



JERICO

Application for Transnational Access to Coastal Observatories





Description of the project (to be provided in pdf format)

Please contact the manager of the infrastructure/installation you wish to use before writing the proposal

PART 1: User group details

Indicate if the proposal is submitted by

- ☐ an individual
☒ a user group

Information about the applicants (PI and project partners)

Principal Investigator (user group leader)

Title **Dr.** Name and Surname **Ainhua B. Caballero Reyes**

Gender ☐ Male ☒ **Female**

Institution **AZTI-Tecnalia**

Department / Research Group **Marine Research Division**

Address **Herrera Kaia Portualdea, z/g, 20110 Pasaia (Gipuzkoa)**

Country **Spain**

email **acaballero@azti.es**

Telephone **+34 667 174 486**

Fax _____

Project partners

(repeat for each partner of the group)

Partner # 1

Title **Dr.** Name and Surname **Anna Rubio Compañy**

Gender ☐ Male ☒ **Female**

Institution **AZTI-Tecnalia**

Department / Research Group **Marine Research Division**

Address **Herrera Kaia Portualdea, z/g, 20110 Pasaia (Gipuzkoa)**

Country **Spain**





email **arubio@azti.es**

Partner # 2

Title **Dr.** Name and Surname **Luis Ferrer Rodríguez**

Gender ☒ **Male** ☐ Female

Institution **AZTI-Tecnalia**

Department / Research Group **Marine Research Division**

Address **Herrera Kaia Portualdea, z/g, 20110 Pasaia (Gipuzkoa)**

Country **Spain**

email **lferrer@azti.es**

Partner # 3

Title **Eng.** Name and Surname **Julien Mader**

Gender ☒ **Male** ☐ Female

Institution **AZTI-Tecnalia**

Department / Research Group **Marine Research Division**

Address **Herrera Kaia Portualdea, z/g, 20110 Pasaia (Gipuzkoa)**

Country **Spain**

email **jmader@azti.es**

PART 2: Additional information about the applicant(s) expertise

Expertise of the group in the domain of the application

AZTI-Tecnalia is a private non-for-profit research organization. AZTI-Tecnalia belongs to the recently created research corporation called TECNALIA that has become the fifth EU private research organization in size. Its main objective is the social development and the increase of the competitiveness in its working areas by means of the research and technological innovation. Since 1981 its activities have been focused to solve the problems of its clients, with an innovative and equilibrated model between the generation and caption of technologies and its diffusion and transfer. Integrated coastal and ocean resources management requires wide and specialized scientific knowledge. The public administration, for management decision making together with the stakeholders and companies linked to the marine environment, claim innovation and continuous technological development.

The Marine Research Division and, specially the Marine Dynamics and Operational Oceanography area, has a long experience in oceanographic studies related to the Bay of Biscay. During the last 5 years this group has been involved in several regional, national and European projects about



ocean-meteorological networks, operational oceanography (ECOOP, LOREA, IBI-ROOS), marine energy, environmental impacts, fisheries management and aquaculture. The Marine Research Division has published numerous reviewed articles (see the complete list at <http://www.azti.es/oceanografia-operacional.html>), including a book dedicated to the Oceanography of the Basque Country.

In addition to the IP A. Caballero, who has proven skills in mesoscale oceanic processes and remote sensing (please refer to her short CV detailed below), the proposing scientific team is made up of three more people from AZTI-Tecnalia with demonstrated expertise on the field of physical oceanography. L. Ferrer is a physical oceanographer, expert on numerical modelling. His activities focus on developing operational oceanography simulations in the Bay of Biscay at different scales. His research is devoted to analyse and describe marine circulation over the shelf and in some key coastal areas and their response to freshwaters inputs and to the atmospheric forcing. A. Rubio is a physical oceanographer; her research is focused on mesoscale and shelf/slope processes. She has a solid experience on the analysis of observational data from different platforms, as well as, on the validation and analysis of numerical data from ocean models. Finally, J. Mader is expert on coastal oceanography. He is currently head of Marine Dynamics and Operational Oceanography area in the Marine Research Division. His main qualifications and domains of expertise are in oceanographic instrumentation, data processing and modelling in marine dynamics.

To finish, it is worth noting that over recent years, with the aim of improving the understanding on the ocean processes governing the ocean circulation and that of developing an Operational Oceanography System in the Basque Country, the Meteorology and Climatology Direction of the Basque Government has promoted the installation of different in-situ observing marine platforms in the SE Bay of Biscay. This system, consisting of 6 coastal stations, 2 deep sea buoys and a HF Radar array (200 km range, 6 km horizontal resolution), provides systematic and long-term routine ocean-meteorological measurements. Together with the real-time data, invaluable for operational oceanographic purposes, the long-term time series of atmospheric, hydrographic and current hourly data are invaluable for the study of the hydrodynamics regarding to multiple time and space scale, in an area where in-situ data were particularly scarce. The combination of the available in-situ and remote data with that obtained from the glider mission proposed in this project, is expected to be particularly fruitful and provide valuable results on the study of the 3D characteristics of a recurrent mesoscale anticyclonic eddy observed in this area.

Short CV of the PI

Ainhoa Caballero finalized her Ph.D. thesis from the Polytechnic University of Catalonia (Spain) in March 2008. The title of her international PhD degree was: Ocean surface circulation within the Bay of Biscay, on the basis of remotely-sensed data. During the PhD period made an internship in the Space Division of *La Maison de la Télédétection*, IRD (France, May-Jun 2004) and in the Space Oceanography Division of the CLS (France, Aug-Oct 2005). She is an expert in climate change (ocean change) and mainly in space oceanography. Within the framework of space oceanography she has been involved in several studies of the physical oceanography of the Bay of Biscay by means of visible, IR and radar (altimeters, scatterometers) sensors. Her experience gathered in the physical oceanography of the study area has been also demonstrated by the participation in international congresses (ISRSE33, EGU, ISOBAY...) and in scientific projects (LOREA; ESTIBB, Plan Nacional I+D+i 2008-2011, ref CTM2009-12339...), together with the



publication or participation of different scientific papers. Besides the publications indicated in the following Section, we list here 4 selected publications on the physical oceanography of the Bay of Biscay:

- Caballero, A., Espino, M., Sagarminaga, Y., Ferrer, L., Uriarte, Ad. González, M., 2008: Simulating the migration of drifters deployed in the Bay of Biscay, during the Prestige crisis. *Marine Pollution Bulletin*, Vol. 56, 475-482.
- González, M., Ferrer, L., Uriarte, A., Urtizberea, A., Caballero, A. 2008: Operational Oceanography System applied to the Prestige oil-spillage event. *Journal of Marine Systems*, Vol. 72, 178-188.
- Ferrer, L., González, M., Valencia, V., Mader, J., Fontán, A., Uriarte, Ad. Caballero, A., 2007: Operational coastal systems in the Basque Country region: modelling and observations. *Proceedings of the 17th International Offshore (Ocean) and Polar Engineering Conference, ISOPE 2007*. Lisboa (Portugal).
- Caballero, A., Sagarminaga, Y., Espino, M., 2005: The relationship between satellite and meteorological model-derived winds with those from ocean buoys within the Bay of Biscay. *Journal of Atmospheric and Ocean Science*, Vol. 10, No. 4, 463–479.

A list of 5 recent, relevant publications of the participant(s) in the field of the project

Caballero, A. Pascual A., Dibarboure G., Espino M. 2008. Sea level and Eddy Kinetic Energy variability in the Bay of Biscay, inferred from satellite altimeter data. *Journal of Marine Systems*, 72, 116–134.

Ferrer L., Caballero A. (2011). Eddies in the Bay of Biscay: A numerical approximation. *Journal of Marine Systems*, 87, 133-144.

Ferrer L, Fontán A, Mader J, Chust G, González M, Valencia V, Uriarte Ad, Collins MB (2009). Low-salinity plumes in the oceanic region of the Basque Country. *Cont. Shelf Res.*, 29 (8): 970-984.

Rubio, A., A. Fontán, P. Lazure, M. González, V. Valencia, L. Ferrer, J. Mader and C. Hernández Seasonal to tidal variability of currents and temperature in waters of the continental slope, SE Bay of Biscay. *Journal of Marine Systems* DOI: 10.1016/j.jmarsys.2012.01.004 (2012, in press)

Rubio, A., G. Reverdin, A. Fontán, M. González, and J. Mader (2011). Mapping near-inertial variability in the SE Bay of Biscay from HF radar data and two offshore moored buoys, *Geophys. Res. Lett.*, 38, L19607, doi:10.1029/2011GL048783.

PART 3: Detailed scientific description of the project

List the main objectives of the proposed research

(one page maximum)

During winter, an anticyclonic eddy is generated in the SE Bay of Biscay that instead of migrate,



remains between 3°W and 4°W for several months. This mesoscale structure correspond to the stationary SWODDY (Slope Water Oceanic eDDY) previously described by Pingree and Le Cann (1992). A recent analysis of a time series of satellite altimetry maps, Sea Surface Temperature maps and outputs from ROMS simulations, in the framework of the ESTIBB project, suggests that these stationary eddies could be generated in the bathymetric and discontinuities of the Cape Breton canyon system, or further to the east, between this canyon and the Ajo and Mayor Capes. Besides this, there are evidences that indicate that these eddies retain plankton, including differentiated densities of ichthyoplankton (early development stages of different fish species spawning in this area).

The main objective of this project is to study, in detail, the characteristics of this eddy, both in the surface and in the vertical, through an extended series of remote sensing, routine in-situ measuring systems (two slope buoys and a HF radar array), two field campaigns with drifting buoys and a field campaign using an underwater Glider.

In-situ measurements will be use as well to validate ROMS simulations in the area to allow further research based on model results.

Pingree, R.D., Le Cann, B., 1992. Three anticyclonic Slope Water Oceanic eDDIES (SWODDIES) in the southern Bay of Biscay in 1990. Deep-Sea Research 39, 1147– 1175.

***Give a brief description of the scientific background and rationale of your project
(one page maximum)***

Several authors have described some aspects of the eddy activity in the SE Bay of Biscay, between Cap Ferret and Cap Breton submarine canyons (Pingree and Le Cann, 1992; Garcia-Soto et al., 2002; Serpette et al., 2006; Caballero et al., 2008). For instance, Pingree and Le Cann (1992) describe an stationary anticyclonic eddy during summer in 1997, around 44.5°N and 4°W. In the same area (around 4°W), other SWODDY like eddies have been described by Garcia-Soto et al. (2002), also during summer periods and using different data bases. However, the observations to the east of 3.5°W are much more scarce and there are few evidences or descriptions of eddies in this area.

Recently, an Spanish research project (ESTIBB: CTM2009-12339) founded by the Ministry of Science and Innovation of the Spanish Government currently being developed by the group of Marine Dynamics and Operational Oceanography of AZTI (participants: A. Caballero, L. Ferrer and A. Rubio) permits to study the spatio-temporal variability of the eddy activity in the Bay of Biscay (see Ferrer and Caballero). The recurrent identification of an anticyclone in this area, from different independent data sources, has motivated this proposal, with the aim of investigate the 3D characteristics of this structure.

To that end, we propose to undertake a glider mission in this area and to combine the obtained data with the systematic and long-term routine ocean-meteorological in-situ and remote measurements available in the study area.

Garcia-Soto, C., Pingree, R.D., Valdés, L., 2002. Navidad development in the southern Bay of



Biscay: climate change and swoddy structure from remote sensing and in situ measurements. Journal of Geophysical Research 107, 3118. doi:10.1029/2001JC001012.

Serpette, A., Le Cann, B., Colas, F. 2006. Lagrangian circulation of the North Atlantic Central Water over the abyssal plain and continental slopes of the Bay of Biscay: description of selected mesoscale features. Scientia Marina, Vol 70, No S1.

Present the proposed experimental method and working plan

(one page maximum)

The experimental campaign that we propose herein has the objective of study the **characteristics** of the anticyclone eddy described above.

Figure 1 shows the different radial that will be made by the Glider. The radials are classified in two groups. The red radials will cover the area to the east of the eddy, to get information on the slope currents. The blue radials will cover the area where the eddy remains trapped.

The westernmost radial covered by the Glider will be a rectilinear transect perpendicular to the coast around 4.7°W until 44°40'N 4°40'W, after that it will make a diagonal radial from the last position to the coast in front of Mayor and Ajo Capes, from which it will be directed perpendicular to the coast until 44°40'N 4°W (Fig. 1, red lines). The dataset resulting from this sampling will serve to analyse in surface and depth the characteristics of the slope current.

From the last position, the Glider will describe a diagonal radial, until Cape Breton canyon (Fig. 1, blue lines), then it will continue to the North until 44°40'N 3°W, and finally from this position it will make another diagonal radial until 43°40'N 4°W (Fig. 1, blue lines). The dataset resulting from this sampling will serve to analyse the horizontal and vertical characteristics of the eddy; therefore, the Glider will be submerged to the greatest technically possible depth (~1000m).

The glider will repeat this sampling trajectory during, at least, two to four weeks to be able to follow the evolution of the observed structure and to allow a better coverage of the structure from satellite products.

The deployment/recovery of the Glider could be done eventually using our facilities in Pasaia. The research center of AZTI- Tecnalia in Pasaia is located within the Pasaia Harbour (<http://www.azti.es/en/inv.-marina/>).

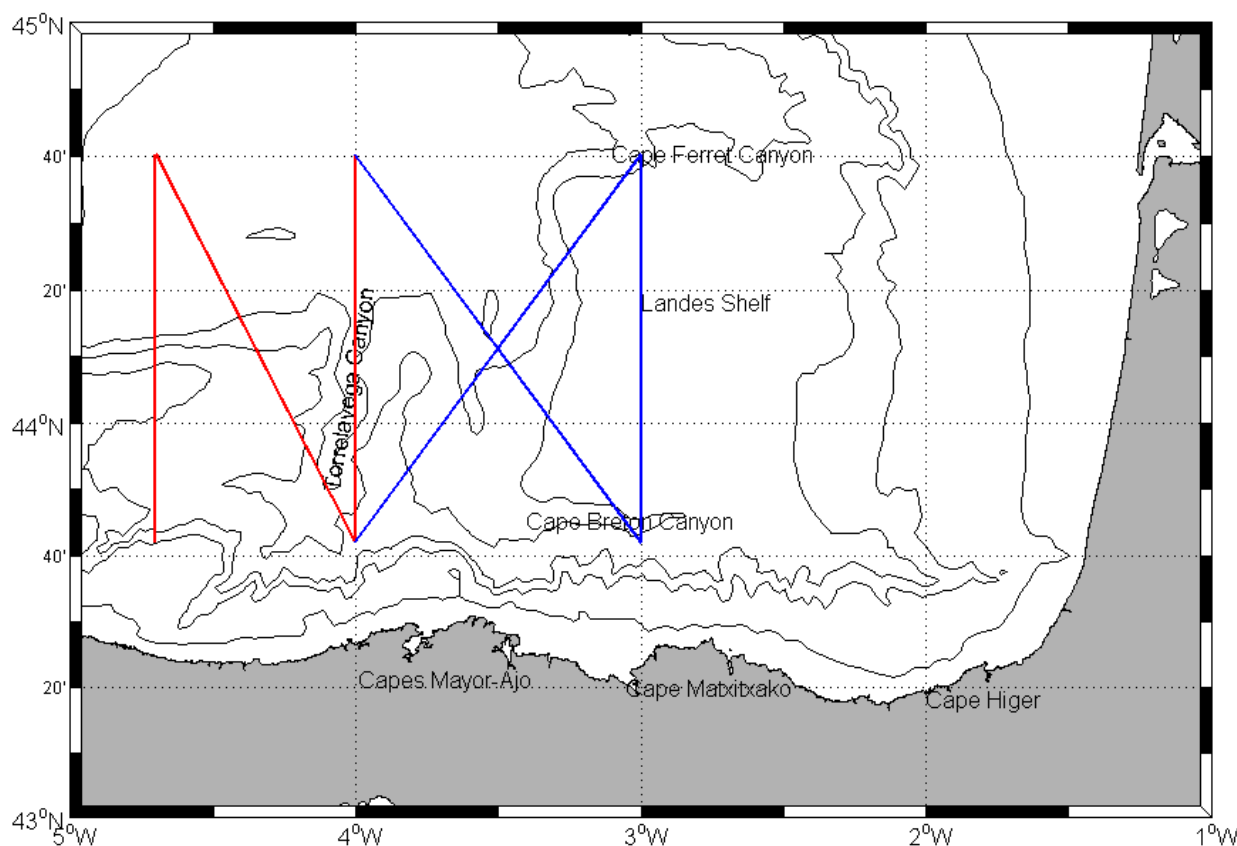


Figure 1. Area of Study. The red and blue lines indicate the radials the Glider will sample.

Indicate the type of access applied for

- ☒ **remote** (the measuring system is implemented by the operator of the installation and the presence of the user group is not required)
- ☐ partially remote (the presence of the user group is required at some stage e.g. installing and un-installing)
- ☐ in person/hands on (the presence of the user group is required/recommended during the whole access period)

Indicate the proposed time schedule including expected duration of access time
(half a page maximum)

The historical observations indicate that this structure remains in this area during several months between the beginning of the spring and the end of summer. Therefore, in order to ensure the presence of the stationary anticyclonic eddy, the experimental sampling will take place within the period February to May 2013. We expect the glider would repeat the sampling trajectory described above during, at least, four weeks to be able to follow the evolution of the observed structure and to allow a better coverage of the structure from satellite products. The duration of access time to



the facility could be reduced to two weeks depending on the availability provided by the host.

Host infrastructure

Indicate the type(s) of JERICO host facility(s) you are interested in
(Tick more than one if it is useful for your project)

☐ ferrybox ☐ fixed platform ☒ glider ☐ calibration laboratory

Indicate the specific JERICO host facility(ies) you wish to choose

National Glider facility (CETSM)
Institut National des Sciences de l'Univers/ Centre National de la Recherche Scientifique
INSU/CNRS (La Seyne sur mer, France)

Explain briefly why you think your project will be best carried out at the specified host facility(ies)

The CETSM (INSU/CNRS) institute has a wide and demonstrated experience in the use of gliders, with at least one Glider campaign in the SE Bay of Biscay (Aspex_02, source: <http://www.ego-network.org/dokuwiki/doku.php?id=public:glidersdeployments>). The CETSM (INSU/CNRS) is the facility which offers the highest availability of Gliders, with up to three deep gliders (0-1000 m) which ensures the feasibility of the proposed mission.

If possible, list other JERICO facility(ies) where you think your experiment could alternatively be carried out

Additional information

Is there a facility similar to the one you wish to utilize in your country?

☒ Yes ☐ No

If yes, please indicate your reasons for requesting access to the JERICO facility you have chosen

The main reason is the need of optimizing the use of European and National facilities. In Spain, SOCIB-IMEDEA in Balearic islands and PLOCAN in Canary Islands are managing gliders. Nevertheless, for performing the field campaign proposed here, in the bay of Biscay where scientific



and operational collaborations exist between France and Spain, the use of the French fleet in a European context appears to be the best option, in the following framework:

A new research project has been submitted by AZTI-Tecnalia in 2012 to National R+D+I plan of the Ministry of Science and Innovation of the Spanish Government to study, in detail, the characteristics of the stationary eddy in the SE Bay of Biscay, both in the surface and in the vertical. This project will support the analysis of an extended series of remote sensing, routine in-situ measuring systems (two slope buoys and a HF radar array) together with field campaigns with drifting buoys in the study area. The proposal is supported by Dyneco-Ifremer Brest and the data will be exploited jointly in the framework of the French project EPIGRAM (ANR/LEFE-IDAO).

There are no currently National glider facilities in the Iberian Atlantic coast. Nevertheless AZTI-Tecnalia has been in touch with the Spanish facility involved in JERICO: SOCIB-IMEDEA (Balearic islands). At the moment, SOCIB has not the fleet capacities to perform services at a national level, in particular in the Bay of Biscay. For this reason, the present call in the framework of JERICO is a great opportunity to complement the foreseen sampling through the use of underwater gliders in the area. In addition, the CETSM (INSU/CNRS) institute has a wide and demonstrated experience in the use of gliders, with at least one Glider campaign in the SE Bay of Biscay, which guarantees the feasibility of the proposed mission.

Have you already submitted an Access Proposal to any of the participating facilities under this or previous EU Programs?

☐ Yes ☒ **No**

If yes, please indicate the name of the institution, submission date and reference number for each such proposal

Is this a resubmission of a previously rejected proposal? (Select "yes" if this application is a revised version of a proposal submitted to JERICO before that was rejected by the Selection Panel)

☐ Yes ☒ **No**

If yes, please give the exact reference number and submission date. Kindly describe briefly the changes made in comparison to the rejected version.

Is this a continuation of an earlier project funded under a previous call for Transnational Access in JERICO at the same facility?

☐ Yes ☒ **No**



If yes, please give the exact reference number and submission date. Kindly indicate also what has been achieved in the previous experiment and the reasons why the objectives have not been fully met.

PART 4: Technical information

Wherever possible, please specify your requests regarding the use of your chosen facility's equipment/instruments/sensors, including any additional services, data or other requirements.

One deep glider (0- 1000m) equipped with CTD and fluorimeter for one field campaign of 2 to 4 weeks within the period February to May 2013.

List all material/equipment you plan to bring to the JERICO facility (if any):

Please provide a detailed and realistic budget for the expenses you expect to incur for travel/boarding and the shipment of equipment, if applicable in your case (note that a maximum of two travel grants will be assigned to each user group, depending on the length of the requested period of stay).

Please tick the appropriate boxes and give detailed information for the kind of risks associated with your proposed activity

- ☐ Chemical :
- ☐ Biological :
- ☐ Radiological :
- ☐ Other :



Date of compilation _____ 02/04/2012 _____

Signature of the PI _____ Ainhoa Caballero _____

Signature of an appropriate authorised person
(e.g. Head of Department, Research Office) _____ LORENZO MOTOS _____

This section reserved to the JERICO TNA Office

Date of proposal receipt by email _____

Assigned reference number _____

Signature of receiving officer _____