and capacities of the centre, which is then presented to the Board of Governors to help them with the strategic orientation of the centre.

In 2013, the composition of the COCI was as follows:

#### **CHAIR**

Prof. Gerold Wefer

Professor from the University of Bremen

#### **MEMBERS**

Mr Enrique Álvarez Fanjul

Head of the Area of Knowledge of the Physical Environment of the State Ports Authority

Dr María Soledad Izquierdo López

Professor at the University of Las Palmas de Gran Canaria

Dr Alicia Lavín Montero

Researcher from the Oceanographic Centre in Santander, Spanish Oceanographic Institute (IEO)

Prof. Chris Barnes

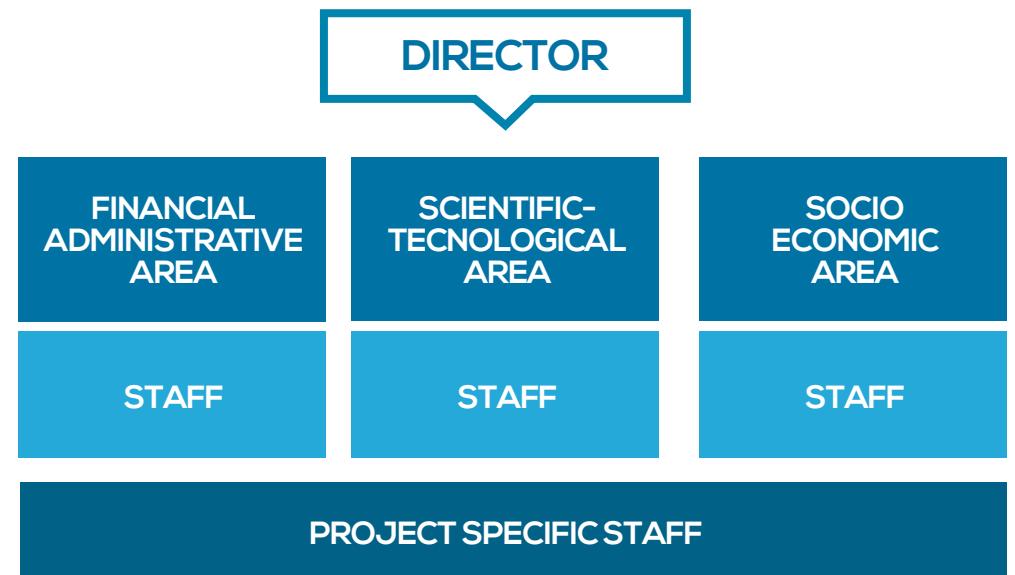
Professor of the University of Victoria (Canada)

#### **SECRETARY**

Prof. Aída Fernández Ríos

Researcher of the Marine Research Institute of Vigo (CSIC)

The following diagram shows the internal organisational structure of the Consortium, with three distinct areas in which the Consortium staff is divided.

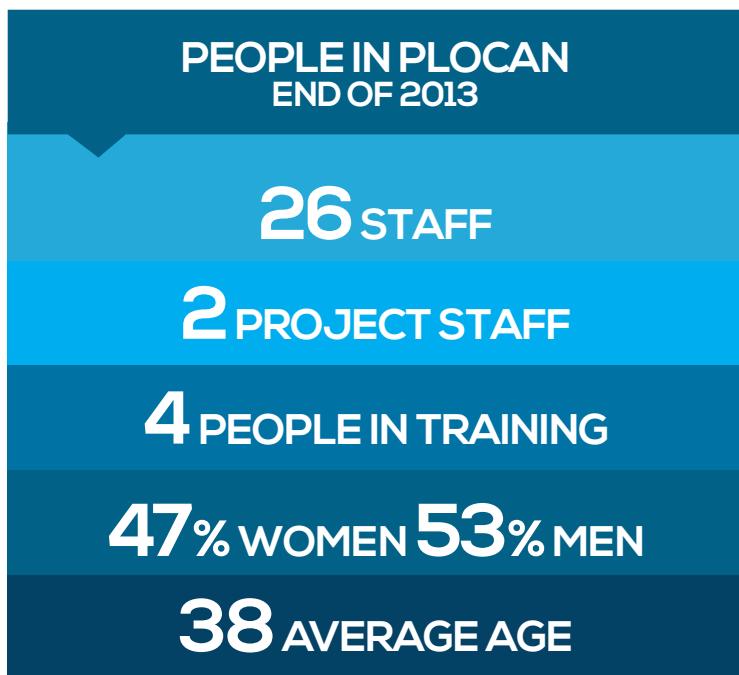


▲ Figure 5. Internal Structure of the Consortium





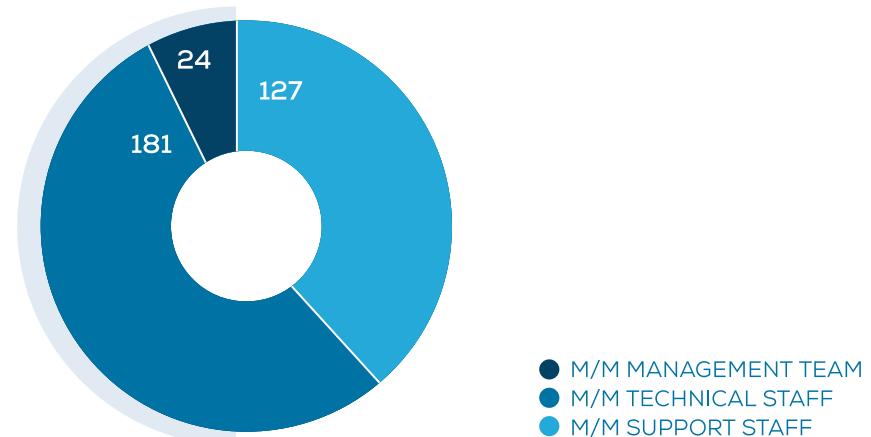
# 6. PEOPLE IN PLOCAN



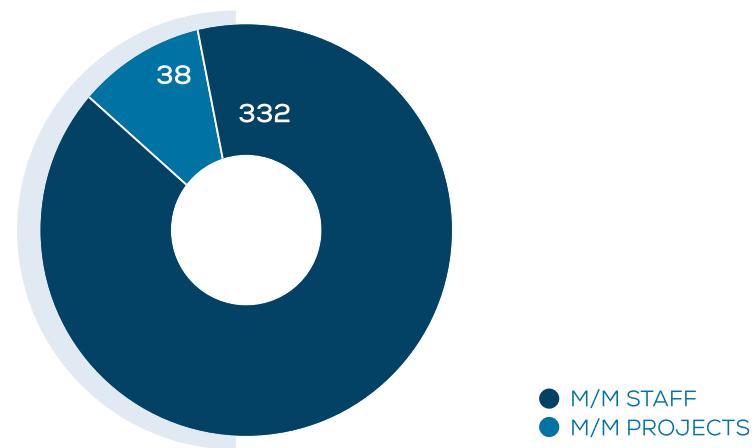
In 2013, the organisational structure of the Consortium was readjusted to bring it in line with the socio-economic circumstances and the real needs of the organisation, with a view to enhancing efficiency, thus starting the process of adapting to the operational needs of the infrastructure.

The following graphs show the proportion of the man/month units existing at the different levels of the organisation and the relation between the man/month units specifically hired for projects and the Consortium staff.

Section 7 (Activities report), sub-section 7.8 provides information on the call for candidates for jobs published.



▲ Figure 6. Man/month units at the different levels of the organisation



▲ Figure 7. Man/month units for projects and staff

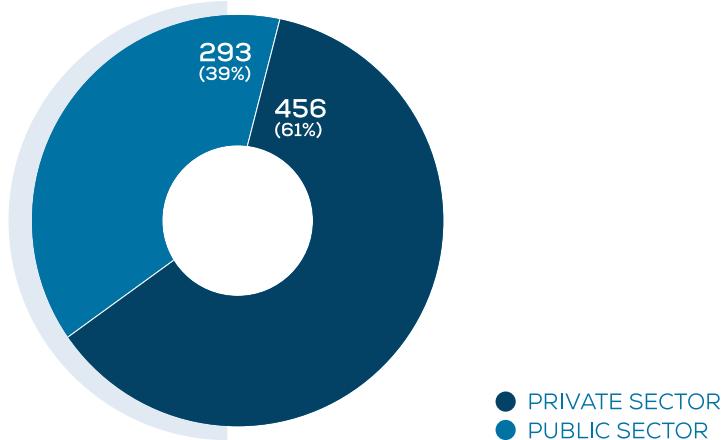


# 7. ACTIVITIES REPORT

The general activities engaged in for 2013 in the different areas are in an appendix to this annual report.

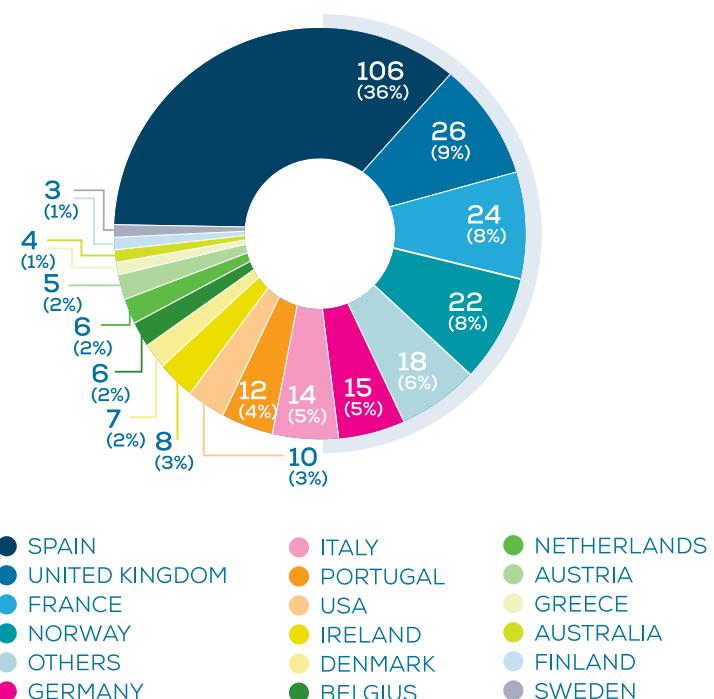
## 7.1. PLOCAN RELATIONS WITH THE BUSINESS AND INSTITUTIONAL FABRIC

In 2013, PLOCAN continued with its objective of driving the establishment of relations with companies and institutions related to the area of knowledge in both the public and the private sector. The number of collaborations increased in comparison with previous years. The graph below shows the comparison between co-operation established with the public and private sectors.



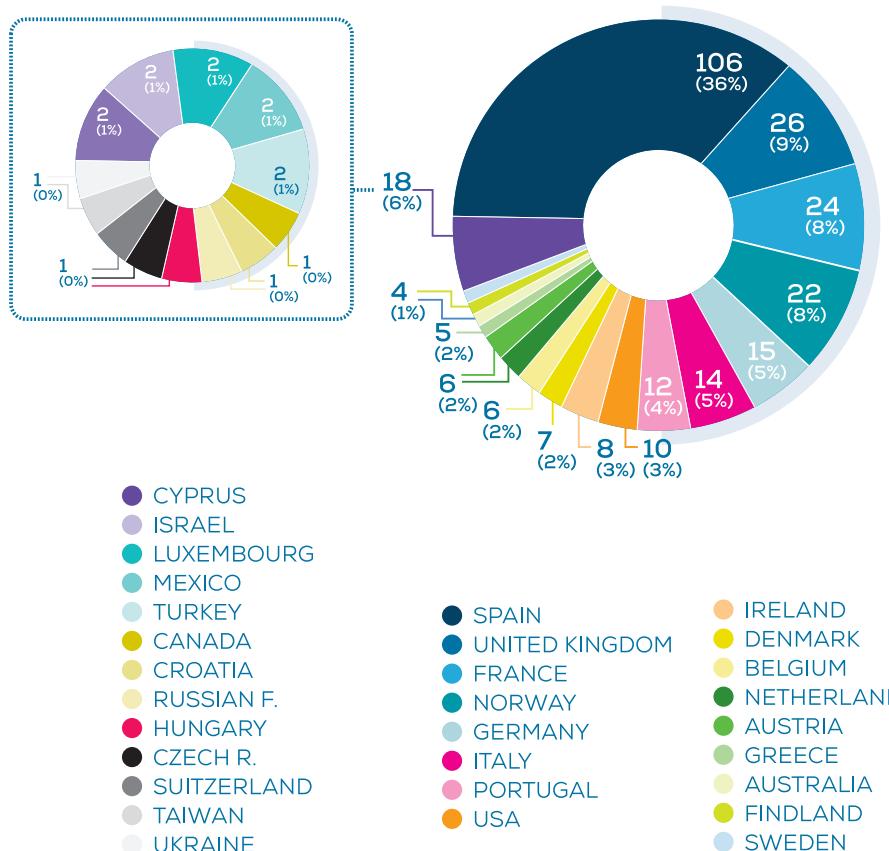
▲ Ilustración 8. Distribution of public-private co-operation

The graph below shows the major active collaboration that PLOCAN has established with the business sector. It shows that Spanish companies continue to be one of the main objectives of galvanising the R+D+i carried out by PLOCAN. The trend initiated in 2012 – an increase in relations with foreign companies, mainly European companies – was consolidated in 2013 and we continue to establish ties with new countries that we intend to promote in the future.

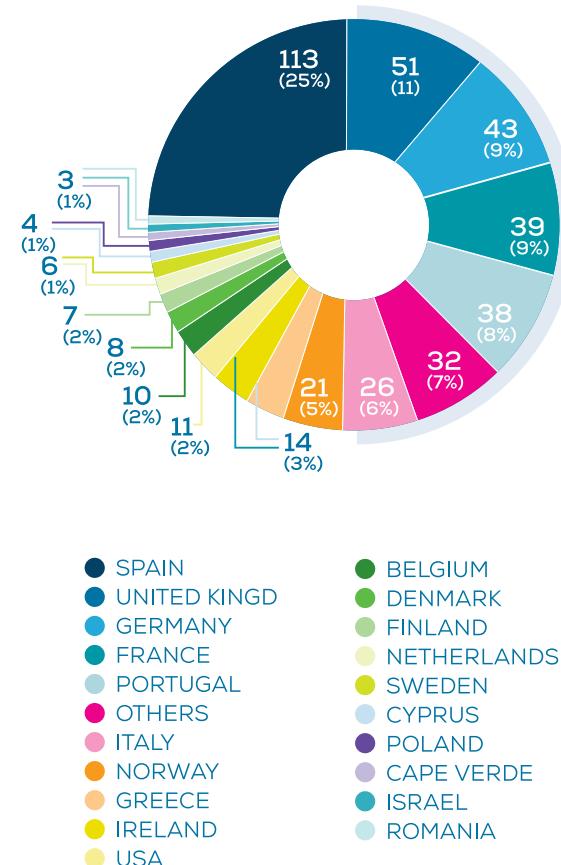


▲ Ilustración 9. Private co-operation distributed by countries

The following graph shows how PLOCAN has opened up to the European scientific and technical community (universities, research centres and government bodies). As with companies, the percentage of international relations has increased over the previous year, not just in the European context, but also with regard to interactions with more countries.

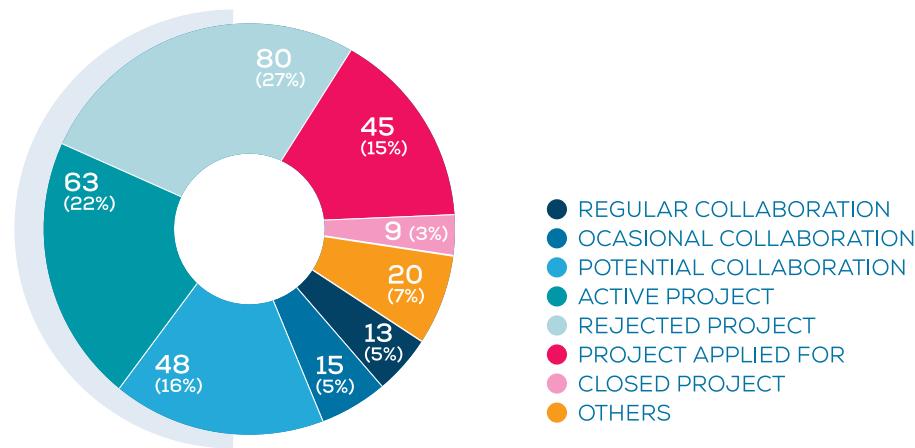


▲ Figure 10. Private co-operation distributed by countries



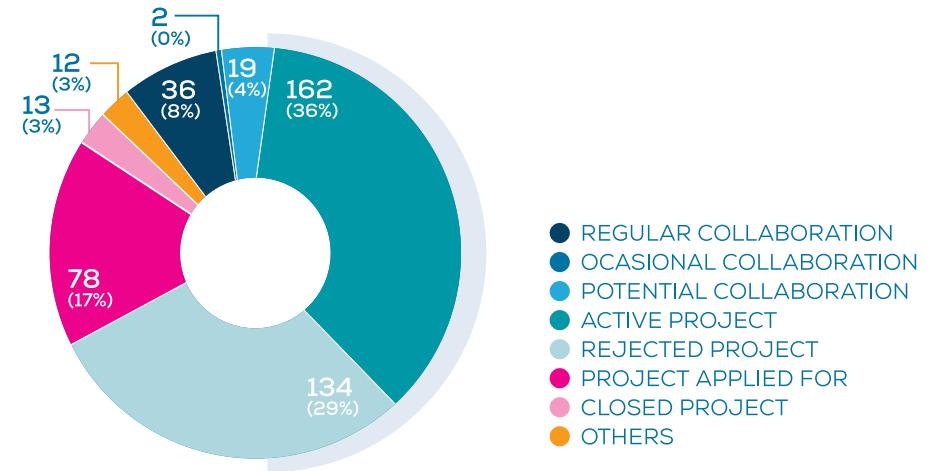
▲ Figure 11. Public co-operation distributed by countries

The following graph shows PLOCAN's relations with private bodies, distributed by the kind of collaboration established. The trend starting in 2012, in which potential collaboration started to give way to projects requested as the largest percentage, has been consolidated. The number of partners in active projects increases significantly in 2013 over the previous year. This suggests ever-greater and ever-more sound relations between PLOCAN and the companies of its scientific and technological environs, both nationally and internationally.



▲ Figure 12. PLOCAN relations with private bodies

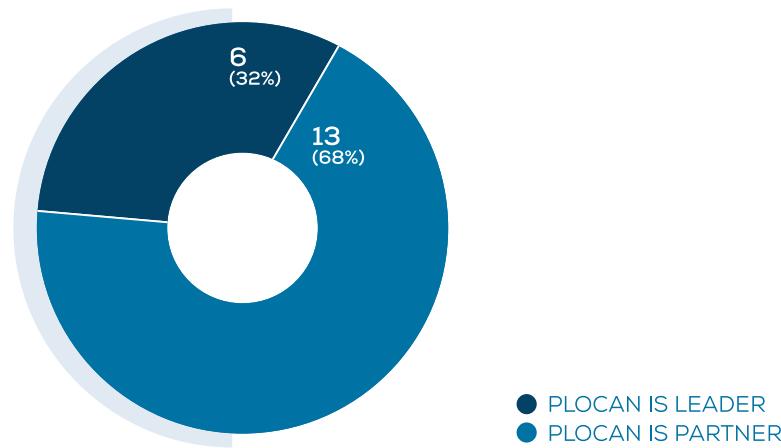
Like last year, with regard to public bodies, we can see that most of the relations established with institutions of this kind occur in the framework of joint participation in R+D+i projects.



▲ Figure 13. PLOCAN relations with public bodies

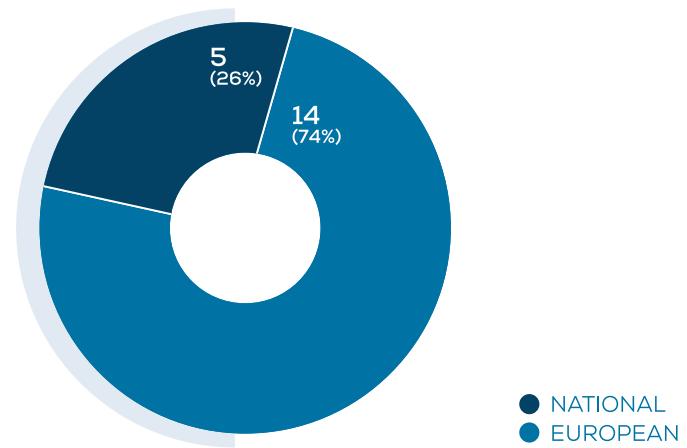
## 7.2. PROJECTS

A total of twenty one projects were managed in 2013, eight of which were led by PLOCAN. The following graphs offer a view of the kind of PLOCAN participation in these projects.

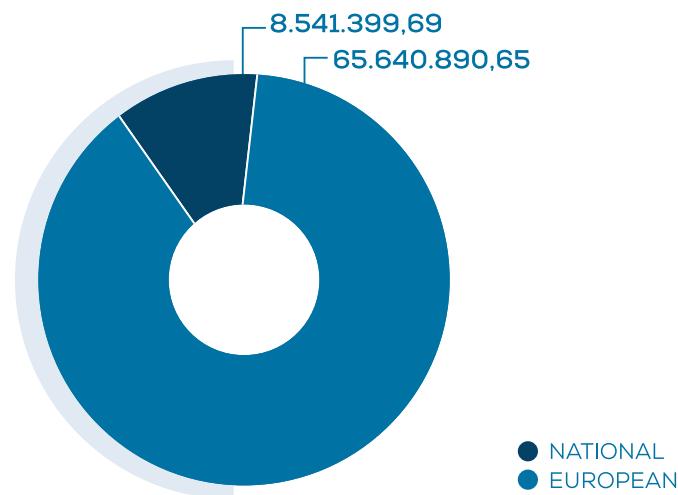


▲ Figure 14. PLOCAN's role in projects implemented in 2013.

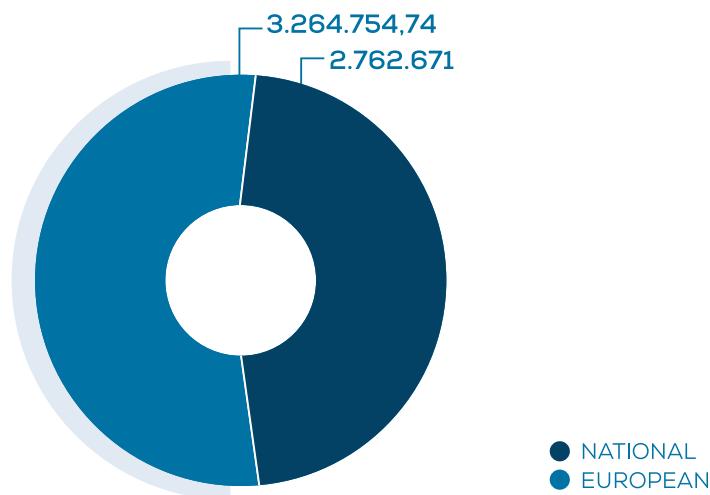
By origin of funding, seven of them were national projects, while fourteen were European.



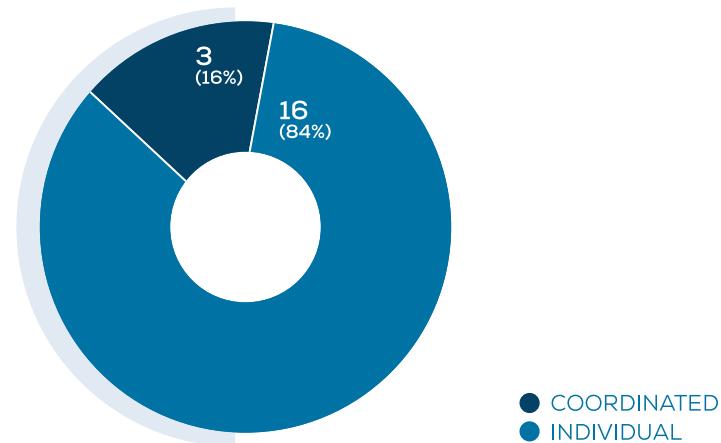
▲ Figure 15. Projects on-going in 2013 classified by origin of funding



▲ Figure 16 Total funding of projects implemented in 2013



▲ Figure 18 PLOCAN funding through projects implemented in 2013



▲ Figure 17. Projects on-going in 2013 classified by kind of project

The list and description of the projects managed by PLOCAN in 2013, in alphabetical order, is as follows:

## CANAUTIC

Canaries-Cape Verde leisure sailing co-operation platform. Socio-economic and environmental diagnosis of sailing activities and proposals for planning leisure and sports sailing activities

PCT-MAC 2007-2013

The CANAUTIC project seeks to use collaboration between maritime and marine institutions of the Canary Islands and Cape Verde to foster sustainable regional development by integrating the economic activities of the coastal areas of the Canary Islands and Cape Verde to establish a framework of rational use of the coastal areas based on social, economic and environmental criteria. The project is divided into three distinct phases:

- Phase one: to identify port infrastructures devoted to sailing activities and an environmental and socio-economic diagnosis. The sustainability component will be a study of the use of Renewable Energy in port facilities

associated with leisure and sports sailing in Cape Verde and the Canary Islands.

- Phase two: the distinguishing features will be to use maps of the coast, with these focusing on sports and leisure sailing-related uses. Moreover, there will be descriptions of all the sailing connections between the Canary Islands and Cape Verde, which will be fed into the CANAUTIC Web GIS. On the other hand, a CANAUTIC conference is planned.
- Phase three: roll out the CANAUTIC Co-operation Platform and implement a project communication plan.

## EDUROVS

Workshop to attract and motivate high school students into science and engineering by building and remotely operating ROVs

### La Caixa Social Work

The general objectives pursued by this project are as follows:

- Introduce students to science, technology and engineering by reinforcing concepts such as Newton's laws, density, moment, torque, force or distribution of masses.
- Foster an interest among students in science and technology using submarine exploration and robotics as a common tool that connects the two fields.
- Provide incentives for team work, respect for values and promote creativity
- Construction, bearing in mind a technological

need for marine use, respecting the environment and using every-day materials.

The specific Project objectives are:

1. Train between 7 and 14 teachers in the skills and content necessary for teaching and organising the workshop.
2. Organise, prepare and give the workshop to build the ROVs in high schools/ and other centres on each of the islands.
3. Organise a ROV Demonstration and Operation Event in Gran Canaria among participating High Schools and other Centres.

# EGO-COST Action ES0904

## European Gliding Observatories Network

COST European Cooperation in Science and Technology

The main objective of this action is to coordinate on-going research that uses gliders and the conception of future research, to operate fleets of autonomous submarine gliders to provide profitable methods for discovering and monitoring the ocean on a global, regional and coastal scale, providing benefits for basic oceanographic research and for operational applications for marine activities. The gliders are affordable smart platforms that are useful for long-term multi-parameter observations. They play an important role in both present and planned marine observation networks.

Deployed in groups, they provide high spatial and temporal resolution data almost in real time that will efficiently fill the gaps left by the existing, in situ networks based on other marine platforms, such as ARGO on-line profiling floats. This will be beneficial both for oceanographic research and for operational oceanography systems in which many marine activities currently confide. However, the deployment of groups of gliders requires highly-qualified operators and a sophisticated level of co-operation. The objective of the "European Glider Observatories" action is to build scientific, technological and organisational co-operation for a European capacity for sustained ocean observation with submarine gliders.

# ESTRAMAR

## Marine-Maritime R+D+i Strategy for Macaronesia

PCT-MAC 2007-2013

The object of the Project is to promote the Marine-Maritime R+D+i+D+i of the European and African Macaronesian regions so that their approaches and results are aimed at helping to enhance the articulation of the science-technology-business system in fields such as transport safety and sustainability, maritime tourism and ports, enhancing protection of coastal areas, resources and marine bio-diversity and the forecasting and management of natural risks, and hence drive the socio-economic development of these regions by continuing with international objectives.

This objective is a specific contribution to improve the deficient R+D+i system in a specific area – Marine/ Maritime -, where the regions of Macaronesia face their own conditions and have their own potential that, if harnessed, will contribute significant value to their development. Prior experience and the agreements established between partners and other stakeholders of the sector guarantee continuity in strengthening a sound base for co-operation and financial sustainability.

## ETS

*Submarine Transformer Station Infrastructure and Equipment for the environmental monitoring of simultaneous operation of new marine electricity generation devices*

ERDF Technology fund Operational Programme

The prime objective of the project is to drive and accelerate the development of marine renewable energies in competitive conditions, in "limited" spaces in environmentally sustainable conditions, laying the scientific-technical foundations to start socially acceptable certification methods and guarantees. This general objective translates into two specific objectives:

1) Investment in acquiring, installing and commissioning a Submarine Transformer Station (ETS) for multiple marine production devices: This infrastructure will facilitate trials

for emerging technologies for harnessing the energy potential of the seas, based initially on wave-generated energy.

2) Acquisition of advanced equipment for the environmental monitoring of the operation and interaction of a concentration of generating devices. The environmental impact of a concentration of initiatives in a relatively small area is the emerging factor to be assessed, monitored and "certified", for which complex equipment has to be available, some of which has to be specifically designed for this mission.

# EURATHLON

*Support action from a targeted intelligent autonomous robotic contest:  
the European RoboAthlon*

FP7-ICT-2011-9

EUROATHLON is a new open-air robotics competition that invites candidate teams to test the intelligence and autonomy of their robots in realistic, simulated emergency-response scenarios. Inspired by the Fukushima accident in 2011, the EUROATHLON competition will require a team of land, marine and air robots to work together to inspect the scene, gather environmental data and identify critical risks. Before this “grand challenge” in 2015, one land-based and one marine-based competition are to be held in 2013 and 2014 respectively. The EUROATHLON competitions will be supported by annual workshops for competitors. At the same time, there will be an open process for developing standards to allow a

comparison of different robots in the EUROATHLON competitions. Associated audience-participation activities will connect EUROATHLON to research into robotics, the industry and the emergency services, and also with the general public. The public will be welcome to attend and the EUROATHLON events are expected to draw considerable attention from the press and the media. As it addresses a specific and pressing need – smart robots for disaster response – EUROATHLON will provide European robotics with a platform to challenge the world to spread and showcase an increasingly challenging, wide-spread and high-profile European cognitive robot technology.

# FIX03

## *Fixed point open ocean observatory network*

### FP7-INFRASTRUCTURES-2012-1

The fixed point observatory network (Fix03) seeks to integrate European fixed point open ocean observatories and enhance access for the community in general to these key facilities. This will provide multi-disciplinary observations in all parts of the oceans from the air-sea interface to the deep ocean bed. Co-ordinated by the National Oceanography Centre, United Kingdom, Fix03 will be based on the significant advances achieved by the EuroSITES, ESONET and CARBOOCEAN FP 7 programmes. With a budget of €8.4m over 4 years (from September 2013), the initiative has 29 partners from the areas of academe, research institutions and SMEs. Moreover, 14 international experts from a wide range of disciplines make up the Advisory Committee.

The programme will be achieved by means of:

1. Co-ordination activities to integrate and harmonise the current technological, procedural and electronic infrastructure processes. Strong ties will be fostered with a broad community from academe, industry, politics and the general public via dissemination, an exchange of know-how and training activities.

2. Support actions to offer a) access to observatory facilities for those who do not currently have such access and b) free access to data and product services.
3. Joint research activities to innovate and improve the current capacity for multi-disciplinary in-situ observation of the ocean. Open ocean observation is currently a priority for European marine and maritime activities, as reflected in the recent declaration made by the EurOCEAN 2010 Conference, and internationally from the declaration of the OceanObs09 Conference. The programme proposals will provide important data on environmental products and services to tackle the Framework Directive on Marine Strategy and to provide support for the E.U. Integral Maritime Policy. The Fix03 network will provide free access to top-quality in-situ fixed point data. It will provide an integral framework of open ocean facilities in the Atlantic Ocean from the Arctic to the Antarctic and throughout the Mediterranean, allowing for an integral, regional and multi-disciplinary approach to understand natural and man-made changes in the ocean.

# GROOM

Gliders for research, ocean observation and management

FP7-INFRASTRUCTURES-2011-1

Gliders are affordable, smart platforms, useful for long-term, multi-parameter marine observation. Thanks to their remote controlled sailing capacity and the high spatial and temporal resolution of the measurements in real time, gliders have been identified to fill existing gaps in the current ocean observation systems. Together with a rapid increase in their importance in purely scientific applications, the application of gliders in the World Ocean Observation System has been recognised as a key point for improving the observation capacity of observation systems.

The objective of GROOM is to design a new European research infrastructure for using gliders to the benefit of European citizens, researchers and industry. GROOM will define scientific, technological

and organisational levels of a European glider infrastructure for sustained research and observation of the oceans, in line with European and international initiatives. The proposal of this new infrastructure is based on the EuroARGO and JERICO infrastructures that are emerging and also takes into consideration important international co-ordination bodies like GOOS. The technological infrastructure is based on a range of dedicated glider ports to maintain and operate a European fleet of gliders in co-ordination with the United States, Canada, Australia and other similar infrastructure. This new infrastructure will be beneficial for oceanographic research and for the operational oceanography systems in that a large number of marine and maritime activities currently place their trust.

## IECOM

*Canaries-Cape Verde leisure and sports sailing co-operation platform. Socio-economic and environmental diagnosis of sailing activities and proposals for planning sports and leisure sailing activities*

### ERDF Technological Fund Operational Programme

The object of this project is to design, acquire and install the Electrical and Communications infrastructure necessary for operations in the marine area reserved for PLOCAN activities and to facilitate the achievement of their objectives.

This infrastructure will be especially useful for the PLOCAN test bed, observatory and VIMAS base, which intends to offer the possibility of implementing innovative activities and projects in the field of observation and, in particular, in the next few years, those related to marine renewable energies.

The infrastructure will, in general, be made up of medium voltage wiring (13.2kV) and a maximum evacuation power of 15MW. Most of this will be underwater, made up mainly of hybrid wiring (copper wire for transmitting the electricity and fibre optic cables for data and image transmission) and underwater hybrid connectors, including a short land section to allow this to be connected to the electricity sub-station on land.

## INNPACTO WAVE ENERGY

Development and demonstration of the utility of Pipo Systems APC-PISYS technology-based R+D+i projects

### INNPACTO 2010 CALL FOR PROJECTS

The main objective of the INNPACTO Wave Energy Project is to develop and demonstrate the utility of PIPO Systems APCPISYS-based technology systems by building and locating two usable technological applications or products in a marine environment to satisfy existing demand, consisting of:

- a) Autonomous marine observation and surveillance device (5kW installed power prototype)
- b) Energy buoy (200 kW installed power prototype)

The autonomous marine observation and surveillance device clearly and generally covers the existing energy deficit in autonomous ocean observation devices, for both coastal and open ocean waters, by way of an example demonstrating the real problems faced throughout the world. The development of devices of this kind will also act as systems optimisation, used as a prototype and as a preliminary step to manufacturing the energy buoy. In other words, the same technology with two different technological applications and both based on existing real demand.

# LEANWIND

Logistic efficiencies and naval architecture for wind installations with novel developments

FP7-OCEAN-2013

The main objective of LEANWIND is to reduce costs over the whole life cycle and supply chain of offshore wind farms and to develop state-of-the-art tools and technologies. The marine wind energy industry in inshore shallow water sites still has to become economically competitive with conventional energy sources while new sites are planned further offshore or in deeper waters, giving rise to new challenges. The off-shore wind power industry has still to apply lean principles in the logistics operations of wind farms and in all stages of its life cycle, as the LEANWIND Project proposes. Lean principles were originally developed by Toyota to optimise the processes of the manufacturing industry. These optimisation and efficiency

principles have subsequently been adopted by many other industries to eliminate wasteful stages and to make processes more responsive. These principles will be applied to each of the critical stages of the project: logistics processes, land-based transport links, temporary storage and port facilities, vessels, cranes and lifting machinery, safety and operations and maintenance. The LEANWIND approach will ensure the elimination of unnecessarily complex or wasteful stages of the development process, which makes the transition between stages faster, enhances quality and hence optimises time and costs to enable the industry to reduce the gap between current expenditure and the economic aspirations of the industry.

# MACSIMAR

*Incorporating the integrated meteorological and oceanographic system of Macaronesia into the European marine/maritime research strategy*

PCT-MAC 2007-2013

Reinforcing the R+D+i capacities in the domains of climatology, meteorology and operational oceanography by means of the components of modelling, monitoring and disseminating information in useful time and on the right scale to the sectors that depend on them.

Integrating EU aims – creating a European Network of Observation and Information about the Sea (EMODNet) - in a network and hence lever the privileged position in the Atlantic Ocean. These aims will be attained with the consolidation and development of existing devices and skills.

This project incorporates innovation by leveraging the business sector in the development of devices (models, platforms and sensors), thus helping to promote the European Marine and Maritime Research Strategy, in accordance with the Galway and Aberdeen priorities. The results and products will be available in real time and deferred time, providing better organisation with the scientific business system in specific fields such as safety, maritime-port management, transport, fisheries, tourism, protections of resources and coastal areas.

# MaReS

## *Macaronesian Research Strategy*

PCT-MAC 2007-2013

The aim of the MaReS Project is to organise a common tool for all the archipelagos of Macaronesia for analysing, co-ordinating and identifying opportunities that enables them to face the challenges of sustainability with a competitive research and development strategy in European Atlantic Island regions. This came about based on the evidence that the dimension of R+D+I systems in these islands did not allow them to compete effectively on their own in the European Research Area, or in the international scientific context.

The methodology will be rolled out, based on a

first case, in turn, based on independent initiatives with sufficient preliminary consolidation in each region to make it possible to test a new model to increase the dimension, arising from working together/co-ordinating preliminary efforts and thus projecting into the European and international area a Macaronesian structure that is sufficiently large, coherent and attractive. The methodology will spread continually, in accordance with the possibilities and resources of the area as a whole and the issues addressed, including marine sciences, energy, climate change and environmental sciences.

# NETBIOME-CSA

*Strengthen European research co-operation for smart and sustainable management of tropical and subtropical biodiversity in ORs and OCTs*

FP7-ENVIRONMENT-2013

NetBiome-CSA will extend and strengthen research and co-operation alliances for the smart and sustainable management of tropical and subtropical biodiversity in the Outermost Regions (ORs) and the Overseas Countries and Territories (OCTs). This will be achieved through a participative process, mobilising the stakeholders, their know-how and resources for initiatives such as policy and priority analysis, dialogue among multiple interested parties, exchange of best practices, training and recommendations.

The project is based on the association of existing biodiversity researchers created through the ERA-Net NetBiome Project and takes up the challenge of mobilising more parties interested on all levels of the quadruple helix (knowledge institutions, business, government and civil society) to tackle the top-priority challenges identified to reconcile conservation and the sustainable handling of tropical biodiversity with the sustainable development of European regions and territories,

based on the benefits arising from the enormous biodiversity. The project activities, specifically adapted to the needs and priorities identified by the ORs and OCTs, will help with: an improvement in the governance of research and innovation; an alignment of research efforts with political needs, strengthening evidence-based policies; improved implementation and impact of EU biodiversity strategy and the CDB strategy plan; A Biodiversity Management Toolbox, and increase in social, economic and cultural development of the regions; a higher profile for the ORs and the OCTs and an up-take of best practises, experience and know-how; efficient international and trans-national co-operation among European ORs and OCTs and with third countries. NetBiome-CSA addresses the (ENV.2013.6.5-2) issue completely and sub-issue (g) of the work programme as its activities will promote research alliances towards the sustainable management of biodiversity in European ORs and OCTs, giving rise to a continuation and extension of the NetBiome alliance.

# NEXOS

*Next generation, cost-effective, compact, multifunctional web enabled ocean sensor systems empowering marine, maritime and fisheries management*

FP7-OCEAN-2013

According to those responsible for marine research in Europe in the Ostend Declaration of 2010, support for the development of a truly integrated and sustainably funded European oceanographic observation system is a major challenge. This can be achieved with the long term measurement of key parameters but it is hindered by the cost and the lack of reliability of oceanographic sensors in general. The NeXOS Project aims to improve the time and space cover, the resolution and the quality of marine observations by developing cheap, innovative and inter-operable in-situ sensors that can be deployed from multiple platforms and web services for key domains and applications. This will be achieved by developing new, low-cost, compact, integrated sensors, with multiple functions, including the measurement of key parameters that are useful for a series of objectives, from more accurate marine monitoring and modelling to better evaluation of fisheries. Seven new, compact, efficient sensors

will be developed, based on optic and acoustic technologies, aimed at most of the descriptors identified by the Framework Directive on Marine Strategy aimed at attaining a good ecological state. Two of the new sensors will contribute specifically to the Common Fisheries Policy with the pertinent variables for an eco-systemic approach to fisheries. All the new sensors will meet the need for multi-platform integration, inter-operability of data and sensors with quality guarantees and the reliability requisites. All of these will be specified for each new sensor system. All the new sensors will be calibrated, integrated in several types of platform, scientifically validated and demonstrated. Finally, one of the main objectives of NeXOS is to improve the competitiveness of European SMEs in the marine sensor market. With this purpose, the specifications and requisites of the sensors will be evaluated in an early stage of the project for market penetration.

# OCEANERA-NET

Coordination of national research activities of member states and associated states in the field of ocean energy

FP7-ERANET-2013

The vast European coastline houses enormous potential for ocean energy to be exploited as a source of renewable electricity, contributing to the objectives for 2020 and beyond. The ocean is a complex working environment, relatively little is known about it and it is widely used by other sectors, such as fishing, transport and leisure. However, the price of generating ocean energy is high, estimated by DG MARE, for 380 GW.

Several member states and regions are currently funding ocean energy research, demonstration, technology and innovation (R+D+T+i). There is a common objective to generate know-how of the marine environment and to accelerate the development of this emerging sector. But these research efforts are not co-ordinated. For this reason, member states are proposing the ocean energy ERA-NET as described in this document. The ERA-NET will provide a framework for joint, trans-national activities and will co-operate with the EERA Ocean Energy Joint Programme and

other important European projects and the industry stakeholders.

This wide-reaching ERA-NET brings together 16 partners from nine states with the intention of obtaining the benefits of a co-ordinated funding of research. The member states have different levels of commitment to the ocean energy sector, and it is important that the ERA-NET actions reflect this fact. The objective is to improve the quality, scope and fragmentation of research with better networks, tackling common barriers and improving co-ordination. The proposal establishes the implementation of the project from the creation of networks and sharing of know-how, to the launch of at least one joint, trans-national call for projects. This way, the partners will develop a shared vision of the sector, an action plan to deliver and a toolbox for administration. The result will be less fragmentation in funding research, the development and greater dissemination of best practices and support for marketing the ocean energy sector.

# PERSEUS

*Protection of European seas and borders through the intelligent use of surveillance*

## FP7-SECURITY RESEARCH-2010

PERSEUS contributes to Europe's efforts to control illegal immigration and fight the associated crime and smuggling by proposing a large-scale demonstration of an EU-wide marine surveillance system, based on existing national surveillance systems, improving them with innovative capacities and going beyond the expectations of EUROSUR 2013, by tackling the key challenges:

- support for the network created by the national contact centres, Frontex and EMSA by means of greater capacities, including the trans-national exchange of useful and available information and of the associated mechanisms and procedures, thus supporting the creation of a common environment of exchange of information.
- generation of a common situation dashboard
- improved detection and identification of non-collaborative/suspicious small boats and low-flying aircraft
- improved and increasingly automated detection of abnormal behaviour of boats, threat identification

and monitoring and reports on non-identified boats. PERSEUS organises this demonstration in 5 exercises grouped together in 2 campaigns, carrying out missions against drug-smuggling and illegal immigration missions and providing continual surveillance from the coast to the high seas. PERSEUS offers a broad set of validated and proven recommendations and proposes standards. PERSEUS has brought together the main users and suppliers, ensuring privileged access to existing surveillance systems and resources for optimum cover of the area in question. These users will define, assess and validate the alignment of the PERSEUS recommendations with their own needs. PERSEUS also includes a mechanism to extend the user base and integrate emerging technologies during its life time. PERSEUS will enhance the efficiency and operational capacity of existing systems and it will make an important and co-ordinated contribution to establishing an integral system of Europe-wide maritime border control.

# PCMA

## PLOCAN test bed electricity generation device observation and environmental control programme

### ERDF Technology Fund Programme

The central objective of the project is to develop an observation and environmental control programme for the concentration of electricity generation devices on the PLOCAN test bed. This objective fits the raft of regular activities aimed at the environmental observation and assessment of the marine environment, including aspects of design, realisation, data generation, evaluation and production of useful information for the management and administration of marine renewable energies. This information is placed at the service of companies and public administrations interested in the field of marine renewable energies.

The objective considered in this project is to monitor all the activities that are taking place, or which are going to take place in the Electricity and Communications Infrastructure of the PLOCAN Test Bed and the Submarine Transformer Sub-

Stat in permanently and in real time. To this end, an operational and environmental surveillance plan is established that will provide greater insight into the interaction between the components that make up an electricity production network at sea and its effects on the surrounding marine environment.

In this sense, the observation programme will enable us to study different operating and management methodologies for the structural components of the network (cables, wave energy converters, observation instruments, etc.). In particular, methodologies can be studied for working with divers and ROVs. On the other hand, it will allow key environmental parameters to be monitored, such as the electro-magnetic fields generated, facilitating the trials of different sensors and sampling methodologies that will subsequently help to assess the effects on the marine environment better.

# TROPOS

*Modular multi-use deep water offshore platform harnessing and servicing  
Mediterranean subtropical and tropical marine and maritime resources*

## FP7-SECURITY RESEARCH-2010

The essential objective of the TROPOS Project is to develop a modular, multi-use floating system for use in deep water, with an initial geographic focus on the tropical and sub-tropical Mediterranean regions, but designed to be flexible enough so that it is not limited in its geographic scope.

The TROPOS approach focuses on modular development, where different kinds of module can be combined in accordance with the area. This way, the TROPOS multi-use platform system can integrate a wide range of functions from the sectors of transport, energy, aquaculture and leisure, in a larger number of geographic areas than if were a fixed platform design. Consequently, it provides greater opportunities of profitability.

The TROPOS design will focus on a multi-use floating structure capable of operating and exploiting deep waters, where fixed structures like those driven into the ocean bed are not feasible. The multi-use platforms designed from the concept designs will have the potential to provide European coastal regions with adequate aquaculture systems, innovative transport services and leisure and marine energy solutions.

The main scientific and technological objectives of the project are:

- To determine the optimum sites for off-shore, multi-use platforms in Mediterranean, sub-tropical and tropical latitudes, based on numeric and physical models.
- To research the relations between oceanic activities, including wind energy, aquaculture, maritime transport solutions and other additional services
- To develop new designs for economically-efficient, multi-use modular platforms that allow an optimum coupling of different services and activities
- To study the logistics needs of the new multi-use platform
- To assess the viability and economic feasibility of the platform
- To develop an integral environmental impact methodology and its evaluation
- To set out at least three complete solutions for the Mediterranean, sub-tropical and tropical areas.

# UNDIGEN

## Functionality of wave-driven electricity generation systems

### INNPACTO CALL FOR PROJECTS 2011

The Wedge Global, S.L. technology company has developed a direct electricity generation "Power Take-off System (PTO)" to harness the sea's wave energy that is potentially right for different kinds of Wave Energy Converters - WEC's (Vertical and pendulum point absorbers and oscillating water column absorbers, among others).

This PTO is the prime part of the WEC, because it has an autonomous capacity to optimise the complete WEC function, apart from converting the energy. This direct electricity generation solution (key component) has been satisfactorily tested

and validated in the laboratory (Cedex-Ciemat), so it would appear to be essential to carry out marine trials on this innovative solution as the natural next step in the technological development, aimed at its industrial purpose in a future commercial phase.

The project objective focuses on developing a basic collector that will act as a PTO test bed in order to carry out the marine functionality trials effectively to confirm the good laboratory results and, in turn, allow for an analysis of different control strategies in real application.

## VOTEMAR

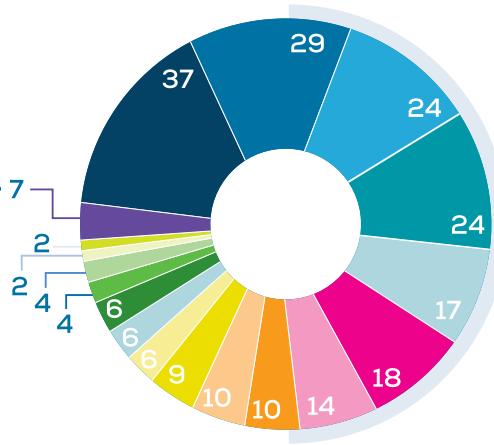
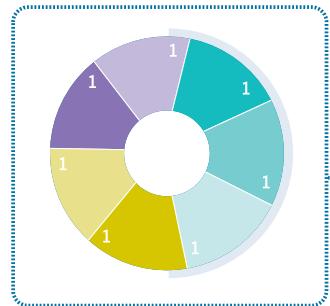
### *Foster professional vocations in marine technologies*

#### Call for grants for fostering scientific culture and innovation FECYT

This action seeks to drive professional vocations in science and technology by helping to enhance and promote innovation and creativity in secondary education, vocational training and 6th form in the field of marine technologies. Based on the knowledge acquired in preliminary workshops on the construction of prototype submarine robots in the University of Girona (UdG) and in the Canary Islands (PLOCAN), we want to drive and extend the experience among non-university education centres throughout the country. The idea is to train teachers about the workshop and get the students, under their supervision, to be able to creatively and innovatively develop ROV prototypes from the low-cost, every-day materials supplied by the Action. In turn, there will be virtual co-operation and support between PLOCAN, the UdG and the teachers from schools, to finally organise several

meetings where the ROVs made in each school will be presented and demonstrated. Harnessing these events, and to reach a wider audience, an exhibition on marine technologies will be organised. The remote controlled vehicles (ROVs) represent what is currently an innovative technology and very much in demand for operations of different kinds in the marine environment (e.g. salvage and rescue, renewable energies, deep-water sampling). There are already a range of ROVs on the market that vary depending on their application, although these are a minority and their development represents the blooming of a growing industry. There is currently demand for people in the submarine robot sector, so new professional courses must be created and vocations fostered among non-university students to apply for these courses. This proposal is a PLOCAN's initiative with the support of the UdG.

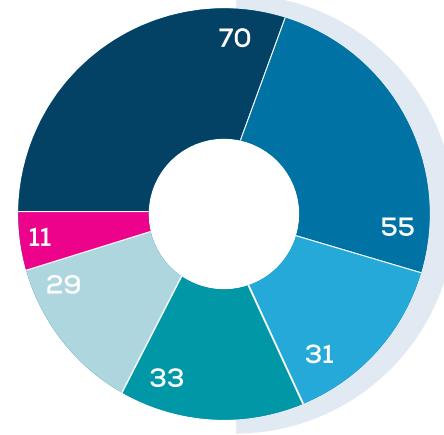
Below is an analysis of the partners in the active projects in 2013, by origin, kind of institution and partners by specific project.



- ISRAEL
- NEW CALEDONIA
- POLAND
- SWITZ
- TAIWAN
- TURKEY
- ICELAND

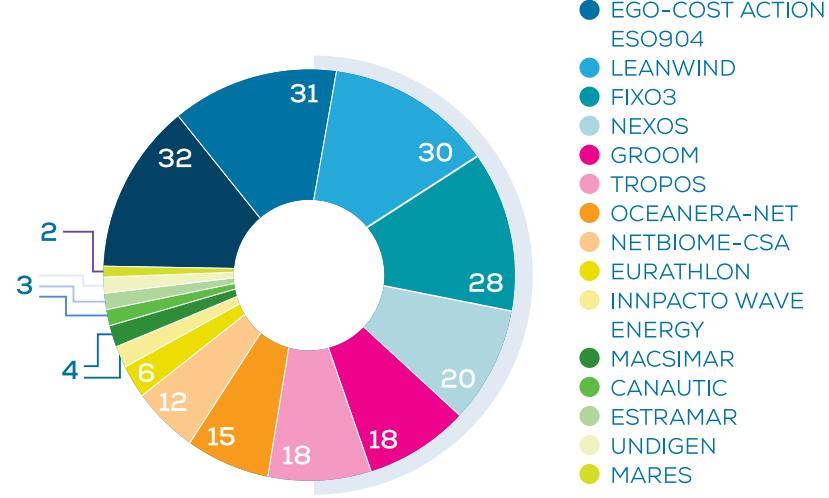
- SPAIN
- FRANCE
- GERMANY
- UNITED KINGDOM
- NORWAY
- PORTUGAL
- ITALY
- GREECE
- IRELAND
- BELGIUM
- DENMARK
- FINLAND
- NETHERLANDS
- CAPE VERDE
- SWEDEN
- CYPRUS
- LUXEMBOURG
- OTHERS

▲ Figure 19. Partners in PLOCAN projects active in 2013 by countries



▲ Figure 20. PLOCAN Project partners 2013 by kind of institution

- RESEARCH CENTRE
- HIGHER EDUCATION CENTRE
- LARGE COMPANY
- SME
- PUBLIC CENTRE
- NON-PROFIT MAKING



▲ Figure 21. PLOCAN active Project partners 2013 by project

### **7.3. CO-OPERATION AGREEMENTS**

The following agreements were signed in 2013:

- Specific agreement between the **University of Las Palmas de Gran Canaria** (ULPGC) and PLOCAN, for the placement of a university lecturer in PLOCAN to generate major projects and/or services of mutual interest to the parties, signed 9th January 2013.
- Specific co-operation agreement signed between the **ULPGC** and the PLOCAN Consortium to create a joint laboratory in "Marine Robotics", signed 28th January 2013.
- Specific agreement between the **ULPGC** and the PLOCAN Consortium for the joint implementation of the Sauce Project, signed 31st January 2013.
- Specific agreement between the **University of Las Palmas de Gran Canaria**, The **ULPGC Science and Technology Park Foundation** and the PLOCAN Consortium for engaging in joint actions in the area of the course "Big data and scientific computing summer school" in the context of the Cei-Canarias: Tri-Continental Atlantic Campus, signed 31st January 2013.
- Appendix to the co-operation agreement signed between the **INNOVAMAR Foundation** and the PLOCAN Consortium to regulate the implementation of specific co-operation projects and their details and results and/or lines of research, signed 22nd February 2013.
- Co-operation agreement between the **GREDOS SAN DIEGO BUITRAGO school** and the PLOCAN Consortium to develop a professional On-the-Job Training module, signed 2nd April 2013.
- Addendum to the specific co-operation agreement between the PLOCAN Consortium and the **ULPGC** for the placement of a university lecturer in PLOCAN to generate major projects and/or services of mutual interest to the parties, signed 5th April 2013.
- Framework co-operation agreement between the **Canary Islands Research, Innovation and Information Society Agency**, the **University of Las Palmas de Gran Canaria** and the PLOCAN Consortium on the management and use of the facilities provided by the Canary Islands Autonomous Community, signed 2nd August 2013.
- Framework co-operation agreement between the **University of La Laguna** and the PLOCAN Consortium to develop joint academic, management and research action programmes, signed 21st October 2013.
- Associated partnership agreement between **IFREMER** (co-ordinator of the JERICO Consortium) and the PLOCAN Consortium to establish the terms for PLOCAN participation in JERICO, signed 13th November 2013.
- Collaboration framework agreement between the New Caledonia Economic Development Agency (**ADECAL**) the PLOCAN Consortium, to regulate the collaboration between ADECAL and PLOCAN in order to carry out activities of mutual interest for both parties, in particular those related to the ocean and deep sea marine and maritime environment with regard to science (RDI&i), technology, training, entrepreneurship, business development and dissemination of knowledge, signed 22nd November 2013.
- Appendix to the educational co-operation agreement between the "**San Vicente Mártir**" **Catholic University of Valencia** and the PLOCAN Consortium for job placements, signed 22nd November 2013.



▲ Figure 22. Submarine robot demonstration workshop



▲ Figure 23. Glider school 2013

## 7.4. EDUCATION AND DISSEMINATION

A demonstration of the EDUROV Project was held in May in which high school students from El Hierro, La Gomera, La Palma, Tenerife, Gran Canaria and Lanzarote showed the prototypes that they had built in the workshop for the design, construction and operation of remote-controlled submarine vehicles, organised by "la Caixa" and PLOCAN. 101 students and 7 teachers took part in the workshop and they presented a total of 15 submarine vehicles. The EDUROV projects brings submarine robotics to students in a practical fashion and aims to arouse their motivation and interest in science and technology and an awareness of the ocean.

A fourth edition of the PLOCAN glider summer school took place in July. University students and professionals enhanced their know-how and skills with submarine gliders.

Students and teachers, employees of 24 tech-based international companies and 10 oceanographic research institutions from 12 countries took part (Brazil, Canada, USA, Finland, United Kingdom, Spain, France, Germany, Italy, Cyprus, Australia and Norway).

Organised seminars include "Innovative public-private co-operation opportunities and prospects for the Macaronesian marine and maritime sector in the European 2020 Horizon" held in Funchal in April.



▲ Figure 24. Seminar Funchal



▲ Figure 25. Seminar Cape Verde

The seminar "Marine observation in the Archipelagos of Macaronesia: experiences and potential" was held in Cape Verde in May, with the participation of the marine-maritime sector of the Canary Islands, Azores, Madeira and Cape Verde.

In November, the PLOCAN offices hosted "A Changing Ocean" international conference, sponsored by the EUR-OCEANS consortium and the French Institute of Research and Development, to discuss progress and prospects in our knowledge of issued considered urgent in marine sciences. The event attracted almost one hundred scientists and technologists from institutes and universities of Europe and the United States.

AS is becoming the norm, in 2013, PLOCAN trainees did stages as part of the COST Action 0904 initiative, in which PLOCAN participates, associated with the glider programme that the initiative is implementing. The stages take place in the Australian National Centre for Ocean Gliders (ANFOG), the Helmholtz-GEOMAR Oceanographic Research Centre (Kiel, Germany) and in the Maritime Research and Experimental Centre (CMRE), which is part of the North Atlantic Treaty Organisation (NATO).

Finally, university and vocational training students did work experience placements in the PLOCAN facilities:

- Degree level placements – I.T. Engineering – University of Las Palmas de Gran Canaria. Nº of credits recognised: 350. Nº students: 1
- VQ curricular placements – Quality control and analysis laboratory – Gredos San Diego Co-operative (Buitrago). Nº students: 1
- VQ curricular placements – quality control and analysis laboratory - Politécnico High School of Las Palmas. Nº students: 1
- Degree level placement – Telecommunications engineering – University of Las Palmas de Gran Canaria. Nº of credits recognised: 350. Nº students: 2

In 2013, PLOCAN staff were given specific training in different subjects, including:

- PRINCE2 Foundation Examination
- Safety at Sea
- Wave energy
- Submarine robotics
- Python
- Year-end accounts and taxes
- Electronic notifications with Public Administrations
- Integral organisation and management of events
- Executive secretariat
- Photography

At the same time and throughout the year, they also attended language classes at different levels.

## 7.5. CORPORATE ASSOCIATION ACTIVITIES

PLOCAN as an oceanic observation initiative is a Spanish site in the European observatories' network EMSO (*European Multidisciplinary Seafloor Observatory*).

PLOCAN belongs to the robotics and automation group and to the maritime safety group of the Technology Platform of the Spanish Maritime Sector. This organisation provides a meeting place and dialogue with all stakeholders related to the sea and other aquatic media.

PLOCAN is a member of the Spanish Standardisation and Certification Association (AENOR) as part of the AEN/206/SC114 sub-committee. The objective of this sub-committee, known as "marine energies: wave and current converters", is to draw up standards for everything to do with harnessing sea wave and current energy to produce electricity. The mandates of this sub-committee concern the standardisation of the technology and procedures associated with transforming the energy contained in waves and marine currents into electricity. PLOCAN currently contributes by providing experts for the working groups relating to the assessment of environmental impact and the evaluation of energy resources.

PLOCAN is a member of the European Marine Renewable Energy Producers' Association (APPA). Marine APPA has twenty six members and it was founded in 2006 to bring the industrial sector together and work for the development of this technology in Spain. Most of the companies and bodies engaged in activities in this sector in Spain are members of this Association, so it is in a unique position to provide a realistic overview of the sector. The immediate objective of the Marine section of APPA is to promote a suitable legal framework and the associated technological development to allow Spain to attain a high profile in marine energy in renewable energy production in 2020.

The PLOCAN test bed figures on the Ocean Energy Systems web site, an initiative of the international energy agency on ocean energy, as an infrastructure for testing devices in the open sea.

PLOCAN has belonged to the international network of innovative maritime territories since 2012. This network represents Spain, France, Germany, Italy, Argentina, Mexico, United States, China and Vietnam, among others.

PLOCAN participates in the "Energy and Sustainability Classroom" of the University of Las Palmas de Gran Canaria. The object of this school is to act as a meeting point for discussion between the University and Society on issues of interest for the future of the Canary Islands. It falls within the university functions of dissemination, promotion and transfer of knowledge at the service of culture, quality of life and economic development.

In 2013, PLOCAN signed up to the initiative to create a Management Committee for the Macaronesian Marine Maritime Cluster that seeks co-operation and the creation of synergies in the maritime sector to formulate projects and optimise the use of legislative and financial instruments of the EU for the period 2014-2020.

## 7.6. PUBLICATIONS AND COMMUNICATIONS TO CONFERENCES

### PUBLICATIONS, SCIENTIFIC AND TECHNICAL DOCUMENTS:

P. López-García; M.D. Gelado-Caballero; D. Santana-Castellano; M. Suárez de Tangil; C. Collado-Sánchez; J.J. Hernández-Brito.

*A three-year time-series of dust deposition flux measurements in Gran Canaria, Spain: A comparison of wet and dry surface deposition samplers.* Atmospheric Environment. 79, pp. 689 - 694. 2013.

Kind of production: Article. Kind of support: Journal

E. Quevedo; D. Horat; G.M. Callicó; F. Tobajas.

*Computation time optimization in super-resolution applications.* Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). 8112 LNCS - PART 2, pp. 101 - 108. 2013.

Kind of production: Article. Kind of support: Journal

A. Cianca; R. Santana; S.E. Hartman; J.M. Martín-González; M. González-Dávila; M.J. Rueda; O. Llinás; S. Neuer.

*Oxygen dynamics in the North Atlantic subtropical gyre.* Deep-Sea Research Part II: Topical Studies in Oceanography. 93, pp. 135 - 147. 2013.

Kind of production: Article. Kind of support: Journal

J. Rodríguez; A. Quesada-Arencibia; D. Horat; E. Quevedo.

*Web georeferenced video player with super-resolution screenshot feature.* Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). 8112 LNCS – PART 2, pp. 87 - 92. 2013.

Kind of production: Article. Kind of support: Journal

## COMMUNICATIONS TO CONFERENCES

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Title: A Hybrid Cloud Computing approach for Intelligent Processing and Storage of Scientific Data.

Name of conference: Fourteenth International Conference On Computer Aided Systems Theory

Host City: Las Palmas de Gran Canaria, España

Date: 02/2013

Eduardo Quevedo; David Horat; Gustavo M. Callicó and Félix Tobajas.

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Title: Computation Time Optimization in Super-Resolution Applications

Name of conference: Fourteenth International Conference On Computer Aided Systems Theory.

Host City: Las Palmas de Gran Canaria, España

Date: 02/2013

Eduardo Quevedo; David Horat; Gustavo M. Callicó and Félix Tobajas.

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Title: Statistical assessment of annual patterns in coastal extreme wave conditions.

Name of conference: Coastal Processes III

Host City: Las Palmas de Gran Canaria

Date: 10/2013

Vega, José Luis ; González, Javier ; Rodríguez, Germán

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## **7.7. COMUNICATION**

PLOCAN continued to develop and fine-tune its active communication strategy in 2013, maintaining fluid relations with the media that enables it to occasionally offer society information concerning the most important actions it has rolled out. The [www.plocan.eu](http://www.plocan.eu) web site is refreshed daily to provide information almost in real time on the activities engaged in. The web site includes a specific news section, a project area offering access to information about these and to its web pages and a profile of the contracting party where all the information is on tenders. Users can also find information on job offers, training and missions with gliders.

The progress on building the Platform, a set of technological development initiatives, scientific quotes, the training of PLOCAN experts, participation in fairs, dissemination of science, technological contributions and participation in international projects were followed by the regional and national media, more so in the press of the two provinces and also on radio and television programmes and the digital media.

The following actions attained media impact:

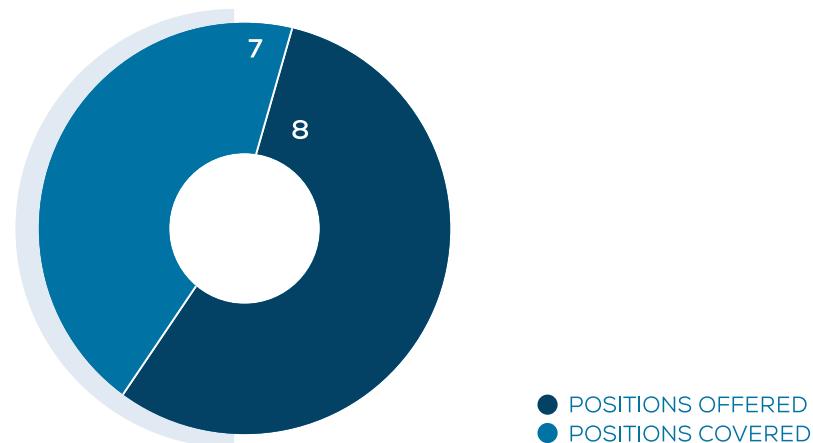
- PLOCAN in collaboration with La Caixa, presents the Edurov submarine robot project for Canary Islands high school students
- Information on the state of construction of the Platform to 2014
- Participation in EUROCAST
- Presentation of FIMAR
- Placements of Norwegian students in PLOCAN
- Reference to PLOCAN in meeting with the President of the Canary Islands Government with the UK ambassador

- Trials of the AUV-Autosub LR prototype in Taliarte
- Participation in FIMAR
- Presentation of Robusto, Langlee Wave Power
- Committee of investments and strategic projects of the Canary Islands Government, PLOCAN generates investments
- PLOCAN block in the port of La Luz and Las Palmas
- Langlee Wave Power announces trials in PLOCAN
- Presentation of prototypes made by high school students from Las Palmas de Gran Canaria
- Declarations about the acidification of the oceans, coinciding with the visit to PLOCAN of Susanne Neuer
- Information about the location of the future PLOCAN platform and test bed
- IV "Glider Summer School"
- Meteorological Station in Las Canteras
- Institute of Marine Sciences given to PLOCAN
- PLOCAN mission in the Baltic
- Presentation of the NeXOS international project for creating new optical and acoustic sensors for studying the ocean
- Meeting of the Eur-Oceans scientific consortium in PLOCAN
- Application for the PLOCAN test area in the coastal waters of Telde
- Extension of the PLOCAN construction deadline

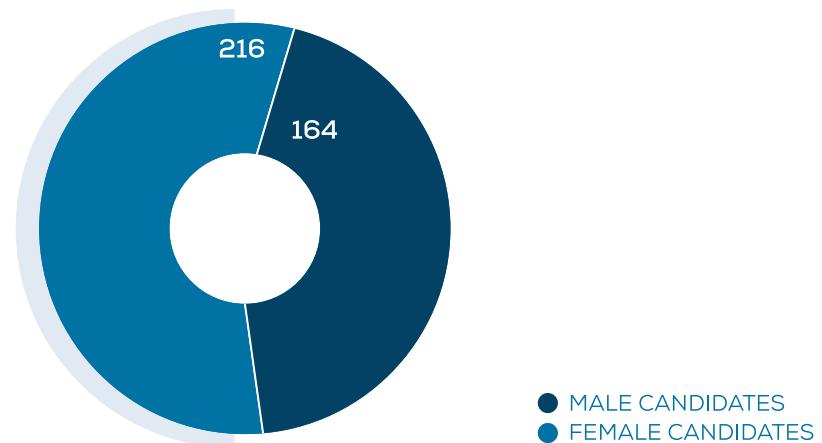
## 7.8. JOBS

Two job vacancies were published in 2013 for a total of eight contracts for projects. The jobs were offered through a public competition

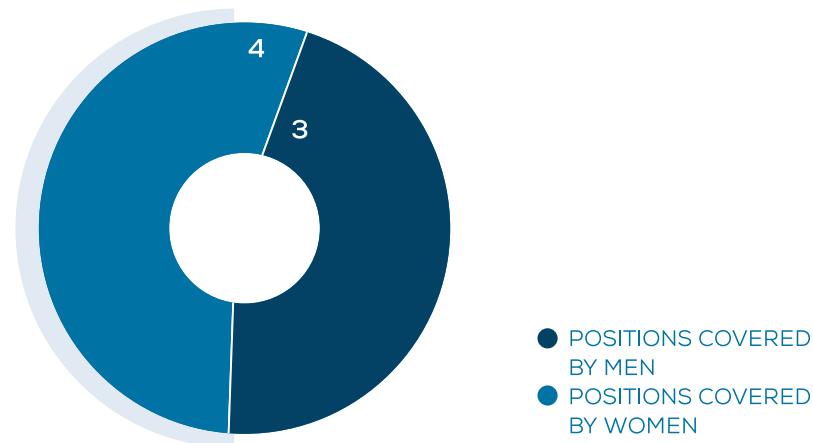
process based on principles of merit, transparency, publicity, equity and impartiality. The graphs below show certain characteristics of the call for candidates and of the candidates themselves.



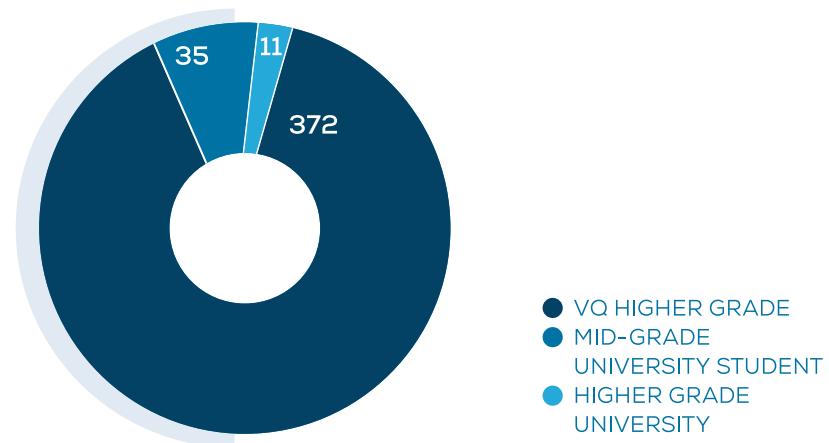
▲ Figure 26. Ratio between posts offered and posts covered



▲ Figure 28. Candidates by gender



▲ Figure 27. Ratio of post covered by men to posts covered by women



▲ Figure 29. Candidates by qualification



# 8. CORPORATE SOCIAL RESPONSIBILITY

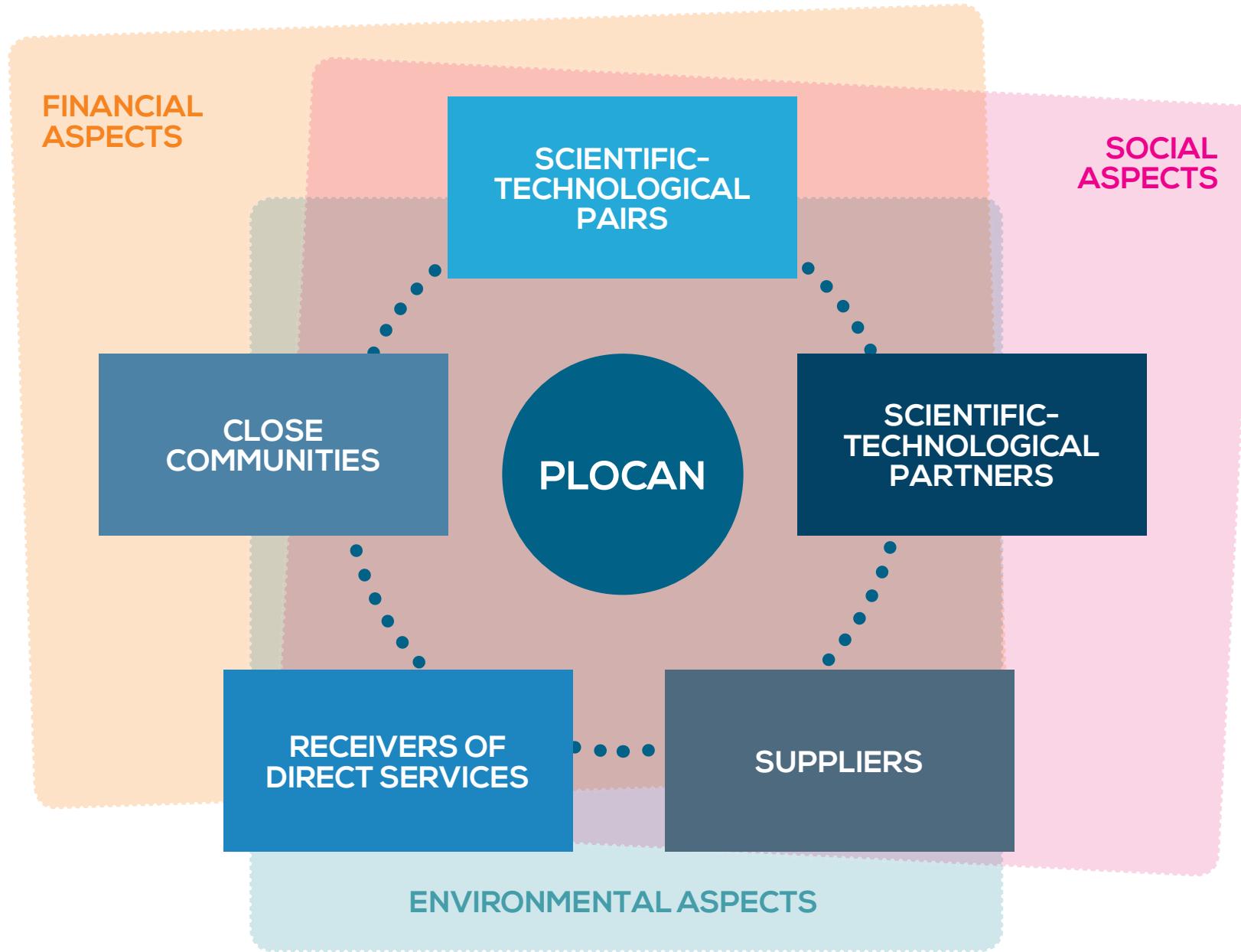
Corporate Social Responsibility (CSR) is defined as the company's voluntary integration in social and environmental concerns in its commercial operations and in its relations with interlocutors.

Since 2012, PLOCAN has focused its activities on CSR compliance by following the general classification of AGE (State General Administration)

criteria and measures (figure 30) established by a working group created by the SR Technical Committee, the philosophy of the State Social Corporate Responsibility Council (CERSE) set up by the Ministry of Work and Immigration and the existing international models on this and the Sustainable Economy Act (Law 2/2011, of 4th March).



▲ Figure 30. Classifying SR criteria and measures



▲ Figure 31. PLOCAN-related stakeholders

In 2013, actions have been rolled out aimed at CSR compliance that form part of both the annual action plan and the CSR plan itself.

In the case of topic 1 measures, some related to the management and internal operations of the Consortium and others to the marine-maritime scientific-technological activity itself. These measures include: the development of a permanent environmental surveillance plan, which goes beyond the obligations set forth by the environmental impact statements.

- Energy saving measures related to climate control and office equipment.
- Measures aimed at reducing paper consumption.
- Measures aimed at rolling out the selective collection of waste and raising awareness among the personnel.

Topic 2 contemplates measures aimed at enhancing service quality. These include:

- Implementation of the UNE ISO9001 quality standard in organisation procedures to obtain the quality certificate.
- Interaction with the citizenry and lobbies.
- Shared management of infrastructures with other institutions and synergic use of resources.

- Co-operation with public and private bodies.
- Implementation of documental work and management systems that promote team work among members of the organisation and with third parties.
- Measures aimed at improving communication.

Topic 3 includes the measures aimed at enhancing the welfare and working atmosphere of employees. Those rolled out in 2014 include:

- Training actions.
- Measures aimed at motivating the staff in their vision and knowledge of the project objectives.
- Reinforce health and safety measures beyond strict compliance with standards.
- Implement the SCR plan.
- Flexi-time for employees.
- Provide working resources and systems that offer ideal working conditions.



# 9. PLOCAN IN FIGURES

Below is an analysis of the most important figures with regard to the liquidation of the Budget for 2013.

The contributions received by PLOCAN in 2013 come from:

- Partners: Ministry of the Economy and Competitiveness (MINECO) and the Canary Islands Government with regard to creating the PLOCAN Consortium (A).

- Other Sources of Funding: Revenues arising from PLOCAN participation in R+D+i projects allowing research and the scientific and technological development of the marine-maritime sciences, provision of services and financial revenues (B).

The table below shows the aforesaid contributions together with the total sum of expenses arising from creating the PLOCAN Consortium (C) and those incurred from PLOCAN participation in R+D+i projects, the provision of services and financial revenues (Other Expenses - D).

YEAR	CONTRIBUTIONS FROM PARTNERS (A)	OTHER SOURCES OF FUNDING (B)	EXPENSES FROM CREATING PLOCAN CONSORTIUM (C)	OTHER EXPENSES (D)
2013	2,145,000.00 €	6,601,312.64 €	4,159,896.59 €	1,064,521.51 €

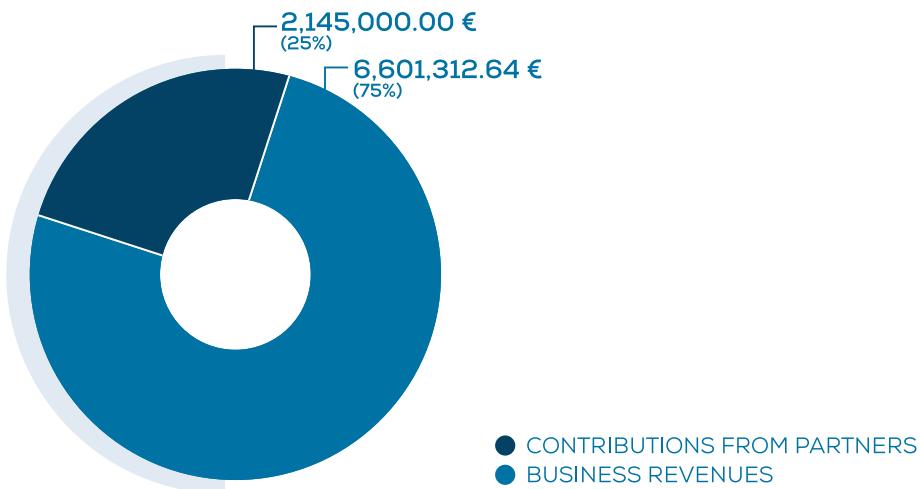
▲ Figure 32. Income and expenditure report 2013

As we can see, the total amount from contributions from the Ministry of Economy and Competitiveness and the Canary Islands Government obtained over 2013 amount to €2,145,000.

The table also shows the total amount reached in 2013 from revenues from PLOCAN participation in R+D+i projects, from national and international

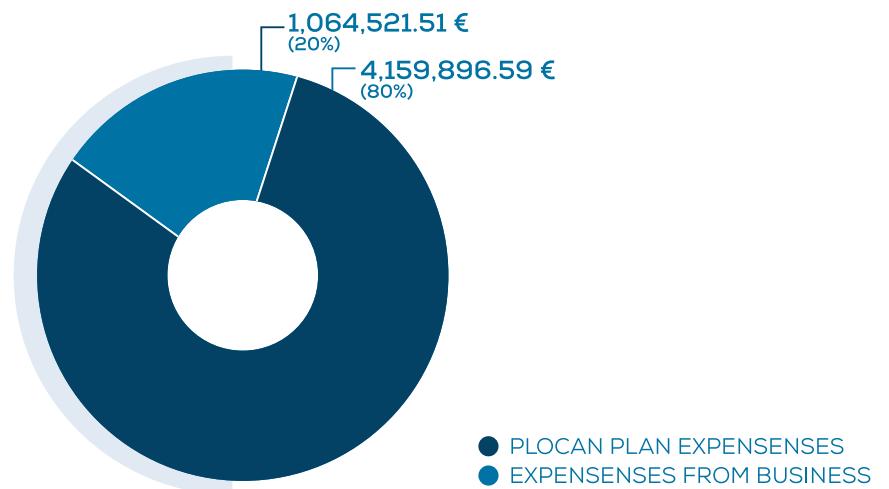
bodies, schools, business and other funding sources (€6,427,121.41). We would like to highlight the increase in this amount in comparison with the previous year (€5,178,308.91), due mainly to the success obtained in participating in European projects and from MINECO assigning projects funded by ERDF Funds.

Below are the percentages of revenues received during 2013 by their origin:



▲ Figure 33. Revenues 2013

Below are the year's expenses percentages for 2013:



▲ Figure 34. Expenses 2013

Concerning the expenses incurred over 2013, their total sum amounts to €5,190,270.54, part of which is devoted to covering expenses arising from creating the PLOCAN Consortium (€4,145,107.70) and part is used in scientific and technological research and development in the marine-maritime field (€1,045,162.84€).



