JERICO-S3

Proposal for Transnational Access

to Coastal Observatories

1st Call

2nd June 2020 - November 16th 2020

Description of the project to be sent in pdf format to jerico.ta@marine.ie

Please consult access rules at http://www.jerico-ri.eu and contact the manager of the infrastructure/installation you wish to use before writing the proposal

The JERICO-S3 project is funded by the European Commission's
H2020 Framework Programme under grant agreement No. 871153
Project coordinator: Ifremer, France.

PART 1

1. GENERAL INFORMATION

Title of the project (255 characters max.)	ABACUS 2021
Acronym (20 characters max.)	Algerian Basin Circulation Unmanned Survey 2021
Applying Institution	UNIVERSITÀ DEGLI STUDI DI NAPOLI "PARTHENOPE"
Host Institution	SOCIB - *Balearic* Islands *Coastal* Ocean Observing and Forecasting System
Host facility(ies)	SOCIB glider facility

Have you or other members of your user group previously used the requested facility(ies)?	X	Yes		No

If yes, please indicate the EU Program(s), the name of the project(s) and year(s) you or other members of your user group have used such facility(ies)	The user group, with some differences in its composition, and with two different principal investigators realized several successful projects in collaboration with the hosting facility. In 2014, the first ABACUS mission was funded by the Joint European Research Infrastructure network for Coastal Observatories (JERICO) Trans National Access (TNA) third call (grant # 262584). During 2015, a glider mission was realized through application to SOCIB external user access. In 2016, a new ABACUS glider mission was funded under the JERICO NEXT TNA first call with the support of the European Commission – H2020 Framework Programme, JERICO NEXT under grant agreement No. 654410. In 2017, the ABACUS 4 survey was funded under the JERICO NEXT TNA second call with the support of the European Commission – H2020 Framework Programme, JERICO NEXT under grant agreement No. 654410. In 2018, the ABACUS 5 project was selected among the the ones eligible for funding. Unfortunately, due to unexpected issues from the host facility (SOCIB), the glider cruise was cancelled.

If you have received transnational access support from a previous JERICO project, please list resulting publications, conference contributions, patents. List only the ones that acknowledge the support of the European Commission and JERICO	**PUBLISHED PAPERS:** 1. Aulicino, G.; Cotroneo, Y.; Olmedo, E.; Cesarano, C.; Fusco, G.; Budillon, G. **In Situ and Satellite Sea Surface Salinity in the Algerian Basin Observed through ABACUS Glider Measurements and BEC SMOS Regional** Remote Sens. 2019, 11, 1361 https://doi.org/10.3390/rs11111361 2. Cotroneo, Y., Aulicino, G., Ruiz, S., Sánchez Román, A., Torner Tomas, M., Pascual, A., Fusco, G., Heslop, E., Tintoré, J., and Budillon, G. **Glider data collected during the Algerian Basin Circulation Unmanned Survey** Earth Syst. Sci. Data, 2018, 130 https://doi.org/10.5194/essd-2018-130. 3. G. Aulicino, Y. Cotroneo, S. Ruíz, A. Pascual, A. Sanchez Roman, G. Fusco, J. Tintoré, G. Budillon **Monitoring of the Algerian Basin through glider observations, satellite altimetry and numerical simulations along a SARAL/Altika track** Journal of Marine Systems Volume 179, 55-71, 2018 4. Y. Cotroneo, G. Aulicino, S. Ruíz, A. Pascual, G. Budillon, G. Fusco, J. Tintoré **Glider and satellite high resolution monitoring of a mesoscale eddy in the Algerian Basin: effects on the mixed layer depth and biochemistry** Journal of Marine Systems Volume 162, 73–88, 2016 **PUBLISHED DATASET:** Budillon, G., Cotroneo, Y., Aulicino, G., Fusco, G., Heslop, E.,Torner, M., and Tintoré, J. **SOCIB TNA Abacus (Version 1.0),SOCIB,** https://doi.org/10.25704/b200-3vf5, 2018.

CRUISE REPORT

Barceló-Llull, B., A. Pascual, L. Díaz Barroso, A. Sánchez-Román, B. Casas, C. Muñoz, M. Torner, E. Alou, E. Cutolo, B. Mourre, J. Allen, G. Aulicino, A. Cabornero, N. Calafat, E. Capó, Y. Cotroneo, F. Cyr, A. Doglioli, F. d'Ovidio, F. Dumas, J.-G. Fernández, L. Gómez- Navarro, G. Gregori, J. Hernández-Lasheras, A. Mahadevan, E. Mason, A. Miralles, D. Roque, M. Rubio, I. Ruiz, S. Ruiz, E. Ser-Giacomi and T. Toomey.

PRE-SWOT Cruise Report. Mesoscale and sub-mesoscale vertical exchanges from multi-platform experiments and supporting modeling simulations: anticipating SWOT launch (CTM2016-78607-P).

http://dx.doi.org/10.20350/digitalCSIC/8584

CONFERENCE CONTRIBUTIONS

1. **"26th IUGG General Assembly 2015"**

Glider and satellite monitoring of a Mediterranean mesoscale eddy in the Algerian Basin: effects on the mixed layer depth

G. Aulicino, Y. Cotroneo, G. Fusco, A. Orfila, S. Ruiz, M. Torner, J. Tintoré, G. Budillon

2. **"Workshop THEMES 2015 - Teleconnections and Hemispheric scale impacts on the Mediterranean Sea"**

Algerian Basic Circulation Unmanned Survey – ABACUS: Glider missions to monitor Mediterranean water characteristics and relevant mesoscale features in the Algerian Basin

Y. Cotroneo, G. Aulicino, S. Ruiz, A. Pascual, G. Budillon, G. Fusco, J. Tintoré

3. **"The EGU General Assembly 2016"**

Glider and satellite high resolution monitoring of a mesoscale eddy in the Algerian Basin: effects on the mixed layer depth and biochemistry

Y. Cotroneo, G. Aulicino, S. Ruiz, A. Pascual, G. Budillon, G. Fusco, J. Tintoré

	4. **"48th Liege Colloquium on Ocean Dynamics - Submesoscale Processes: Mechanisms, Implications and new Frontiers - University of Liège"** **Glider and satellite high resolution monitoring of a mesoscale eddy in the Algerian basin: Effects on the mixed layer depth and biochemistry** Y. Cotroneo, G. Aulicino, S. Ruiz, A. Pascual, G. Budillon, G. Fusco, J. Tintoré. 5. **"41° CIESM Conference "** **Algerian Basin Circulation Unmanned Survey – ABACUS: Glider missions to monitor Mediterranean water characteristics and relevant mesoscale features** Y. Cotroneo , G. Aulicino , S. Ruiz , A. Pascual , G. Budillon , G. Fusco and J. Tintoré. 6. **"Workshop "THEMES 2016 - Measuring, Modelling and Predicting Marine Environments: State of the Art and Challenges"** **Multi-source monitoring of the Algerian basin during fall 2014 and 2015** Aulicino G., Cotroneo Y., Ruiz S., Sanchez-Roman A., Pascual A., Fusco G., Tintoré J., Budillon G. 7. **"The EGU General Assembly 2017"** **Intercomparison of numerical simulations, satellite altimetry and glider observations in the Algerian Basin during fall 2014 and 2015: focus on a SARAL/AltiKa track** Aulicino G., Cotroneo Y., Ruiz S., Sanchez-Roman A., Pascual A., Fusco G., Tintoré J., Budillon G. 8. **"IUGG/IAPSO-IAMA-IAGA joint Assembly2017"** **Monitoring of the Algerian Basin circulation through glider observations, numerical simulations and altimetry during fall 2014-2016** Cotroneo Y., Aulicino G., Ruiz S., Sanchez-Roman A., Pascual A., Fusco G., Tintoré J., Budillon G. 9. **"IMEKO TC19 workshop on the Metrology for the Sea" 2017"** **Algerian Basin Circulation Unmanned Survey – ABACUS: glider missions to monitor Mediterranean water characteristics and relevant mesoscale features during fall 2014-2016** Y. Cotroneo, G. Aulicino, S. Ruíz, A. Pascual, A. Sanchez Roman, G. Fusco, M. Torner, E. Heslop, J. Tintoré, G. Budillon.

	10. "The EGU General Assembly 2018" **Algerian Basin Circulation Unmanned Survey – ABACUS: High resolution repeated glider missions to monitor Mediterranean water characteristics from basin-to mesoscale** Y. Cotroneo, G. Aulicino, S. Ruiz, A. Pascual, A. Sánchez Román, G. Fusco, M. Torner, E. Heslop, G. Budillon, and J. Tintoré **11. "The EGU General Assembly 2018"** **Monitoring the Algerian Basin through glider observations, satellite altimetry and numerical simulations along a SARAL/AltiKa track** G. Aulicino, Y. Cotroneo, S. Ruiz, A. Pascual, A. Sánchez Román, G. Fusco, M. Torner, E. Heslop, G. Budillon, and J. Tintoré **12. "25 Years of Progress in Radar Altimetry"** **"Overview of Fine-scale Multiplatform Experiments in the Southwest Mediterranean Sea: Lessons Learnt in the Last Five Years"** A. Pascual, S. Ruiz, A. Sánchez-Román, L. Gomez-Navarro, B. Barceló-Llull, L. Díaz-Barroso, P. Chabert, E. Cutolo, M. Amelia, E. Heslop, B. Casas, M. Toner, B. Mourre, E. Alou, Y. Cotroneo, G. Aulicino, E. Mason, A. Mahadevan, J. Tintore, F. D'Ovidio, R. Fablet, J. Allen **13. "25 Years of Progress in Radar Altimetry"** **"Monitoring the Algerian Basin Through Glider Observations, Satellite Altimetry and Numerical Simulations During the ABACUS Projects (2014-2018)"** Aulicino G., Cotroneo Y., Ruiz S., Pascual A., Sanchez Roman A., Fusco G., Torner M., Heslop E., Budillon G., Tintoré J. **14. "JERICO-NEXT 2nd General Assembly"** **"High resolution glider missions to monitor and understand the variability of the circulation & ecosystem response from basin to mesoscale"** Y. Cotroneo, G. Aulicino, S. Ruiz, A. Pascual, A. Sánchez Román, G. Fusco, M. Torner, E. Heslop, G. Budillon and J. Tintoré

	15. **"2018 Ocean Salinity Science Conference"** **"Mesoscale Sea Surface Salinity in the Algerian Basin observed through SMOS and ABACUS glider data"** Aulicino G., Cotroneo Y., Olmedo Casal E., Belmonte Rivas M., Cesarano C., Fusco G., Budillon G. 16. **"EGU 2019"** **"Glider data collected during the Algerian Basin Circulation Unmanned Survey since 2014"** Y. Cotroneo, G. Aulicino, S. Ruiz, A. Sánchez Román, M. Torner Tomàs, A. Pascual, G. Fusco, E. Heslop, J. Tintoré, and G. Budillon 17. **Ocean Surface Topography Science Team (OSTST) Meeting·Virtual·** **"Multi-platform experiments, numerical simulations and data science techniques forg eneration of new altimetric products: focus on mesoscale and sub-mesoscale variability(MANATEE –OSTST proposal)"** A. Pascual, R. Fablet, E. Mason, S. Ruiz, A. Sánchez-Román, B.Barceló-Llull, G. Aulicino, Y. Cotroneo, L. Gómez-Navarro, E. Cutolo, D. Rodríguez-Tarry, S. Ouala, H. Antich, M. López-Radcenco, B.Mourre, Y.Faugère, A. Mahadevan, A. Doglioli, F. D'Ovidio

2. USER GROUP DETAILS

Indicate if the proposal is submitted by

☐ an individual

☒ a user group

Principal Investigator (user group leader)

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User group members

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3. HOST INFRASTRUCTURE

Indicate the JERICO-S3 host facility(ies) offered in Chapter 1 (Observing systems) you are interested in

(Tick more than one boxes if it is useful for your project)

		Short name	***Requested access time (UA*)***
	Cabled observatory		
	Ferrybox		
	Fixed platform		
	Fishing vessel		
x	**Glider**	**GLIDER - SOCIB**	**60**
	Supporting facility		
	Special equipment		

**UA: please refer to the Infrastructure description in the JERICO-S3 website*

Modality of access

	remote	*the measuring system is implemented by the operator of the installation and the presence of the user group is not required*
x	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*

If you wish to avail also of a support facility from Chapter 2, please fill in the table below

		Short name	***Requested access time (UA*)***
	Supporting facilities and specialized equipment		

**UA: please refer to the Infrastructure description in the JERICO-S3 website*

Modality of access

	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*

Explain briefly why you think your project will be best carried out at the specified host facility(ies)	**The SOCIB glider facility has already proved its efficiency during previous missions of the ABACUS project.** **In particular, it is worth mentioning:** • **The existence of the pressure test site for gliders at SOCIB.** • **The existence of a dedicated staff working 24/24h and an engineering lab.** • **The facility to reach the study area for deployment/recover of the glider.** • **The ability of planning and realizing, in agreement with the user group, the deployment and retrieval of the glider at given time, allowing the glider to be overflown by the altimeter satellite.** • **The ability to activate emergency logistic through the use of the SOCIB zodiac-hurricane boat, as well as the possible presence of the R/V SOCIB in the study area.** • **The interaction with the SOCIB data centre in order to associate glider in situ data to satellite and model data in near real time.**
If possible, list other JERICO-S3 facility(ies) where you think your experiment could alternatively be carried out	**N/A**

Is there a facility similar to one/all those you wish to utilize in your country?		Yes	**X**	No
If yes, please indicate your reasons for requesting access to the JERICO-S3 facility(ies) you have chosen and also exist in your country	**Even if the glider technology is slowly becoming present in Italy, some infrastructures (i.e. pressure test site, the rescue support vessel and the data centre) are not present in the applicant's country and make the SOCIB glider facility a necessary asset for the project.**			

4. REQUEST FOR A JERICO-S3 GRANT

(tick the box)

X	**Travel grant** (*)
	Shipment of your equipment, if applicable

(*) travel, hotel and meals

Please provide a detailed and realistic budget for the expenses you expect to incur, including the number of people and days required. Explain clearly the role of each person for which a travel grant is requested.

Please note that a base amount of 3000-6000 € has been set for each facility involved in a TA project. The effective grant assigned to a project will be considered case- by-case depending on the type of access, the types and number of facilities requested, the length of stay, and the costs in the visited country.

ON-SITE VISIT – PROBE INSTALLATION-MISSION BRIEFING

Before each glider mission, COVID 19 permitting, the presence of three scientists from the ABACUS team in Mallorca will be linked to the installation of the acoustic probe and the to the planning activities of the ABACUS 2021 glider missions.

Travel grant is requested to cover the expenses connected to the first on-site visit only.

After each mission, a plenary meeting will be realized online with all the partners in order to discuss the results obtained during the first mission and the expectations from the project.

- **Travel: 3 RT flights from Italy, France or England to Mallorca for 3 pax** **2100 €**
- **Hotel : 4 nights for 3 pax (about 100 € for single room)** **1200 €**
- **Meals : 48 meals for 3 pax (about 25 € for single meal)** **1200 €**

Shipment of equipment : *<type of carrier, costs>* **N/A**

TOTAL GRANT REQUESTED **4500 €**

PART 2

Note: This part contains material for the evaluation

1. SCIENTIFIC EXCELLENCE OF USER GROUP
(maximum score: 5)

Short biography of the PI ***(half a page)***

Yuri Cotroneo, gained his Master Degree in "Environmental Sciences" in 2003 at the University of Naples "Parthenope" – degree summa cum laude. After a scholarship at the ENEA research centre, He started his PhD research on "The variability of the Antarctic Circumpolar Current from in situ and satellite data" that was finally defended in 2009 at the University of Siena.
From 2011 to 2014 he was Contract Professor in Physical Oceanography at the University of Messina (Italy). Since 2017 he is a full time researcher at University of Naples "Parthenope" (Italy) also teaching "Coastal Oceanography" and "Meteorological and Oceanographic instrumentation and data analysis".
He has been the P.I. of the following projects:
MOMA (Multiplatform Observations and Modelling in a sector of the Antarctic Circumpolar Current) funded by the Italian National Antarctic Programme,
ABACUS 4 funded by JERICO NEXT - TNA – Second Call
ABACUS 5 funded by JERICO NEXT - TNA – Third Call
He is part of several international projects and is part of the ABACUS user group since 2014.
He is a sea-going oceanographer and his research focuses on ocean dynamics and water mass properties from in situ and satellite data in the Mediterranean Sea and the Southern Ocean also including the use of unmanned vehicles.
Since 2012 he works on the merged use of in situ and satellite altimetry data for the detection and study of mesoscale eddies.
He presented 87 communications at international meetings as presenter, convener, chairman and invited speaker. He published 22 research papers on international peer reviewed journals.

Expertise of the user group in the domain of the application ***(half a page)***

The "ABACUS" group was born in 2014 at University of Naples "Parthenope", merging the experience of professors and early career scientists whose activities are mainly focused on the physical properties of the Mediterranean Sea and of the Southern Ocean.
Since then, the scientific team has created the opportunity for several collaborations with scientists from other research institutions who joined the data analysis and discussion and co-authored the associated publications enlarging and enriching the group year by year.
In this general framework, each researcher shares his background on a different topic, so contributing to enrich the global expertise. Team main skills include Mediterranean Sea circulation and long-term variability from both in situ and satellite data, research activities focused on mesoscale eddies and innovative satellite data applications.
The ABACUS group has already proved its efficiency during the previous edition of the ABACUS survey from 2014 to 2017. The results have been presented in several papers, workshop and conferences (see previous section)

A list of 5 recent, relevant publications of the user group in the field of the project

In Situ and Satellite Sea Surface Salinity in the Algerian Basin Observed through ABACUS Glider Measurements and BEC SMOS Regional Aulicino, G.; Cotroneo, Y.; Olmedo, E.; Cesarano, C.; Fusco, G.; Budillon, G. Remote Sens. 2019, 11, 1361 https://doi.org/10.3390/rs11111361 Cauchy, P., K. J. Heywood, N. D. Merchant, B. Y. Queste, and P. Testor, 2018: Wind Speed Measured from Underwater Gliders Using Passive Acoustics. J. Atmos. Oceanic Technol., 35, 2305–2321, https://doi.org/10.1175/JTECH-D-17-0209.1. Monitoring of the Algerian Basin through glider observations, satellite altimetry and numerical simulations along a SARAL/Altika track G. Aulicino, Y. Cotroneo, S. Ruiz, A. Pascual, A. Sanchez Roman, G. Fusco, J. Tintoré, G. Budillon Journal of Marine Systems Volume 179, 55-71, 2018 Glider and satellite high resolution monitoring of a mesoscale eddy in the Algerian Basin: effects on the mixed layer depth and biochemistry Y. Cotroneo, G. Aulicino, S. Ruiz, A. Pascual, G. Budillon, G. Fusco, J. Tintoré Journal of Marine Systems Volume 162, 73–88, 2016 Potential for an underwater glider component as part of the Global Ocean Observing System Liblik, T., J. Karstensen, P. Testor, L. Mortier, P. Alenius, S. Ruiz, S. Pouliquen, D. Hayes, E. Mauri, K. Heywood (2016). Methods in Oceanography, 17, 50-82.

2. SCIENTIFIC AND TECHNICAL VALUE OF THE PROJECT
(maximum score: 5)

Description of the project

Main objectives *(half a page)*

The proposed research focuses on the characteristics of the Algerian Basin (AB) circulation. The AB is dominated by the presence of energetic mesoscale structures that usually develop from meanders of the Algerian Current to isolated cyclonic and anti-cyclonic eddies.

The project aims at confirming the importance of the ABACUS monitoring line across the AB between Palma de Mallorca and the southern part of the Algerian basin, and contribute to data collection in The Southern European Seas, one of the main EU maritime policy objectives, as outlined in the Marine Strategy Framework Directive (MSFD).

ABACUS-2021 will allow us to realize 2 glider missions, in the study area during April-May and November-December 2021. The first leg (2021.S) will last about 40 days and will be useful for improving the study of the spring interannual variability along the ABACUS transect. The second one (2021.F) will last 20 days providing continuity with the 2014-2017 ABACUS surveys.

This approach will allow to extend and enrich the observations previously collected in the study area and will provide a valuable dataset for improving the study of the Algerian Basin circulation and the validation of CMEMS products. Furthermore, beyond the classical temperature, salinity, chlorophyll-a and dissolved oxygen concentration measurements, the collected information will be completed by new sensors mounted on the glider to measure PAR, CDOM and particulate backscattering at 700nm, as well as by passive acoustic hydrophones that will allow to detect and record cetacean vocalizations.

In summary, the main objectives of the proposed research are:

•To continue the time series of oceanographic data collected in the AB along the endurance line between Mallorca and Algeria during the JERICO TNA-ABACUS project in 2014, during the external-access SOCIB call in 2015 and during the JERICO NEXT – TNA ABACUS 3 project in 2016 (first call) and 2017 (second call).

•To identify the physical and biological properties of the surface and intermediate water masses between Balearic Islands and Algerian coasts;

•To collect data across spring mesoscale structure eventually identified during the ABACUS 2021.S leg;

•To understand sub-basins dynamics;

•To assess the ocean description capabilities of several satellite products when approaching coastal areas, also comparing them to glider in situ data;

•To validate the new along-track (L3) and gridded interpolated maps (L4) altimetry products provided by the Sentinel-3 altimetry mission and other satellites overflying the western Mediterranean Sea;

•To contribute at the creation of a composite dataset to be used for the SWOT satellite mission preparation and calibration;

•To acquire ground truth for satellite retrievals of particulate backscattering (bbp) which are widely used in studies of ocean ecology and biogeochemistry, but have been historically difficult to validate due to the paucity of available comparative field measurements;

•To explore the potential of glider measurements for ecosystem monitoring (fish stocks to cetaceans).

Scientific background and rationale *(one page)*

The south-western Mediterranean Sea is an important transit region characterised by the presence of both fresh surface waters coming from the Atlantic (Atlantic Water, hereafter AW) and more saline waters which typically reside in the Mediterranean region (Cotroneo et al., 2019).

Most of the Western Mediterranean includes the Algerian Basin (AB), a wide and deep basin comprised of the Balearic Islands, the Algerian coast and the Sardinia Channel, where an intense inflow–outflow regime exists and complex circulation patterns are present (e.g., Pascual et al., 2013; Cotroneo et al., 2016; Aulicino et al., 2018).

Several studies report that here AW and Mediterranean waters interact at different scales, from the basin scale to the mesoscale and sub-mesoscale (Robinson and Golnaraghi, 1994; Fusco et al., 2003; Vidal-Vijande et al., 2011). At mesoscale, the Algerian Current (AC) usually becomes unstable along its path due to complex hydrodynamic processes and forms several meanders which frequently evolve to isolated cyclonic and anticyclonic mesoscale eddies (e.g. Millot, 1985; Moran et al., 2001; Ruiz et al., 2002; Font et al., 2004; Escudier et al., 2016; Cotroneo et al., 2016; Pessini et al., 2018), promoting intense mesoscale activity all over the AB. These structures present high levels of kinetic energy (Pascual et al., 2013; Escudier, 2016) and impact the distribution of physical and chemical properties of water masses, especially at surface and intermediate depths (Taupier-Letage et al., 2003; Olita et al., 2011).

These AEs can last for many months or even years (Millot et al., 1997; Puillat et al., 2002, Pessini et al., 2020) and have a strong impact on the general circulation of the entire AB, with marked repercussions for the distribution of water masses and biochemical parameters and, hence, on ecosystems.

Unfortunately, the scarcity of high resolution in situ observations still represents a fundamental gap to fill for improving our knowledge of the AB mesoscale processes. In the last years, an important contribute was provided by glider surveys in this area, as those carried out in the framework of the Algerian BAsin Unmanned Circulation Survey (ABACUS) glider campaigns supported by the JERICO and JERICO-Next calls.

Due to shelf-slope exchanges realized in the AB area south of the Mallorca Island also through mesoscale eddies, this region is of particular interest for the Mediterranean Sea circulation and for the marine ecosystem activity (e.g. Bluefin Tuna).

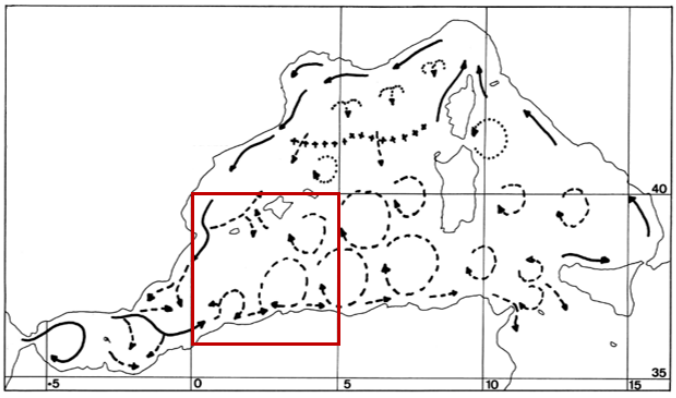

Fig. 1: Surface circulation in the western Mediterranean (from Millot, 1999). The red box highlights the Algerian Basin sector south of the island of Mallorca.

3. QUALITY OF THE WORK PLAN
(maximum score: 5)

Experimental method and work plan

Describe below the proposed method and work plan for the project ***(one page)***

In order to achieve all the objectives of the project, the data from several satellite platforms will be used and a deep-water glider is requested for a total period of about 60 days.

We plan to deploy the glider along one of the #713 Sentinel-3 track (yellow line in Fig.2) lying between the release/rescue point south of the Cabrera Island (about 39° 3'13.68"N / 2°58'47.28"E) and the Algerian coast - AC (37° 5'47.11"N / 3°36'19.24"E). ABACUS 2021 project will realize 2 glider missions along this track in Spring (ABACUS 2021.S) and late fall (ABACUS 2021.F). Each go and back leg along the track (Cabrera-AC-Cabrera), will allow to monitor the area for a total period of about 20 days during two different seasons. The glider will reach the northern border of the AC without entering the Algerian national waters before turning back to Cabrera.

As stated above, the entire proposed mission (about 480 Nm to be divided into two legs) could be performed in about 40 days. The additional days (20) requested will be used to sample any mesoscale structure eventually present in the area identified through satellite near-real-time products during the spring season.

This mission strategy already proved its efficiency in previous ABACUS editions when large scale circulation, as well as mesoscale eddies and filaments were monitored and described in detail. The ABACUS-2021 in situ data will be again useful, together with satellite data, to describe the main characteristics of the area and to contribute to the pre-mission and calibration activities of the SWOT satellite mission.

Satellite ocean color data (MODIS Chl-A products) acquired during the ABACUS 2021 missions will be used to complete glider information in order to characterize the spatial variability of the biological activity and possibly to provide also a proxy for a crude estimate of the downward export of carbon. Furthermore, remotely sensed data will be used to optimize glider near-real time piloting for sampling a target mesoscale eddie.

The starting date will depend on the availability of the deep glider even if seasonal coincidence with previous glider missions suggests to realize a mission in Spring and one during late Fall. Sentinel-3 satellite overflight while the glider will be at sea, possibly in the middle of each transect, is strongly recommended.

<u>Working plan:</u>

The management/deployment of the deep glider (Slocum G2) by the SOCIB glider facility staff is mandatory. Phase 1) The deep glider will be prepared and a specialized technician from SOCIB will manage laboratory operations (ballasting, calibration, informatics, data management and other required operations) and deployment of the instrument. The ABACUS team is expected to support the installation of the acoustic probe and join the mission design; Phase 2) The deep glider will be launched close to the Release/Rescue point in order to minimize the travel time to the satellite track, satellite data will be analysed; Phase 3) Scientists from SOCIB will be involved in the deep glider recovery, while the entire ABACUS team will join the quality control and analysis of the acquired dataset.

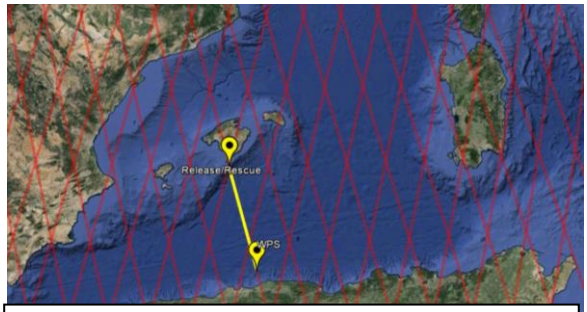

Fig. 2. Sentinel-3 tracks over the Algerian Basin (red lines) and the proposed glider track (yellow line). Rescue/release point and the southern waypoint (WPS) are also indicated.

These three phases will be repeated for the second leg of ABACUS2021. According to the realization of two legs, the SOCIB glider facility will have to provide logistic, technical and scientific support during 2 deployment and 2 recovery operations. In our opinion, this additional effort requested to the glider facility will be fully paid back by the scientific results that can be achieved.

Proposed time schedule

Provide below a clear schedule for your project including interruption, restarts and expected duration of access time

(half a page)

We apply for a 60 days of deep glider activity to be organized in two leg/missions in spring 2021 and fall 2021 in coincidence with the passage of Sentinel-3 satellite in the study area (groundtrack #713). **The first leg might be realized in April-May 2021, while the second one will possibly take place during November/December 2021. Each leg of the proposed monitoring plan requires about 20 days of glider activity at sea (Mallorca-AC-Mallorca round trip), so that 40 days will allow us to realize two complete legs and 4 latitudinal transects in two seasons. The remaining 20 days of glider activities at sea will be used to monitor any eventual mesoscale structure identified in the study area through satellites during the ABACUS 2021.S mission, or to realize an additional Mallorca-AC-Mallorca deep round trip. The two-legs strategy of the ABACUS 2021 project implies the need for a total of 4 release/rescue operations to be realized by the SOCIB glider facility staff.**

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

A deep water glider (Slocum G2 glider to 1000m depth), equipped with CTD, O2 sensors, Fluorimeter (turbidity, Chl-A), PAR, CDOM and particulate backscattering at 700nm sensors, as well as with a passive acoustic hydrophone, is requested. **An intensive collaboration with technicians and engineers from the glider facility, as well as cooperation with the SOCIB data centre, are expected.**

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

N/A

Risks, contingencies and mitigation measures

Describe below the potential risks and contingencies that might occur during the project and how do you plan to avoid, mitigate or resolve them

#	Risk / Contingency	Prevention / Mitigation / Corrective action
1	Collision with boats and fishing activities	Tools are available at the facility to minimize the risks of collision when crossing the main traffic routes as monitored by historical and real time AIS data. The proposed track does not cross the border of Algerian waters and lies out of the main marine traffic routes.
2	Glider functioning anomaly	The ability to activate emergency logistic through the use of the SOCIB zodiac-hurricane boat, as well as the possible presence of the R/V SOCIB in the study area.
3	COVID-19 risks	The glider cruises will be realized even in case of reduced travel possibility for scientists living in country different from the selected facility. In the unlucky event of the impossibility to realize the installation of the passive samplers on the glider, it will be operating with all the sensors provided by the SOCIB. This will ensure the collection of a large set of physical and bio-chemical data.

4. POTENTIAL FOR SEEDING LINKS WITH INDUSTRY (maximum score: 5)

Do you think that this proposal has potential for seeding links with Industry? If so, how?

(half page)

The realization of glider cruises in the southern part of the Western Mediterranean Sea, will contribute to increase knowledge on the circulation of the Algerian basin, and in particular of the Algerian Current System.

The collection of high-resolution data will allow us to improve the use of remote sensed data (mainly altimetry data) to monitor the position, extension and strength of the Algerian Current throughout the entire year.
We will also explore the potential of gliders for ecosystem (fish to cetaceans), particulate and pollutants monitoring in the study area.

In this framework, the fishery industry as well as the marine shipping companies could receive some benefits linked to the identification of fishing areas and the selection of the best routes for shipping.

5. EUROPEAN RELEVANCE AND INTERESTS FOR THE SCIENTIFIC COMMUNITY (maximum score: 5)

Describe the relevance of your proposal at the European level and the potential interests for the research community

(half page)

Through its activities, ABACUS-2021 will contribute to the scientific debate of the ocean community in different ways. First of all, the project will contribute to improve the data collection in the Southern European Seas, one of the main EU maritime policy objectives of the Marine Strategy Framework Directive (MSFD), thanks to the collection of physical and biogeochemical high resolution water column data across the Mallorca-AC chokepoint and over target mesoscale structures.

The collected data will support the study of water mass properties and current dynamics from basin scale to sub-mesoscale, and the comparison of in situ and remote sensed data that is essential for calibration and validation of satellite retrievals of ocean variables. For example, they will improve the knowledge of the AC system and its seasonal (from satellite data) and interannual variability (from in situ data), as well as of the mesoscale and sub-mesoscale structure like eddies or filaments. The co-location with Sentinel-3 groundtracks in a strategic area for the forthcoming SWOT satellite mission preparation will be indeed of large interests for ocean satellite community, as already proven during previous ABACUS glider activities at sea.

An interesting innovation respect to the previous editions is represented by the glider measurements of particulate backscattering at 700 nm that is currently used from satellites as an essential proxy for particulate organic carbon, phytoplankton biomass and particle size estimation which have advanced our understanding of ocean biology at global scale over the last few decades. In situ high resolution observations will provide a relevant answer to the paucity of in situ data that still represents a barrier to the full calibration and validation of satellite particulate backscatter retrievals in the Mediterranean Sea.

Finally, the acquisition of glider passive acoustic measurements will give an interesting opportunity to test cetacean monitoring from gliders in the Algerian Basin, providing interesting data and sparks for the oceanographic international community.

In this context, the international team that constitutes the ABACUS-2021 team will increase the level of cooperation among scientists from different countries (Italy, France, Spain, Algeria) strengthen their collaboration in the study of the Mediterranean Sea area.

GDPR Consent:

Personal data: I hereby understand that the JERICO-S3 project - through the Marine Institute, acting as the Work Package Leader for TransNational Access has needed to collect some of my personal information and data for the means of processing my application for Funding under the Jerico S3 project TransNational Access funding call.

Application processing: The Marine Institute will gather and securely store your data. Access will be restricted to required personnel as well as selected qualified external evaluators who will determine successful applicants. Data will be stored on Marine Institute servers onsite at the Marine Institute, Rinville, Oranmore, Galway, Ireland for the duration of this project which should last 4 years. The data will be deleted thereafter. Your data will not be used for any other purpose without your consent.

1. Privacy Policy: *JERICO-S3* is the data controller pursuant to article 28 of the EU GDPR (EU 2016/679), – *Ifremer Brest Centre, CS 10070 29280 Plouzané France, the Project Coordinator is Laurent DELAUNEY. MAIL Jerico-S3@ifremer.fr JERICO-S3: If you change your mind at any time, you can unsubscribe by contacting us at mailto: Jerico-S3@ifremer.fr. We will treat your information with respect.*

2. *TYPES OF DATA PROCESSED Personal and identification data - Personal data, any information relating to an individual, identified or identifiable, even indirectly, through reference to another piece of information, including a number of personal identification; Identifying data, personal data that includes the direct information of the interested party (such for example name, surname, e-mail address, address, number of telephone, etc ...). Defence in court - The User's Personal Data may be used for defence purposes on the part of the Owner in court or in the preparatory phases to his possible establishment, from abuse in the use of the same or the connected services by the User.*

Date of compilation _____

Signature of the PI _____

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

This section is reserved to the JERICO-S3 TA Office

Date of proposal receipt by email _____

Assigned reference number _____

Signature of receiving officer _____