Annual Report 2012

PLOCAN consorcio

PLATAFORMA OCEÁNICA DE CANARIAS

MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

Gobierno de Canarias

canarias OBJETIVO de PROGRESO

Unión Europea
Fondo Europeo de Desarrollo Regional

1 Introduction by the director

This report contains all the actions and events carried out by the Consortium in 2012. There is no doubt that this financial year has shown clear progress in the effective implementation of the core activity of the Consortium and adjusting to the general socio-economic circumstances

The addendum to the agreement for the constitution of the Consortium, which was signed by all the parties on 28th December, 2012, reflects this adjustment, with restriction to hire staff and incorporating financing of the electrical and communications infrastructure as part of the State/Central Government contribution. It also specifies the Canary Autonomous Community contribution for the land headquarters, through the cession of part of the premises of the Canary Institute of Marine Sciences to the Consortium. It also includes the needs/clarifications in different parts of the Consortium statutes. Among them, pointing out the definition of the concept 'marine and maritime sector' as a conceptual space in which scientific, technological and innovative activities of the Consortium are carried out, always clearly adjusting to European strategies.

This year, in specific aspects regarding the construction of the oceanic infrastructure, the tendering process for the design and construction of the Oceanic Platform of the Canary Islands ended with the signing of the concession contract with the "UTE" (Temporary Joint Venture) made up by the companies ACCIONA INFRAESTRUCTURAS, S.A. and LOPESAN ASFALTOS Y CONSTRUCCIONES, S.A. The "UTE" has submitted a proposal as regards to the location of the platform and has proceeded to the writing of the construction project, according to the proposed schedule. The electrical and communications infrastructures have also been defined, and the procedures are efficiently being carried out so as to be put into operation by the due date to meet the significant needs of use, currently planned for.

During this period the operational goals were settled taking into account the implementation and confirmation of specific and relevant actions; this has allowed us to have a precise view of the infrastructure functionality and to confirm the validity of the drawn up work hypothesis, contrasting its potential both on a national and international sphere. The sequence of the activities listed in the report enable us to confirm that, although the central parts of the infrastructure are still in full development, the Consortium is already operating and widely providing services. Therefore we expect an increase of those services once all the infrastructures are operational; this will allow an exhaustive harnessing of its capacities and potential. The number and significance of the companies and institutions, public and private, national and international, already constitute a work and collaboration space with the Consortium, hence the need, the opportunity and the potentiality of its activity.

The European strategy Horizon 2020 includes Blue Economy, based on knowledge and innovation, and leans on those two factors to promote growth for the period 2014-2020. This strategy was still in the planning stage last year. In this context, it has been necessary to intensively and systematically launch this creation process. Therefore, the Consortium must contribute and position itself in this context, which is actually at the heart of its objectives.

It has to be noted that the results presented in this report could not have been possibly reached without the general and constant support supplied by an increasing number of public and private institutions, companies, research groups and individuals, as well as the enthusiasm and dedication of the Consortium's staff.

Without a doubt, 2012 is to be considered by the Consortium as the end of its initial cycle of definition and operational maturity of its activity; And according to its strategy, it allows to open a functional period for the scientific, technical and innovative marine and maritime community which will efficiently contribute in incorporating excellent science and technology as a propelling drive for sustainable economic growth and employment.

2 PLOCAN's VISION

The international and mainly western social awareness raising has generated a clear position of environmental defence of the ocean and in particular of the deep and distant ocean, as well as significant mistrust of the countries and companies that have the technology for effective access to it.

UNDERWATER ACTIVITY IS GROWING EXPONENTIALLY

It is clear that the international activity in the oceanic spaces at increasing depths has increased exponentially, with a first driving force, which is oil prospecting and exploitation, followed by the activities of energy use, deep drag trawling, communications, prospecting and exploitation of non-oil resources, etc. This industrial impulse has caused great concern due to the need for conservation of the ocean and it has supplied tools which have enabled and given a boost to international scientific and technological research of the first order.

A GREAT DEAL OF KNOWLEDGE AND TECHNOLOGY REQUIRED

This activity requires for its development that there should be very significant scientific and technological knowledge as well as the capacity to mobilise them in an effective manner. The consequence of these requirements is that effective participation in this field in the international sphere is restricted to a very small number of countries, institutions and companies.

The national situation is characterised by the availability of capacities that are scientific, institutional and business-based with a significant potential but that are diverse and of insufficient dimensions to take an effective role internationally.

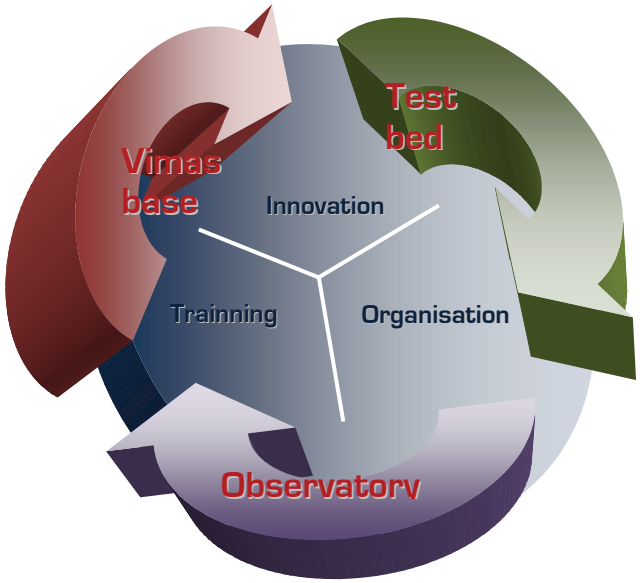
RELIABLE ENVIRONMENTAL GUARANTEES NEEDED

The international and mainly western social awareness raising has generated a clear position of environmental defence of the ocean and in particular of the deep and distant ocean, as well as significant mistrust of the countries and companies that have the technology for effective access to it. For this reason, it is indispensable to generate at the organisations and institutions that are not involved in the use the mechanisms, the scientific and technological capacity and the availability which will make it possible to guarantee the conservation of the ocean and the compatibility with the activities that are possible.

A HIGH AND DISSUASIVE ENTRY THRESHOLD

This set of circumstances has as its consequence that despite the attractions (environmental, scientific, technological, economic, etc.) the club of significant actors in any of these approaches is really limited, as has been indicated, and in any case the Spanish participation is limited in quantity, marginal and consumes international technology and opportunities.

3. Objectives



The Canary Islands Oceanic Platform aims at being the most effective infrastructure in the international context, allowing the best research, technological development and innovation by providing efficient access to the ocean at increasing depths, in an environmentally sustainable manner.

The Canary Islands Oceanic Platform aims at being the most effective infrastructure in the international context, allowing the best research, technological development and innovation by providing efficient access to the ocean at increasing depths, in an environmentally sustainable manner. It pertains to the Map of Singular Scientific Technical Infrastructures, and is co-financed by the Governments of Spain and the Canary Islands, through the Ministry of Economy and Competitiveness (MINECO), the Canarian Agency of Research, Innovation and Information Society (ACIISI) and the European Regional Development Fund (ERDF).

The main objective leads to the following goals, which settle the infrastructure working guidelines:

1.- **Offer of unique technical scientific capacities.** To provide the scientific and technological community with the most effective means and conditions to make and/or test observations and experiments at increasing depths.

2.- **A leading international testbed.** To provide the business environment with the best and in many cases the only test-bed for activities in the deep ocean with adequate environmental guarantees.

3.- **A base.** To create a base of vehicles and working tools for deep sea, operational and available on a permanent basis to those that due to their specific needs require to operate in that area.

4.- **A scientific and technical environment of excellence.** To provide a unique meeting space for the public scientific-technological community of greatest excellence and dynamism and innovating enterprises striving towards the understanding and use of the deep ocean.

5.- **Training with a high degree of specialization.** To provide training programs, from technicians to postdoctoral, including specific formation and training to use the facilities and working devices and access the deep ocean.

6.- **Organisational model.** To test a public scientific-technical organisation that can effectively manage highly skilled teams, complex and expensive instrumental devices and their relationship with innovative companies and socioeconomic public and private institutions.

4 Organs of government and advisory committees

4.1 Strategic Council

The Governing Council is the maximum organ of government and administration of the Consortium and is made up of the Chairman, the Deputy Chairman and the Members. The presidency and deputy presidency rotate and are successively filled for a period of two years by the MICNN (Ministry of Science and Innovation) and the Government of CAC (Canary Islands Region). The members represent the MICINN and the CAC (three in representation of each institution). The secretary, who is appointed by the Strategic Council, attends the meetings as does the director of the infrastructure.

Among the powers of the Strategic Council is establishing the directives and the general framework within which the project must be prepared, setting the rules, guidelines and general criteria for action and operation of the Consortium, approving the form of management according to which the fulfilment of its aims is governed and approving, at the proposal of the Executive Board, the annual budget of the Consortium, the annual accounts and the liquidation of the previous year's budget, among others.

The Strategic Council meets ordinarily twice a year and also on the initiative of the Chairman or when one of the institutions represented requests so. The Chairman of the Strategic Council is the highest representative of the Consortium.

In 2012, the Strategic Council held two sessions, in the months of March and July. In the fourteenth meeting, held in March, it approved the provisional award of the procurement for the elaboration of the project and construction of the oceanic platform of the Canary Islands, to the temporary consortium (UTE in spanish) composed by ACCIONA INFRAESTRUCTURAS S.A. and LOPESAN Asphalts and Buildings, for the amount of 10.366.000 euros. Among other issues, the Strategic Council in 2012 approved the annual report of activities of the year 2011, the action plan for 2012, the 2012 budget and the 2011annual accounts of the consortium.

The Strategic Council meets ordinarily twice a year and also on the initiative of the Chairman or when one of the institutions represented requests so. The Chairman of the Strategic Council is the highest representative of the Consortium.

The composition of the Strategic Council at the end of 2012 was as follows:

CHAIRMAN

Mr Juan Ruiz Alzola
Director General of ACIISI

DEPUTY CHAIRMAN

Ms María Luisa Poncela García,
Director General of International Cooperation and Institutional Relations

MEMBERS

Mr José Ignacio Doncel Morales, Deputy Director General of Planning of Scientific and Technological Infrastructures.

Ms Mª Carmen Peláez Martínez
Deputy Chairwoman of Scientific and Technical Research, CSIC

Mr Eduardo Balguerías Guerra
Director of the Spanish Oceanographic Institute

Ms Margarita Isabel Ramos Quintana
Councillor for Employment, Industry and Commerce

Mr Jesús Velayos Morales
Vice-Councillor for Revenue and Planning

Mr Jorge Marín Rodríguez
Vice-Councillor of the Presidency

4.2 Executive Board

The Executive Board is an organ of government created for the purposes of monitoring and execution of the activities of the Consortium, and is made up of three representatives of the CAC, of whom at least one must be a member of the Strategic Council, and three representatives of the MICINN, of whom at least one must also be a member of the Strategic Council. The exercise of the Chairmanship and the Deputy Chairmanship rotate with the same periods of time as those of the Governing Council, bearing in mind that the Chairmanship of both organs cannot be held simultaneously by the same institution.

The Executive Board is the organ responsible for bringing the proposal for the Consortium's annual budget, the annual accounts and the liquidation of the past year's budget to the Strategic Council for approval, as well as proposing the Annual Plan of Action and Projects and the scientific programme to be carried out in the infrastructure.

The meetings of the Executive Board take place in ordinary session at least once every quarter, and extraordinarily whenever the Chairman calls a meeting or when a meeting is requested by a represented institution.

The Executive Board held two meetings in 2012, one in May, and another one in November.

The Executive Board is the organ responsible for bringing the proposal for the Consortium's annual budget, the annual accounts and the liquidation of the past year's budget to the Strategic Council for approval, as well as proposing the Annual Plan of Action and Projects and the scientific programme to be carried out in the infrastructure.

The composition of the Executive Board at the end of 2012 was as follows:

CHAIRMAN

Mr José Ignacio Doncel Morales
Deputy Director General of Planning of Scientific and Technical Infrastructures

VICEPRESIDENTE

Mr Juan Ruíz Alzola
Director General of the Canarian Agency for Research, Innovation and Information Society

VOCALES

Mr Rafael Zardoya San Sebastián
Coordinator of the Area of Natural Resources CSIC.

Mr Eladio Santaella Álvarez,
Advisory Member of the General Directorate of the Spanish Oceanography Institute

Mr Bonifacio Nicolás Díaz Chico
Managing Director of the Technological Institute of the Canary Islands

Mr Arturo Melián González
Director General of Planning and Budgets

4.3 Advisory Committee on socio-economic activities

El Consorcio PLOCAN está asesorado por dos órganos consultivos que son, el Comité Asesor de Actividades Socioeconómicas (CASE) y el Comité Asesor Científico y Técnico (COCI).

The Advisory Committee on Socio-Economic Activities (CASE) is a consultative body of the Consortium of which the objective is to advise on PLOCAN's activities, programmes and scientific and technological plans as well as proposing future actions which might focus on the work of the Consortium in contributing to the sustainable socio-economic development of oceanic activities.

The CASE is made up of a group of eight persons of acknowledged prestige in the socio-economic fields related with the purposes and activities of the Consortium. On 20th July 2012, the second meeting of the committee was held in which the Head of PLOCAN presented de 2012 report of activities to the members of the committee. They were informed on the construction of the platform and on the general activities which the Consortium is developing.

The composition of the CASE at the end of 2012 was as follows:

CHAIRMAN:

Dr. José Regidor García.
Vice-Chancellor of the University of Las Palmas de Gran Canaria.

MEMBERS:

Ms Mª Isabel Durantez Gil.
Director General of the Merchant Navy.

Mr José Ignacio Gandarias Serrano.
Director General of Fisheries Planning.

Mr Vicente Marrero Domínguez.
Chairman of the Canaries Maritime Cluster.

Mr Miguel Montesdeoca Hernández.
Chairman of the Canarian Engineering Cluster.

Mr Fernando Redondo Rodríguez.
Chairman of the Economic and Social Council of the Canary Islands.

Mr Ángel Martínez Martínez.
Vice-Admiral for Engineering, Director of Naval Construction for the Ministry of Defence.

SECRETARIO:

D. Arturo González Romero.
Director General of the INNOVAMAR Foundation.

4.4 Technical and Scientific Advisory Committee

The Technical and Scientific Advisory Committee (COCI, according to its name in Spanish) is the consultative organ of the Consortium, of which the objective is to advise on the activities, programmes and scientific and technological plans of PLOCAN, to propose future actions which may improve the quality and scope of the work and give form to and propose the options for access of external scientists to the platform and the final selection to be made of them.

The COCI is made up of eight persons of acknowledged international prestige in the fields related with the aims and activities of the Consortium. Its members were appointed by the Strategic Council, at the proposal of the institutions which make up the Consortium.

The third meeting of the COCI took place in Madrid on 21th May 2012. The director told the members of the activities undertaken since the previous meeting and sketched out a plan of actions for the next few years.

The Technical and Scientific Advisory Committee is made up of eight persons of acknowledged international prestige in the fields related with the aims and activities of the Consortium. Its members were appointed by the Strategic Council, at the proposal of the institutions which make up the Consortium.

The composition of the COCI at the end of 2012 was as follows:

CHAIRMAN:

Prof. Gerold Wefer.
Professor at the University of Bremen

MEMBERS:

Dr. Enrique Álvarez Fanjul,
Head of the Department of Knowledge of the Physical Medium of State Ports.

Dr. María Soledad Izquierdo López,
Professor at the University of Las Palmas de Gran Canaria

Dr. Alicia Lavín Montero,
Researcher at the Oceanographic Centre in Santander (IEO)

Dr. Aída Fernández Ríos,
Research Professor at the Institute of Marine Research in Vigo (CSIC)

Prof. Chris Barnes,
Professor at the University of Victoria (Canada)

SECRETARIO:

Vacant

5 Construction the platform

The aim of the PLOCAN Consortium is to build a sustainable oceanic platform that will be the base for the national capacities to conduct scientific and technological activities at the peak of current knowledge within international competition conditions.

The platform will be located in the sea, a nautical mile from the coast belonging to the town of Telde, in the northeast of the island of Gran Canaria. The seabed depth at this location is 30.5 metres (measured from the point zero of the port of Puerto de La Luz y de Las Palmas).

The choice of the location was made after the study of three different possible sites, taking into account the analysis of the geo-physical campaign results, a study of the marine climate and the environmental analysis of each one of the alternatives. The final location was decided upon because it was the best alternative from the technical, economic and environmental aspects.

The optimal place for the location of the Land and Maritime Public Domain Reserve (Spanish abbreviation: RDPMT) has been established facing the coast of Jinámar (between Punta del Palo and Malpaso). The most significant aspects that led to the choice of this sector were the following:

→ Absence of spaces submitted to any kind of protection (protected natural areas, habitats, special areas of conservation, etc.) within the marine area. In this area, there is only the Site of Scientific Interest of Jinámar, which is a land protected space that could, by no means, be affected by the carrying out of the project.

→ Proximity to the power station of Jinámar, that could be used in future projects for the benefit of research.

→ Its central location between the port of Puerto de La Luz y de Las Palmas and the harbour of Taliarte have made it the ideal positioning as the first can act as a logistic base for the Platform and the other can be used as a scientific base. Indeed this harbour is a strategic element from the marine scientific research point of view. In addition, the Marine Scientific and Technological Park and PLOCAN's headquarters are situated there.

→ No military presence

→ Absence of Areas of Aquatic Interest

→ Sector where associated marine uses (fishing, diving, boat transits, etc.) are not of great importance and shall not be affected by the activities carried out at the platform.

→ Absence of residential areas on this stretch of the coastline. Indeed, the buildings and structures concentrated here are mainly industrial (thermal power station, desalination station, Telde's water treatment station, industrial areas, etc.) and commercial (the shopping centres: CC Las Terrazas, CC El Mirador, etc.).

The platform will be made up of a reinforced concrete box-shaped deck section on which the elements that are to form the superstructure will be built. This deck section will be used as the basis to hold all the structure and it will be supported on the seafloor as it will rest on a concrete bedding construction. The deck section will be 37.80 metres long and 32.03 metres wide.

Figure 1. Final location of the platform..

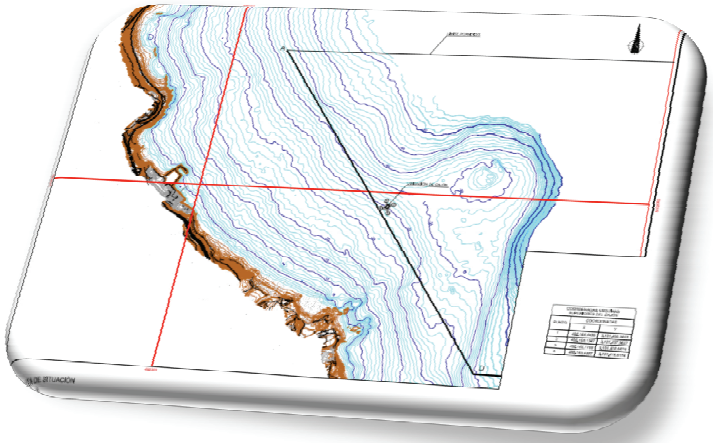
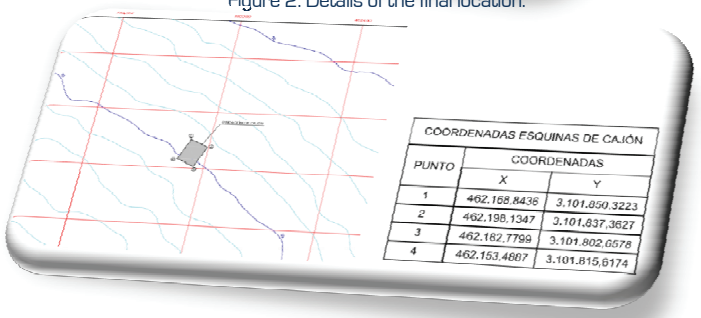


Figure 2. Details of the final location.



Ubicación del banco de ensayos de PLOCAN en la costa Noroeste de la Isla de Gran Canaria.

The infrastructure includes five functional elements of differing nature, which have a varied effect on its design and construction. These five elements are: the observatory, the test bed, the VIMAS base for vehicles, instruments and underwater machines, the training centre and the innovation platform. Each one of these elements has certain characteristics and complexities that are all their own, for each one of which it is possible to find a variable number of references and solutions in the international sphere. The originality and complexity of PLOCAN is derived from its joint approach, which is simultaneous and in one and the same physical structure, to these five elements. This joint and synergic approach is essential to PLOCAN.

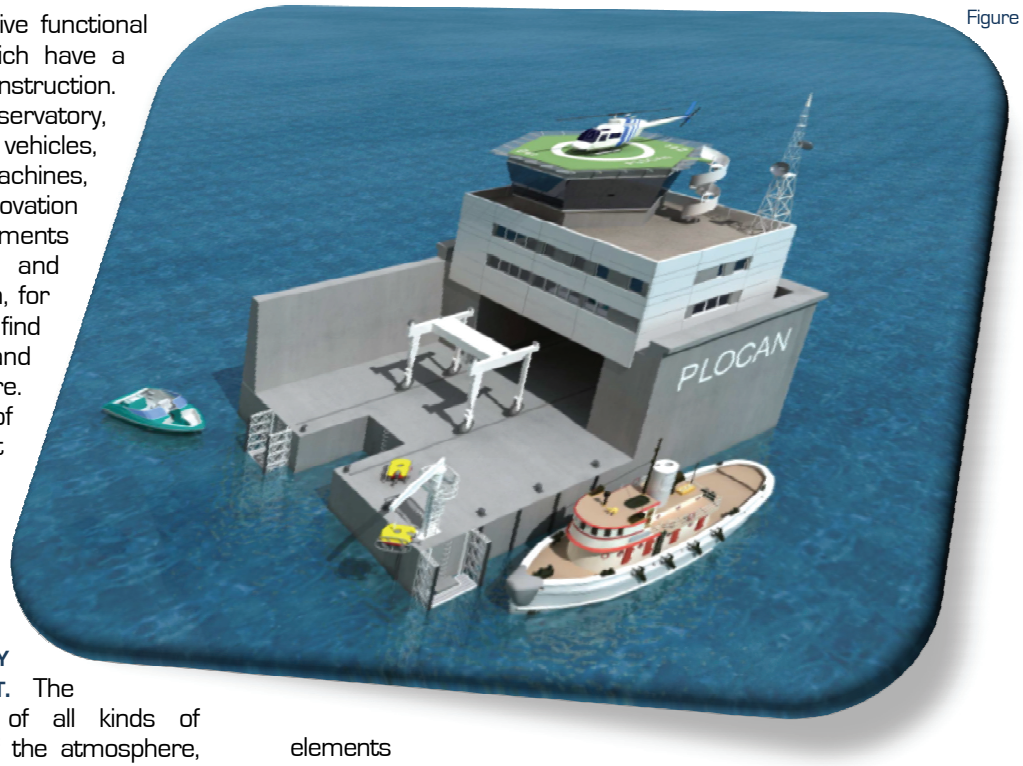


Figure 4. Infographics of the platform.

The infrastructure includes five functional elements of differing nature, which have a varied effect on its design and construction. These five elements are: the observatory, the test bed, the VIMAS base for vehicles, instruments and underwater machines, the training centre and the innovation platform.

THE MULTI-DISCIPLINARY OBSERVATORY OF THE MARINE ENVIRONMENT. The infrastructure will comprise of all kinds of instruments for observation of the atmosphere, the atmosphere-ocean interface, the water column, above the seabed and in the seabed.

THE TEST BED. The platform and its environment will provide the best location for the conduct of all kinds of tests which need to be carried out in the ocean.

THE VEHICLE, INSTRUMENT AND UNDERWATER MACHINES BASE (VIMAS). The observation and instrumental experimentation at increasing distances and depths requiere a varied and complex set of devices, many of which do not yet exist, that will need to have new ports from where they can be deployed and recovered, in a functional, simple and economic manner.

THE TRAINING CENTRE. The concentration of technological resources, activities and scientific and technical approaches, which arise in the three elements previously described, generates a capacity for greater specialisation which is difficult to find. Taking advantage of this capacity depends to a large extent on bearing in mind the needs derived from the training activities in the PLOCAN initiative as a whole and on incorporating the requirements in the design of the infrastructure.

THE INNOVATION PLATFORM. The conceptual definition of PLOCAN and its working strategy around the platform in a space that grows with depth, generate a high degree of concurrency and compatibility between public and private initiatives, that must be enhanced with a very versatile structure of functional elements, with interchangeable tools with the most simple maneuverability as possible.

In order that the facility can take on these functions and characteristics, it must include a number of laboratories, workshops, general services, store-rooms, tanks, etc. It must ensure the possibility of making connections (storing or evacuating energy) with ocean energy capture systems (from currents, waves, thermal gradient, wind, etc.), fish farms, desalination plants as well as the fixing of production tanks and gas storage, always observing the technical and safety requirements. Accessibility to vehicles and means of evacuation by sea or by air (helicopters) must also be guaranteed.

The following figures show some aspects of the construction project.

Figure 5. Transverse section of the platform.

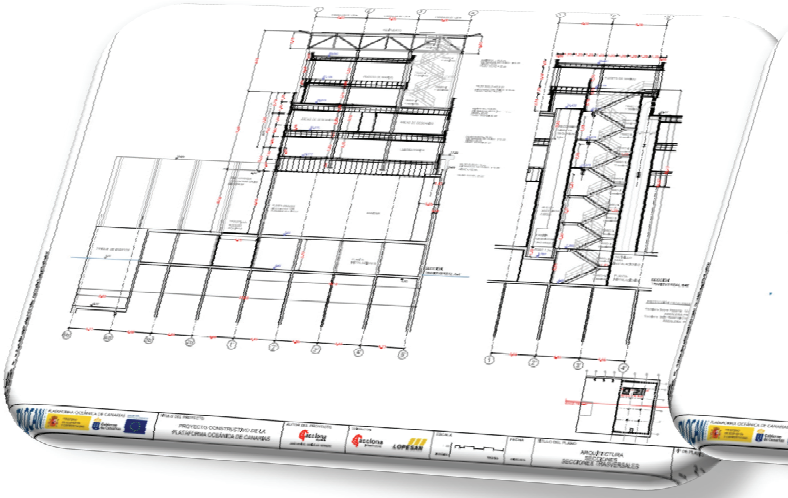
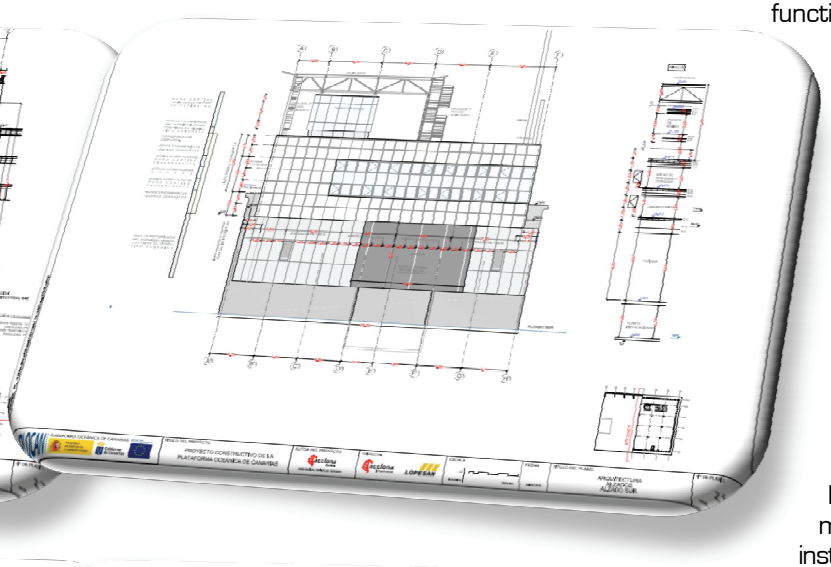


Figure 7. South elevation of the platform.



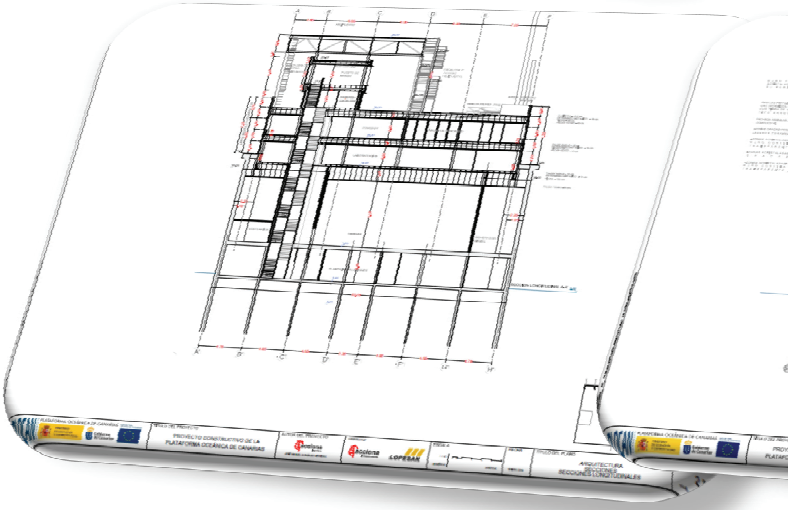


Figure 6. Longitudinal section of the platform.

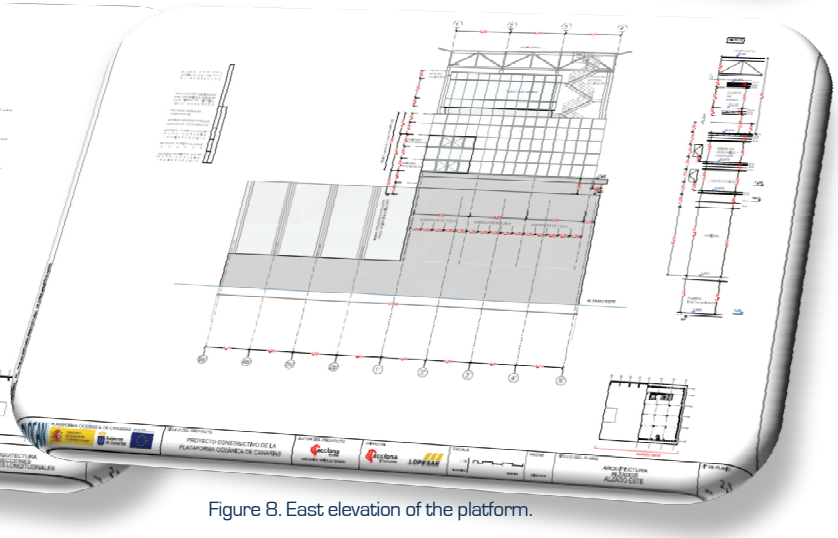


Figure 8. East elevation of the platform.

The conceptual definition of PLOCAN and its strategy of working on the environment of the platform in an increasing space with depth, causes a high degree of simultaneity and compatibility between public and private initiatives, which must be strengthened with a highly-versatile structure of functional elements, with interchangeable elements and the simplest possible handling systems.

In general terms, it must be understood that only what is absolutely necessary and offers permanent or almost permanent service must be installed on the platform and care must be taken with those elements whose installation and removal is especially difficult, costly and/or dangerous.The same criterion extends to the operation of the platform, in such a manner that the number of people on the platform should always be limited to those absolutely necessary to carry out the planned activities or operations, and it should be our objective to have the greatest possible automation and capacity for remote control. Likewise and as a criterion of austerity, the maintenance of the platform and all the instrumentation that is installed there must be designed to obtain the greatest possible economic and operating efficiency, guaranteeing that the operational costs are kept at the most competitive levels at the current stage of technology.

The synergy existing among each and every one of the elements making up the platform is essential to this initiative. Thus any test bed by definition requires control of the environmental variables in which the experiments are carried out, and when this is not possible, exhaustive surveillance and sufficiently long and complete data series are needed in order to analyse and model the experimental conditions. From the point of view of the test bed, this need is a permanent and growing cost to the extent that the experiments will inexorably demand continually greater control and knowledge of

the operating conditions. This is precisely so at the PLOCAN test bed but also in the ocean and from the surface to the sea bottom, which implies a significant difficulty and cost.

However given that these observations necessary for the test bed will be a basic purpose of the observatory, the cost of the test bed will be notably reduced with regard to other similar facilities, due to this synergy.

In an analogous manner, the test bed means that there must be a set of vehicles, instruments, and machines (VIMAS) available to allow operations such as deployment, collection, monitoring, incident attendance, supervision, operations etc. Furthermore, an observatory such as that proposed by PLOCAN requires for its development and operation the availability of such thing as VIMAS to achieve full operation. It is obvious that this collection is in itself valuable and costly and essential for the test bed and the observatory. Duly managed, it will necessarily have an excess of capacity which must be taken advantage of in order to achieve maximum performance. On the other hand, it is also obvious that the VIMAS property and its operations will in this manner become a whole unit, which with the proper technological impulse to promote, test and develop protocols for maintenance and operation, will provide and added value, comparable, without any limitation, to the best initiatives worldwide.

Each one of these units should have, without a doubt, an associated innovation and training programme, as generally happens in most of the examples available in the international sphere. In this case, the joint operation, structured and coordinated, together with the high potential for simultaneity planned for, confers on the whole a greater potential than practically any of the existing references in the world. For this reason, the innovation platform is structured on this potential as an initiative for the convergence of public and private R+D+i and a highlyspecialised training resource centre, the cost of the installation and operation of which would be impossible without the other elements, but with them and with the backing which they get from being objectified as initiatives with a value of their own, it is expected to reach a position of becoming an international point of reference.

The primordial strategy of PLOCAN is the generation of an efficient and competitive infrastructure that will generate a physical and intellectual space which is probably unique, where basic research, technological developments and innovations of relevance and excellence can coexist, be drawn together and become enriched. This scenario, where the different elements of the knowledge value chain are present, will not only be a natural consequence but will be fomented specifically and constantly as one of the identifying marks of PLOCAN.

The testing costs of prototypes and technological trials for making use of marine energy are greater than the devices themselves, with the result that one of the specific missions of the Oceanic Platform of the Canary Islands and its connected environment is to become the best test bed for energy devices anywhere in the world. In the same way, the test facilities for vehicles and underwater machinery, both manned or not, must turn the platform into an international point of reference.

It must be considered that one part of the advantage of this test structure will be derived not only from the position and characteristics of the structure but also from the availability of a set of highly-qualified people with a high level of profesional training, such as deep water divers, drivers for crewed vehicles, whether via a cable or remotely controlled, engineers and technical staff, etc. for whom the platform and its activities are the best professional experience thus offering the technological and scientific community advantages which are impossible to obtain from private groups and institutions.

The platform together with its requirements, energy production and distance from the coast leads to the need to deal with the transfer of high voltage using an underwater cable, which is one of the most serious problems for the management of electricity supply networks in islands and to reduce their high relative contribution of greenhouse gases.

The underwater vehicle base which will be established at PLOCAN will be the first of its kind in Spain, and will in the future contribute, through the experience acquired in its management and operation, to the establishment of other bases.

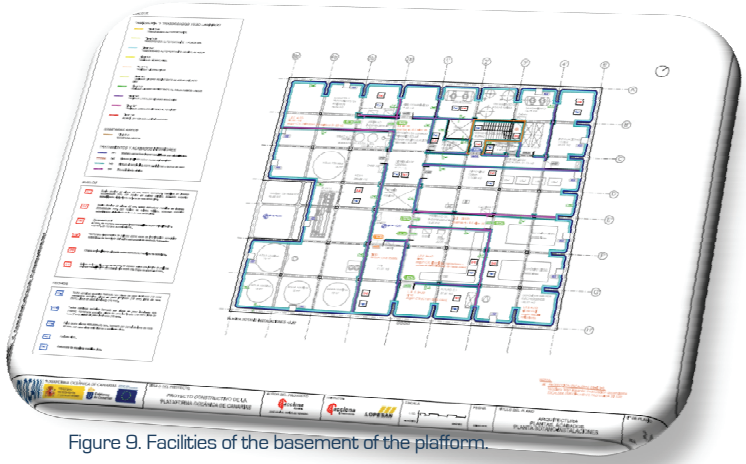


Figure 9. Facilities of the basement of the platform.

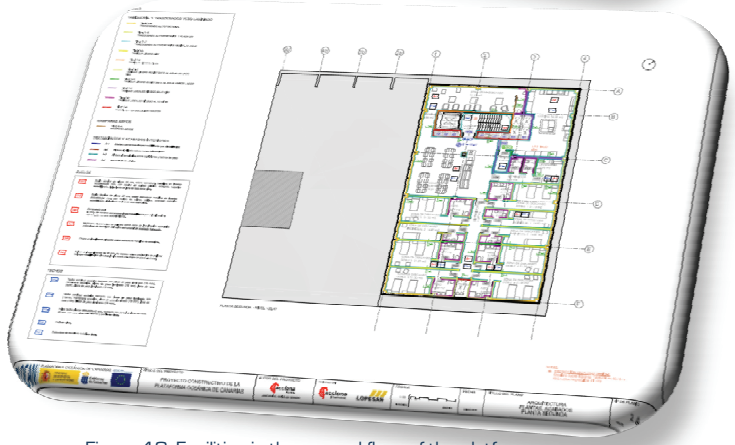


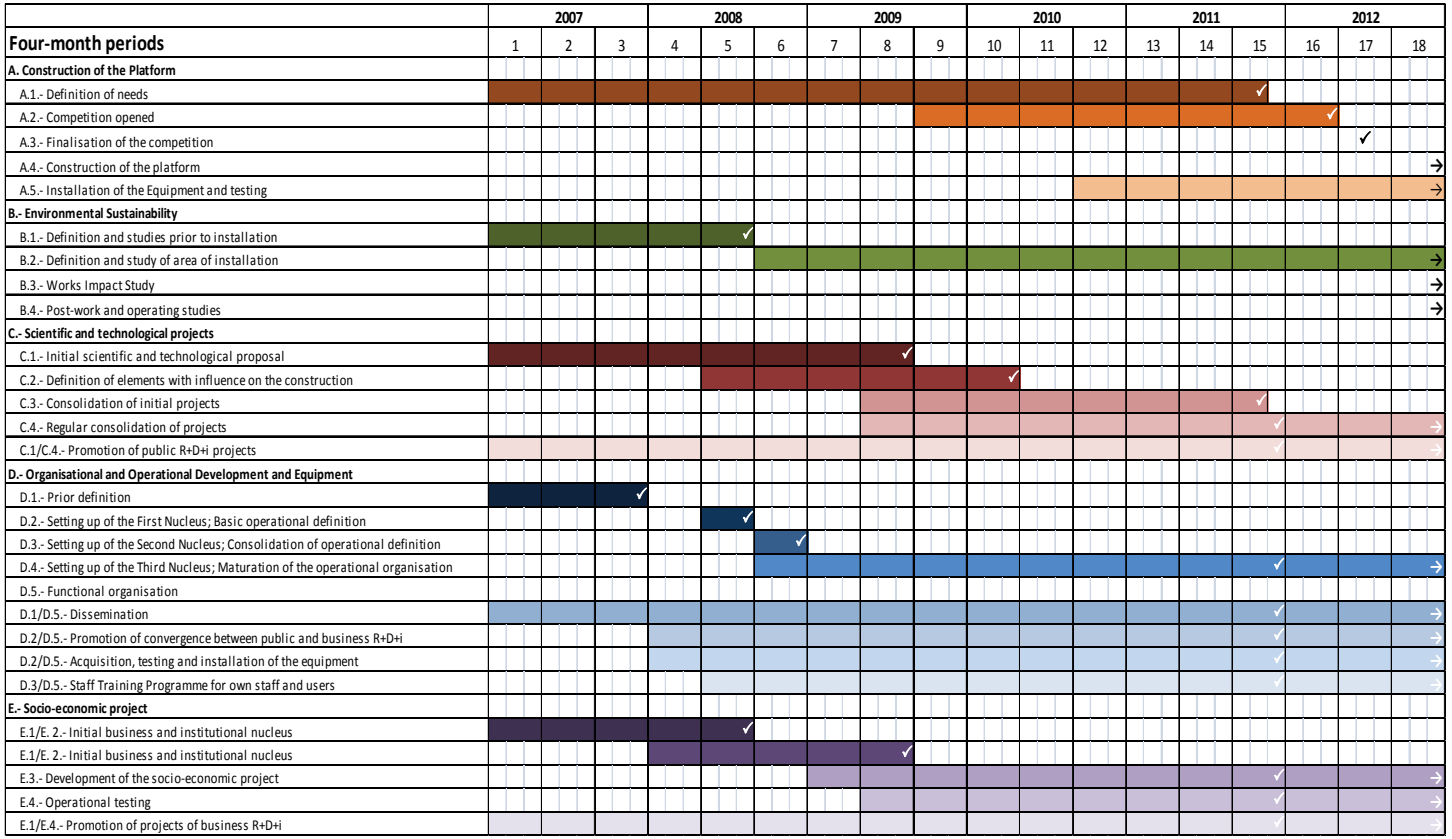
Figure 10. Facilities in the second floor of the platform.

6 Schedule planned actions

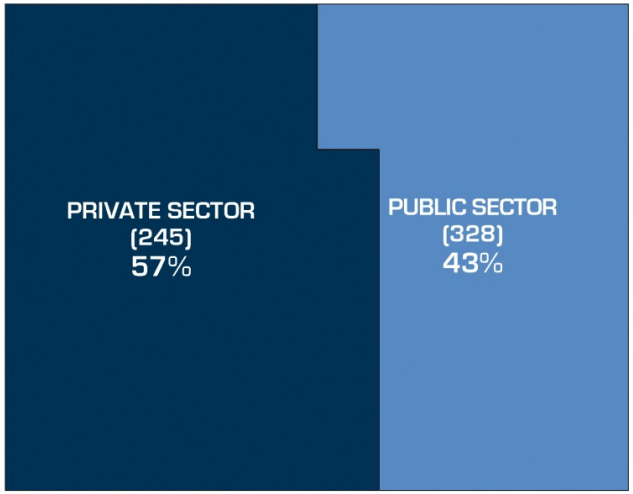
The work programme of the PLOCAN Consortium, which features in the scientific and technical project, was structured in five blocks of activities. The schedule organised in four-month periods, set out in the following table, reflects the activity carried out up to the year 2012, and constitutes the general view of the activities planned for the Platform. This overview will be developed in the annual projects that will be presented to the Consortium's organs of government.

During 2012, a number of activities of a general nature have been carried out (meetings, events, presentations and dissemination activities, etc.) which are enumerated in the long version of the document. In the same way, information is offered in the document on the training activities carried out by PLOCAN during the year, the associative and corporative activities and the collaboration agreements signed with public bodies and private companies.

The work programme of the PLOCAN Consortium, which features in the scientific and technical project, was structured in five blocks of activities.



7 PLOCAN's relations with the business and institutional environment



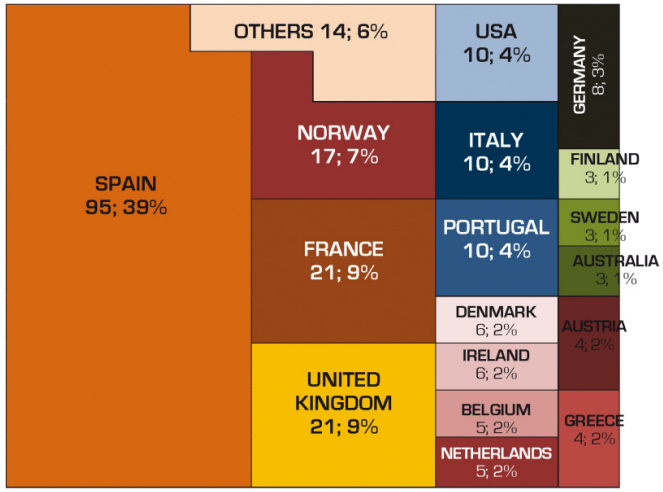
Distribution of public and private cooperation.

In 2012, PLOCAN has strengthened relationships with companies and institutions related to its areas of knowledge, in both the public and private sectors. The number of established collaborations has clearly increased in comparison with the previous year; in fact, collaborations with companies have doubled and collaborations with institutions have tripled. The following graph shows the cooperation between PLOCAN and the public and the private sectors.

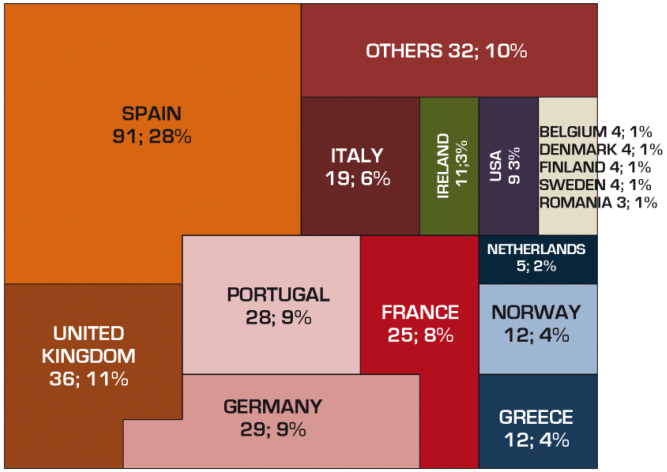
The following graph reflects the significant active collaboration established by PLOCAN with the business sector. It shows that Spanish companies still constitute one of the main objectives of the revitalization of R+D+i conducted by PLOCAN, but compared to the previous year, relationships with foreign companies, mostly of them European, have significantly increased. Throughout 2012, PLOCAN established relationships with new countries that are expected to be strengthened in the future.

The opening of PLOCAN into the European scientific and technical environment is also reflected in relationships established with institutions (universities, research centres, and governmental bodies). Just as in the case of companies, the percentage of international relations has increased, although to a lesser extent compared to the previous year. The following graph reflects PLOCAN's relationship with private bodies according to the type of relationship established. In 2011, the highest percentage corresponded to potential collaborations with companies whereas in 2012, these collaborations were materialized with project requests. This shows that the relationships PLOCAN has with both national and international companies that share its scientific and technical environment, are becoming stronger.

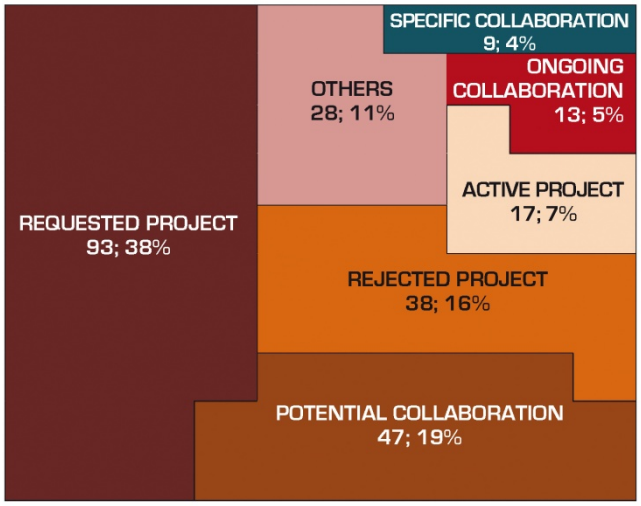
In the case of public bodies, it can be observed that 80% of the relationships established with this type of institution are carried out within the framework of a joint participation, both in the preparation and execution phases of R+D+i projects.



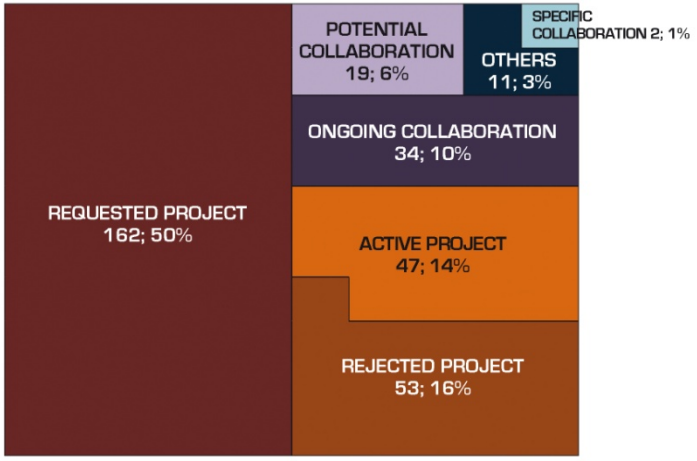
Public cooperation by countries.



Private cooperation by countries.



Relationship of PLOCAN with prívate bodies.



Relationship of PLOCAN with public bodies.

8 Publications

Along 2012 PLOCAN participated in the following research papers and presentations at congresses:

Publications:

Aguzzi, J.; Company, J. B.; Costa, C.; Mata, M.; Azzurro, E.; Paolo Menesatti, A.; Sardá, F.; Canals, M.; Delory, E. & et al. Editores: Gibson, R. N.; Atkinson, R. J. A.; Gordon, J. D. M.; Hughes, R. N.; Hughes, D. J. & Smith, P. . Oceanography and Marine Biology: An Annual Review, Volume 50. *Challenges to the assessment of benthic populations and biodiversity as a result of rhythmic behaviour: Video solutions from cabled observatories*. CRC Press, Taylor & Francis, 2012, 235-286

Boletín Marino Marítimo Macaronésico. nº 6, Plataforma Oceánica de Canarias, 2012

Barrera, C.; Rueda, M.; Brito de Azevedo, E.; Gelado, M.D.; Correia, C. & Llinás, O., *Underwater gliders: Improving the ocean observation strategy in the Macaronesian region. Instituto Hidrográfico* (ed.). Actas das 2ª Jornadas de Engenharia Hidrográfica. 2012, 401-404 (ISBN - 978-989-705-035-0).

Remirez, X.; Llerandi, C.; García A. & Hernández, JJ. Manual de Buenas Prácticas Boya SeaMon-HC. Plataforma Oceánica de Canarias, Universidad de Las Palmas de Gran Canaria e Instituto Canario de Ciencias Marinas. 2012. (ISBN - solicitado, pendiente de adjudicación)

Cianca, A.; Godoy, J. M.; Martin, J. M.; Perez-Marrero, J.; Rueda, M.; Llinás, O. & Neuer, S. *Interannual variability of chlorophyll and the influence of low-frequency climate modes in the North Atlantic subtropical gyre.* Global Biogeochemical Cycles, 2012, 26, 1-11

Vega Moreno, D.; Pérez Marrero, J.; Morales, J.; Llerandi García, C.; Villagarcía Úbeda, M. d. M.; Rueda, M. J. & Llinás, O. *Phytoplankton functional community structure in Argentinian continental shelf determined by HPLC pigment signatures*. Estuarine, Coastal and Shelf Science, 2012, 100, 72-81

Vega, D.; Santana, R.; Rodríguez, C.; Rueda, M. & Gelado, M. . Plataforma Oceánica de Canarias, Universidad de Las Palmas de G.C. y FECYT. La Química de la Vida. D.L.: GC 154-2012. ISBN: 84-695-3819-5; 978-84-695-3819-7. Plataforma Oceánica de Canarias, 2012

Quevedo, E.; Hernández, J.; Wesnigk, J.; Fernández, R.; Delory, E.; Castro A. and O. Llinás for the TROPOS Consortium. *Offshore platforms: The Oceanic Platform of the Canary Islands and the FP7 TROPOS Project, from a fixed structure to a floating approach*. Ship&Offshore December, 2012.

Presentations at congresses:

OCEANS SCIENCES 2012, febrero, Salt Lake City (USA). ESTOC SITE: *Improving its permanent time-series ocean observing program with underwater gliders*. C. Barrera, M.J. Rueda, R. Moran, R. Santana, A. Lorenzo, L. Cardona, A. de Manzanos, D. Vega, O Llinás (comunicación oral).

OCEANS SCIENCES 2012, febrero, Salt Lake City (USA). *Looking the best route for a thermal glider in the North Atlantic.* D. Vega-Moreno, M. Gómez, R. Santana, L. Cardona, C. Barrera, M.J. Rueda, O. Llinás (póster)

2ª Jornadas de Ingeniería Hidrográfica, junio, Lisboa (Portugal). *Underwater gliders: Improving the ocean observation strategy in the Macaronesian región.* Barrera, C.; Rueda, M.; Brito de Azevedo, E.; Gelado, M.D.; Correia, C. and Llinás, O. (comunicación oral).

ICOE 2012, octubre, Dublín (Irlanda). *Modular multi-purpose offshore platforms, the TROPOS project approach.* E. Quevedo, E. Delory, A. Castro, O. Llinás and J. Hernández, for the TROPOS Consortium (comunicación oral).

ICOE 2012, octubre, Dublín (Irlanda). Vision for Marine Renewables in the Canary Islands. J. Hernández-Brito, V. Monagas, J. González, J. Schallenberg and O. Llinás

ICOE 2012, octubre, Dublín (Irlanda). *An Electrical Grid Connection in PLOCAN Testbed to support new marine technologies*. V. Monagas, J. González, J. Hernández, O. Llinás (comunicación oral).

DCIS 2012, noviembre, Avignon (Francia). *Image Resolution Enhancement in Underwater Applications.* Eduardo Quevedo, Olivia Rodríguez, Gustavo M. Callicó, Félix Tobajas and Valentín De Armas (póster)

IREC 2012, diciembre, Sousse (Tunez). TROPOS: *a multi-use offshore platform as integrator of clean energy, seafood production, transport and leisure services.* Eric Delory (keynote).

9 Active proyects

In 2012, the organization decided to introduce an international method for the management of projects (Prince2) and trained and accredited its staff to use it. At the same time, it also implemented software for the management of projects (Daptiv).
On the other hand, at the end of 2012, two projects entered the introductory phase:

Infrastructure of a Submarine Transformer Station and Equipment for Environmental Monitoring of the Concurrent Operation of New Devices of Marine Electricity Generation (ETS: Spanish abbreviation which stands for Submarine Transformer Station). ETS – ERDF (European Regional Development Fund) Complementary Infrastructure

Programme of Environmental Observation and Monitoring of the Concentration of Electrical Generation Devices that make up the Infrastructure of PLOCAN's Test Site. MA – ERDF Complementary Infrastructure

Throughout 2012, nine projects were managed and carried out. In the following table, you will find a brief description of each one of the active projects.

TROPOS (Modular Multi-Use deep water offshore platform harnessing and servicing mediterranean, subtropical and tropical marine and maritime resources)

Call FP7 - *Joint Call* "Ocean of Tomorrow".
Duration: three years

While availability of terrain on land is already limited, it is especially restricted in coastal regions. Thus, space and resources available in the oceans are attracting growing interest, for instance in the use and exploitation of energy and food resources, and in biomass production. Nevertheless, this wide range of resources should be exploited in an organised manner, in accordance with the demand and following eco-friendly principles. In this context, the need for new approaches and integrated solutions for the use of oceanic resources has become increasingly urgent. There is a significant demand in coastal areas for finding innovative methods of production in the aquaculture sector and transportation supply. Shifting the energy supply towards renewable resources creates a high interest in improving use of resources. Finally, an integrated approach to the deployment of the oceans is critically required to prevent conflicts. Sharing sites, infrastructures and costs in these diverse activities could therefore present a unique opportunity for improved oceanic exploitation as well as for sustainable economic growth.

To help tackle this European challenge, the Oceanic Platform of the Canary Islands (PLOCAN) considers that the creation of a Multi-use Offshore Platform System integrating a broad range of specific functions from different sectors, would allow to overcome the needed issues. TROPOS is a collaborative project gathering 18 academic and industrial partners with high expertise and extensive experience. Its main objective is the innovative design of a modular floating platform. The platform will be adapted to deep waters and will enable integrated exploitation of oceanic resources (including energy, aquaculture, maritime transport, recreational and oceanic observation activities), with a focus on tropical, subtropical and Mediterranean areas.

The partners of the project are: University of Edinburgh, University of Bremen-MARUM, Wave Energy Centre, Universidad Politécnica de Madrid, Fraunhofer Institute-IWES, Toulon Var Technologies, Norsk Institutt for Vannforskning, Danmarks Tekniske Universitet, Instalaciones Inabensa S.A., Phytolutions GmbH, Hellenic Centre for Marine Research, National Sun Yat Sen University - Taiwan, Advance Intelligent Development S.L., Bureau Veritas, École Centrale de Nantes,EnerOcean S.L., University of Strathclyde

MaReS
(Macaronesian Research Strategy)

Call PCT MAC (2007-2013)
Duration: three years

The MaReS project aims to organise a common tool for all the Macaronesian island groups, for analysis, coordination and identification of opportunities, which will allow them to accept the challenges of sustainability. It rises from the reflection about the position of the R+D+i systems in the Macaronesian archipelagos in the European Research Space and in the international scientific context. In view of the reality that the dimension of its R+D+i means that these archipelagos cannot compete in an effective manner, it raises the need to determine a competitive research and development strategy in these European Atlantic island regions.

There are three partners involved, being PLOCAN the Lead Partner. The other partners are the Tecnopolo de Madeira and the Regional Fund for Science and Technology of the Azores Government. The project has two fundamental objectives which are, on the one hand, the establishment of a strategy for taking advantage of and boosting the synergies between the areas of greatest potential and complementarity of the R+D+i systems in Macaronesia and, on the other hand, the establishment of the operational bases and the first examples of the strategy.

EGO
(European Gliding Observatories Network)

Call COST Action 2009
Duration: four years

The main objective of this Action is the coordination of ongoing research using gliders, and the conception of future research, to operate fleets of autonomous underwater gliders in order to provide cost-effective methods for the discovery and monitoring of the ocean at global, regional and coastal scales with benefit to both basic oceanographic research and operational applications for marine activities.

Underwater gliders are intelligent and affordable platforms useful for long term multi parameter marine observations. They play an important role for present and planned marine observation networks. Deployed in swarms, they provide near real-time high spatial and temporal resolution data that will efficiently fill the gaps left by existing in-situ observation networks based on other marine platforms such as the profilers in the ARGO network. This will be beneficial for both academic oceanographic research and especially operational oceanography systems on which a large number of marine activities now rely. However, the deployment of swarms of gliders requires highly skilled operators and a sophisticated level of cooperation. The objective of the "European Gliding Observatories" Action is to build cooperation at the technological, scientific and organizational levels for a European capacity for sustained observations of the oceans with gliders.

Partners: Belgium, Cyprus, Germany, France, Sweden, Poland, Ireland, Iceland, Italy, Norway, Portugal, Spain, Turkey, Great Britain, Greece, Israel, Australia, South Africa and Egypt.

INNPACTO Wave Energy

Call INNPACTO 2010 of MICINN.
Duration: three years

The main objective of the INNPACTO Wave Energy Project is the development and demonstration of the usefulness of R+D+i projects based on the APC-PISYS technology of PIPO Systems, through the construction and location in the marine environment of two technological applications or operative products satisfying the existing demand, consisting of:

a) An autonomous observation and maritime surveillance device (prototype of 5 kW of installed power)
b) Energy buoy (prototype of 200 kW of installed power)

The autonomous device for observation and maritime surveillance satisfies the existing energy deficit in a clear and general manner, in the autonomous devices for marine observation, both in the ocean and on the coast and is a demonstrative example for a real problem worldwide. The development of this device will also serve as an optimisation of the system, used as a prototype and as a prior step to the manufacture of the energy buoy. That is to say, one technology with two different technological applications, and both are based on the existing real demand.

El Océano: La Química de la Vida

Call for grants for the support of scientific culture and innovation. Modality 1.C Projects related to scientific commemorations. FECYT 2011.
Duration: one year

In the framework of the International Year of Chemistry, the "The Ocean, the Chemistry of Life" initiative aims to set out, in an educational but friendly way, using a wide spectrum of educational, audiovisual and technological resources, the role that Chemistry has played in the knowledge that we now have about the ocean and marine life and also to emphasise its vital importance - both today and in the future - to carry out the task of monitoring the health of the seas, our atmosphere and life on our planet.

With this vision, the exhibition aimed at secondary, sixth-form and university students and general public is complete in the conceptual field serving both the Canary Islands and the rest of Spain. The exhibition allows the visitor to go in a simple way from fundamental theoretical concepts, which are basic to the understanding of chemical processes in the ocean, their relation with the origin of life and with the environmental balance of the planet, to see, touch and understand both everyday use and latest generation equipment and instruments, for oceanographic research, through guided explanations.

UNDIGEN

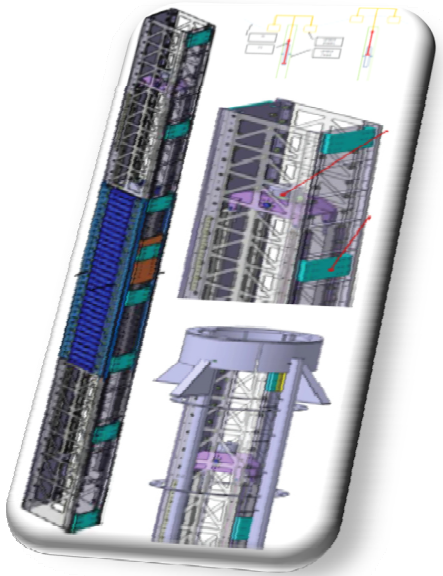
Call INNPACTO 2011 of MICINN.
Duration: two years

The Wedge Global, S.L. company has effectively developed an electrical "Power Take-off System (PTO)" for direct generation for making use of ocean waves for creating energy which is potentially suitable for different types of Wave Energy Converters - WECs (Specific vertical and pendular Absorbers and Oscillating Water Column, among others).
Wedge Global, S.L. structured its original technological project in three phases (prior to this application):

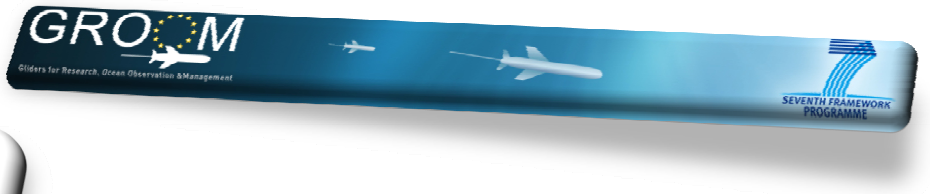
- → Construction of the linear machine and of its system of operation and control
- → Laboratory tests: determination of performance
- → Development of a test bed in the sea and tests of marine functioning

Phases i) and ii) have been finished successfully, leading to the conduct of the Experimental Project (Phase iii). In consequence, the objective of the project is aimed at carrying out phase iii), that is to say, developing a basic sensor which will serve as a test bed for the PTO with the aim of carrying out the effective marine operation test which will confirm the good laboratory results and, in turn, will make it possible to analyse different strategies of control in the real application, both ordinarily and the latest generation for oceanographic research.

In consequence, the objective of the project is aimed at carrying out phase iii), that is to say, developing a basic sensor which will serve as a test bed for the PTO with the aim of carrying out the effective marine operation test which will confirm the good laboratory results and, in turn, will make it possible to analyse different strategies of control in the real application, both ordinarily and the latest generation for oceanographic research.



GROOM (Gliders for Research, Ocean Observation and Management)

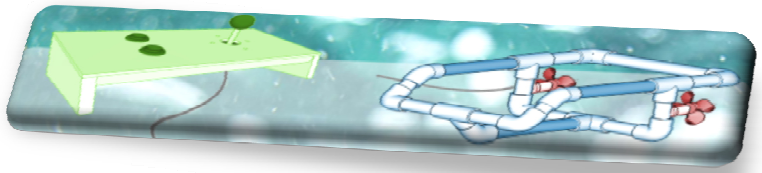


Call 7PM (G.A. nº 284321)
Duration: three years

The project includes the participation of 19 institutions (UPMC, OC-UCY, IfM-GEOMAR, HZG, AWI, UT, FMI, CNRS, IFREMER, HCMR, NURC, OGS, UIB, NERSC, CSIC, PLOCAN, SAMS, UEA and NERC) in representation of a total of 9 countries (France, Cyprus, Germany, Finland, Greece, Italy, Norway, Spain and the UK).

The main purpose of the GROOM project is to design a European research infrastructure using underwater gliders as marine observation tools capable of supplying information of value to different socio-economic sectors that make use of this kind of information in some way. GROOM's mission is to define scientifically, technologically and organisationally the European capacity in the matter of gliders required to maintain the proper and required levels of marine observation in a sustainable manner.

EDUROVs



Obra Social La Caixa
Duration: one año

In this project, secondary school students and their teachers build underwater robots operated by remote control (ROVs) and demonstrate their skills in the construction and management of ROVs in a competition against other schools. The project's main objectives are to introduce students in science, technology and engineering, boosting concepts such as Newton's laws, density, time, torque, force, or mass distribution. To encourage the students interest in science and technology through underwater exploration and robotics, as common tool that links these areas. To encourage teamwork, respecting values and enhancing creativity. To build considering a technological need of marine use, environmentally friendly and using materials of everyday use.

Partners: University of Girona, PLOCAN.

Proyecto OCEAN LIDER

Call: CENIT-E
Duration: three years

Ocean Líder project is focussed on increasing the knowledge and opportunities for the exploitation of renewable marine energies. PLOCAN, in collaboration with the University of Las Palmas de Gran Canaria and the company GMV, has participated in research activities related to the fundamentals of measurement of waves and their potential for improvement.

Partners: IBERDROLA (Leader) and twenty institutions and companies.

10 Human resources

PLOCAN STAFF	01	02	03	04	05	06	07	08	09	10	11	12	P/M
MANAGEMENT	2	2	2	2	2	2	2	2	2	2	2	2	24
TECHNICAL STAFF	15	15	15	15	15	15	15	15	15	15	15	15	180
SUPPORT STAFF	12	13	12	12	12	12	12	12	12	12	12	12	145
TOTAL PERSONS/MONTH	**29**	**30**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	349

Table 1
Staff recruitment in 2012.

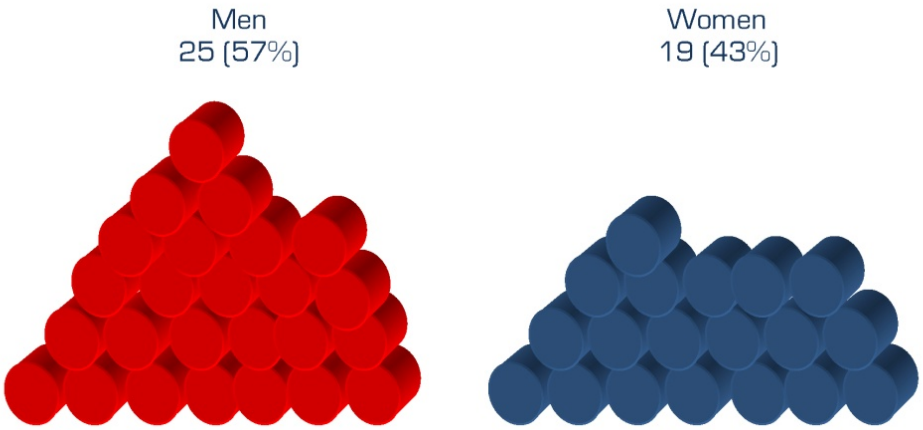
PROJECT STAFF	01	02	03	04	05	06	07	08	09	10	11	12	P/M
PROJECT STAFF	3	4	4	4	4	4	4	4	4	5	5	5	50
TOTAL PERSONS/MONTH	**3**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**5**	**5**	**5**	50

Tabla 2.
Recruitment of project staff in 2012.

In 2012, only the *project manager* of the TROPOS project joined the staff. The position was offered through a public tender, under the principles of merit, transparency, publicity, equity and impartiality in accordance with the provisions of the Spanish Law on Budgets (temporary work contracts for justified causes of necessity and special emergency).

The following graph shows the percentage of men and women who applied to the job possition.

The staff (including personnel hired for projects at the end of 2012) was made up of thirty-four workers. The recruitment of staff has been slowed down because of the guidelines of public hiring in the current economic context.



11 Corporate social responsibility

In 2012, the organization developed its first Corporate Social Responsibility Plan. This CSRP was undertaken according to the general classification of criteria and measures of Social Responsibility in the Public Administration, established by the Workgroup of the Technical Commission of Social Responsibility, that took into account the proposals of the Spanish State Council of Corporate Social Responsibility (Spanish abbreviation CERSE) set up in the former Spanish Ministry of Work and Immigration, and the international models for this purpose (especially the GRI y and the recent ISO norm 26000) and the Law on Sustainable Economy (Law 2/2011, 4th March 2011).

12 PLOCAN IN FIGURES

YEAR	PARTNERS' CONTRIBUTIONS (A)	OTHER SOURCES OF FINANCING (B)	CREATION EXPENSES PLOCAN CONSORTIUM (C)	OTHER EXPENSES (D)
2012	€2,472,927.39	€1,248,812.50	€2,311,624.09	€674,357.06

Table 3.
Income and Expenditure of 2012.

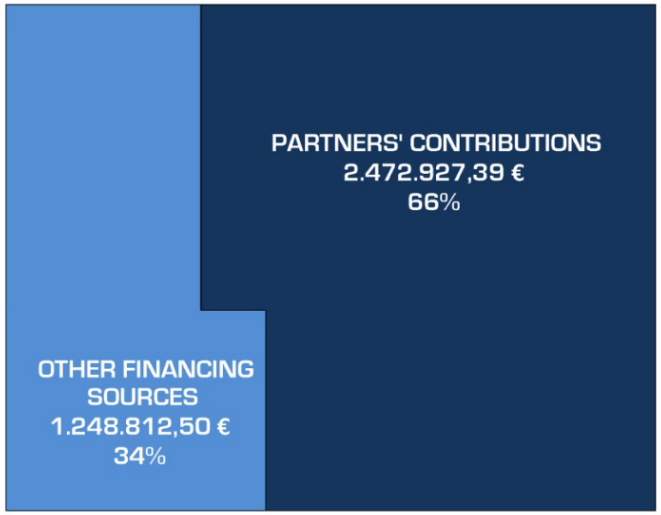


Figure 11.
Income 2012.

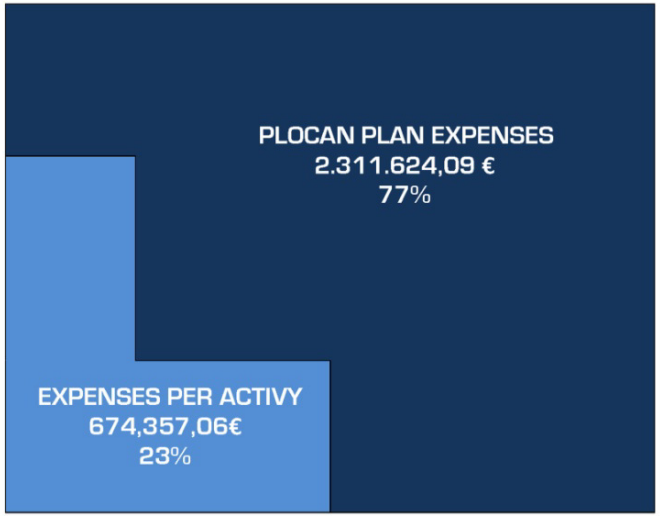


Figure 12
Expenditure 2012.

The following figures are the most relevant as regards accounting for the budget for the financial year 2012. The following table reflects the contributions received by the Oceanic Platform of the Canary Islands (PLOCAN) throughout the same financial year; these come from:

- → Partners' Contributions: the Spanish Ministry of Economy and Competitiveness (hereinafter MINECO) and the Canary Islands Government in relation to the creation of the PLOCAN Consortium (A).
- → Other Sources of Financing: Income due to PLOCAN's participation in R+D+i projects allow for research and the scientific and technological development of marine and maritime sciences, and the providing of services and financial income (B).

On the other hand, this table also includes the total expenses for the creation of the PLOCAN Consortium (C) and those incurred by PLOCAN's participation in R+D+i projects, provision of services and financial income (Other Expenses - D)

As you can see, the amount resulting from the contributions of the Spanish Ministry of Economy and Competitiveness and the Canary Islands Government amounts to a total of €2,472,927.39 for 2012: (MINECO + Canary Islands Government = 549,750.00 + 1,923,177.39).

It is worth indicating that from the total amount received by the Canary Islands Government (€1,923,177.39), €798,177.39 of this amount corresponds to the annuity of 2011. This amount had not been paid during the financial year 2011; it was finally paid during the financial year 2012.

Likewise, the total amount reached in 2012 in income for the participation of PLOCAN in R+D+i projects can be observed here; this amount comes from national and international organisms, centres, companies and other sources of financing (€1,248,812.50).

In the following graphs, one can observe the percentages of income received during the financial year 2012, according to the origin of the same:

It is worth noting that the budget for 2012 was prepared taking into account the current budget restrictions and, for this reason, several of the budget items, did not experience any increase in comparison with the previous year. In this sense, as regards staff expenses, one can underline that PLOCAN staff expenses have not increased since the previous year.

Regarding the expenses of the Oceanic Platform of the Canary Islands in the financial year 2012, it should be noted that the total amount of the same reaches €2,985,981.15. The expenses to cover costs for the creation of the PLOCAN Consortium (€2,311,624.09) and the expenses necessary to carry out research and scientific and technical development of marine and maritime sciences (€674,357.06) make up the total amount of expenses.

It is worth noting that the budget for 2012 was prepared taking into account the current budget restrictions and, for this reason, several of the budget items, did not experience any increase in comparison with the previous year. In this sense, as regards staff expenses, one can underline that PLOCAN staff expenses have not increased since the previous year.

The percentages of expenses of the financial year 2012 are the following:

In 2012, two public contracts for supplies and services were signed. The total amount of the same reaches €432,452 (taxes included).

Procurement Records of 2012

CONTRACT CODE	OBJECT OF THE CONTRACT	CONCESSION PROCEDURE	AMOUNT CONCEDED
L-CSU-PA-1/2011	Provision of a multi-purpose container ship.	Open	€ 379.952,00
L-CPS-NSP-1/2012	Supervision of work project and management of execution of works of the Oceanic Platform of the Canary Islands.	Negotiated without publication	€ 52.500,00