

出國報告(出國類別：訪問)

辦理「與法國海洋事務有關單位交流」  
報告

服務機關：海洋委員會

姓名職稱：副主任委員 莊慶達

科長 林群皓

派赴國家/地區：法國

出國期間：108年08月30日至09月03日

報告時間：108年11月1日

## 辦理「與法國海洋事務有關單位交流」報告

### 摘要

法國為歐盟中重要的成員，且在海洋科研、海洋產業的發展上皆為領頭羊的角色，對歐盟海洋事務之決策具關鍵影響力。為強化我國海洋事務相關政策之規劃與推動，海洋委員會莊慶達副主任委員及林群皓科長於 108 年 08 月 30 日至 09 月 03 日赴法國，拜會當地知名的國際海洋研究機構法國國家海洋研究院(Ifremer)，及法國重要的海洋產業聯盟組織 Pôles Mer，並與海洋風力發電、海洋生態工程、海洋污染監測及海洋航行安全等相關服務之六家廠商進行交流，瞭解其最新科技技術發展之運用。另拜會我國駐法代表處諮詢其對雙邊海洋事務合作之評估意見，做為海洋委員會國際交流政策之參考，以期未來能更有效推動海洋事務之發展，達成「生態永續、海域安全、產業繁榮」之願景目標。

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## 壹、目的

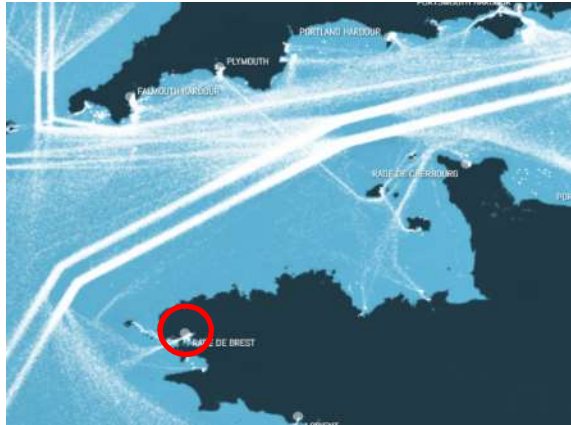
為擴充我國海洋事務政策推動之參考依據，藉由與國外海洋相關機構單位交流互動，並促進未來雙方合作之可能，海洋委員會安排拜會位於法國布雷斯特（BREST）國際知名之海洋研究機構法國國家海洋開發研究院(Ifremer)、法國兩大海洋產業聯盟行政組織 Pole Mer 及聯盟下多元之海洋產業業者進行交流拜會，以強化本會海洋國際性事務發展之能量。

法國本土面積約 55 萬平方公里（若包括屬地則為 67.5 萬平方公里），是西歐地區幅員最大之國家，且法國地理條件良好，國土四面臨海，濱鄰北海、英吉利海峽、大西洋及地中海，海岸線長達 5,500 公里，領海廣闊，專屬海洋經濟區達 1,100 萬平方公里。對海洋之開發利用積極拓展，因此海洋產業、海洋安全、海洋科研等領域之進展於國際間居領先之地位。

而法國城市布雷斯特位於西部濱臨大西洋之布列塔尼半島西端，人口約 15 萬(2019) 是重要海洋產業、海軍基地和貿易港。該城市具有天然的深水港，周邊海域為英吉利海峽通往北海的國際重要航線，船隻往來頻繁戰略地位重要。另該城市海洋產業興盛，是法國主要潛艇停泊及第一艘核動力航空母艦「戴高樂號」的建造基地。擁有海洋產業相關產、官、學、研等資源是法國海洋科研中心，聚集全法國海洋相關科研 60% 人員及機構，且當地海岸線優美，水產資源豐沛，各類海洋休閒活動相當興盛。



法國城市 BREST 位置圖(資料來源：google map)



BREST 周邊海域航線軌跡圖

## 貳、行程簡介

日期	內容	備註
8 月 30 日(星期五)	拜會法國海洋產業產業聯盟組織 Pôle Mer Bretagne Atlantique 及各海洋產業業者	
9 月 02 日(星期一)	拜會法國重要之生態工程公司 Biotope	
9 月 03 日(星期二)	拜會國際重要海洋研究機構 法國國家海洋開發研究院(Ifremer)	

## 參、參訪法國國家海洋開發研究院

法國國家海洋研究院(Ifremer)是綜合性的海洋研究機構，也是世界六大海洋研究機構之一，對歐盟海洋事務的推動扮演關鍵性智庫的角色。此次拜會由該機構歐洲及國際事務處處長 Dr.Gilles Lericolais 及該處的國際及科學政策主任 Dr.Nan-Chin Chu (諸南沁博士)負責接待，分別從組織架構、願景、目標、發展方向等介紹說明研究院的各個面向，整理說明如下：

### (一) 組織架構

組織架構主要包含總部及 5 個研究中心，總部內設有科學處、生物資源及環境處、物理資源及深海生態處、海洋學及生態系動力學處、研究設施及資訊系統處及海洋研究船隊處，除了位於本國的濱海布洛涅研究中心、布列塔尼研究中心、南特研究中心、濱海拉塞訥研究中心等 4 個外，尚包含位於屬地的大溪地研究中心，並於本國及屬地設置 19 個海洋工作站。研究院之總部及布列塔尼中心位於布列塔尼半島上緊鄰布雷斯特西側之普盧扎內區內；且園區內亦有其他組織進駐，如法國國家科學研究中心(CNRS)、法國極地研究所(IPEV)、發展研究院(IRD)等，另園區周邊有 4 所大學，海洋相關產、官、學、研互動密切。



Ifremer 研究中心及海洋工作站位置示意圖



IFREMER 總部園區範圍圖

## (二) 人員及預算

2019 年 9 月其整體人員組成為 1,474 人，其中超過半數（765 人）位於布列塔尼的總部內，全體人員中包含 647 位研究者及工程師；206 位博士研究生。2019 年年度預算為 2.35 億歐元(約新台幣 83 億元)，預算編列歸屬於法國科技部下。



本會莊副主委(左)及林科長(右)拜會該機構歐洲及國際事務處處長 Dr.Gilles Lericolais(中)



本會莊副主委(右)及林科長(左)與 Ifremer 歐洲及國際事務處國際及科學政策主任 Dr.Nan-Chin Chu(中)意見交流

## (三) 願景與目標

其組織的願景是成為「海洋知識建構、環境監測、及海洋事務永續發展的促進者。」發展的三大目標則以「研究」、「創新」、「專業」為主軸，以達成增加及提升海洋知識，致力於藍色經濟成長並支持公共政策的推動。

#### (四) 發展方向與國際連結

該院對未來整體之發展規劃為「致力於海洋發展，成為海洋知識的建構與傳遞者」，並針對發展方向規劃三大主軸如下：

1. 科學支援社會發展：提高海洋認知、公民科學及公共政策支持。
2. 創新的海洋科學：促成海洋科技產業化及藍色經濟發展。
3. 海洋發展催化劑：建構海洋船隊、研究設施及對世界開放。

該院並以百年之尺度進研究方向規劃，對 2100 年願景的研究設定了六大面向，分別為：

1. 海洋動力學及未來演變。
2. 氣候及地質事件與災害。
3. 海洋與陸地的交互作用。
4. 生物多樣性及生態系統功能。
5. 全球變遷下的生物演變。
6. 海洋社會生態系統的適應性管理。

而在國際合作與連結上，積極參與歐洲海洋事務網絡組織，如歐洲海事委員會、歐洲漁業水產品組織、EurOcean 等，並提供各項海洋發展之意見，協助政策訂定，是歐洲海洋重要智庫組織。

在經費爭取上積極參與歐盟各項計畫的提案，例如從歐盟第 7 次框架科技計畫(FP7) (2007 年-2013 年) 獲得支持 85 個項目(2,800 萬歐元)；另從歐盟科技框架計畫「展望 2020」(Horizon 2020) (2014 年-2018 年) 則獲得支持 49 個項目(2,400 萬歐元)，計 2007 至 2018 爭取獲得新臺幣 18.4 億元，並與我國台灣海洋大學、成功大學及中央大學有海洋領域合作計畫。

#### (五) 國家海洋研究船隊

以往法國海洋研究船分散於法國國家科學研究中心(CNRS)、法國極地研究所(IPEV)、發展研究院(IRD)及法國國家海洋開發研究院(IFREMER)。為利科研船在維護保養、航行專業駕駛、船務管理人力及使用排程上更有效能，自 2018 年 1 月起由法國國家海洋開發研究院統整法國海洋研究船隊，年度預算由法國科技部編列約 7,200 萬歐元(約新台幣 25.4 億元)辦理相關工作。目前該院管理的船隻及水下系統如下：



1. 4 艘大型遠洋研究船。
2. 5 艘沿海船隻。
3. 7 艘小型船舶。
4. 水下系統則包含：載人潛水艇、遠端遙控潛水器(ROV)、水下自主載具(AUV)，複合式遙控載具(HROV)等。



Ifremer 管理之研究船隻及水下調查載具照片

#### 肆、拜會 Pôle Mer 海洋產業聯盟

法國國家產業聯盟分別有兩大集團，分別是 Pôle Mer 地中海及 Pôle Mer 布列塔尼-大西洋兩個集團，整體會員數超過 800 個。在組織上雖然是獨立的，但在事務發展上則是進行充分的合作，為強化本會對法國海洋產業推動模式之了解，並作為政策擬定之參考，特別前往拜會其聯盟組織。

其中 Pôle Mer 布列塔尼-大西洋聯盟辦公室設立於 IFREMER 園區旁，前往其辦公室由副處長 Mr.Monbet 進行接待，透過簡報介紹其聯盟組織概況，表示該組織現有成員 354 個，其組成中小企業超過 60%，會員類別主要包含海上安全、海洋能源、生物資源、海岸防護、運輸、遊艇等 6 個領域，其推動事項主要包含如下：

- (一) 透過研發合作計畫促進創新：由董事會進行各項專案計畫的管理，拓展會員組成並建構合作網絡，海洋事務推動專業知識的發展等面向。

- (二) 協助中小企業國際化：協助中小企業針對澳大利亞、韓國、印尼等目標國家拓展業務，參與各地重要國際貿易展，並協助中小企業獲取歐盟計畫經費，進行產業升級研發。
- (三) 爭取歐盟各項資助計畫：爭取歐盟及相關組織的資助計畫如 H2020、INTERREG、藍色生物科技、海洋再生能源等項下經費進行相關研究，以利組織業務發展。



莊副主委(右)拜會 Pole Mer 副處長 Mr.Monbet(左)

## 伍、海洋產業業者交流

法國海洋產業業者的類別多樣化且多居於領先地位，此次也透過 Pôle Mer 布列塔尼-大西洋協會組織，邀集相關產業廠商進行介紹及意見交流，分別說明如下：

- (一) France Energy Machine：風力發電的技術廠商，其專長面向主要包含基地特性調查、風機結構設計、環境影響評估及風場優化整合等。

公司網址：<https://www.france-energies-marines.org>

- (二) CLS：法國太空署投資之公司，以發展衛星科技、航空監測及資訊系統技術，提供有關海洋安全、污染事件監測及永續漁業管理之應用服務公司，其在全球有 720 位員工、25 個服務據點。

公司網址：<https://www.cls.fr/>

(三) eodyn：一家新創的 7 人小型公司，透過對海洋動力學(洋流)及天氣條件的演算，以 AI 技術提供給在海上進行運輸、海事安全事務的船隻可信賴的路線規劃之服務資訊，達成降低成本、減少碳足跡和提高安全性之目標。

公司網址：<https://www.e-odyn.com/>

(四) nke instrumentation：該公司是海洋環境資訊監測儀器製造商，其提供之儀器類別包含：數據記錄器、多參數探針水質環境監測、浮標和漂流監測器、深海沉積物探測等類別。

公司網址：<https://nke-instrumentation.com/>

(五) Quiet Oceans：專注於水下噪聲處理的公司，估算風險和提出減輕噪聲的解決方案；協助各類海洋開發公司-海洋能源（風力發電、潮汐、熱能等）、港口工程及地震勘探的環境影響研究。

公司網址：<https://www.quiet-oceans.com/>

(六) Biotope：生態工程公司，匯集了歐洲最大的生態學家團隊，全球有 25 個據點、236 名員工。專為企業、政府和非政府組織提供諮詢、培訓和溝通。目前風力發電相關生態課題，為其重要服務面向。

公司網址：<https://www.biotope.fr/en/>



Quiet ocean 公司 Carl Bois 處長介紹海洋開發之噪音解決方案

## 陸、其他拜會行程

為瞭解我國與法國外交事務發展現況，以利作為海洋委員會未來與法國海洋事務相關單位合作之評估，因此特別排定前往我國駐法國代表處進行相關意見交流。吳志中大使及古文劍公使提及法國自英國脫歐後，在歐盟中的角色日顯重要，且法國在海洋科研、海洋產業的發展居於領先地位，並願意與我國進行交流合作，可做為海洋委員會在海洋事務雙邊交流與合作之重要對象。另建議有關海洋油污染緊急應變訓練課程，仍請以法國相關機構為優先合作對象，在既有的基礎上進行深化與拓展。

另適逢 108 年我國玉山獎助學者獲獎最高的 Dr.Dufour 博士亦為法國自然史博物館著名的海洋生物演化專家，是台法海洋科研交流的重要推手之一，莊副主委慶達特別偕同駐法代表處科技組張中白組長及陳明杰秘書前往該館進行拜會交流，了解該博物館在海洋相關主題之策展情形。



本會莊副主委(左)致贈駐法國代表處吳大使志中(右)紀念瓷盤



本會莊副主委(右二)偕同駐法國代表處張中白組長(右一)、陳明杰秘書(左一)拜會 Dr.Dufour(左二)

## 柒、心得與建議

### (一) 心得

1. 法國海洋科技與產業發展多元先進，從離岸風電、衛星技術應用、噪音監測及航線規劃服務等，均是台灣發展海洋事務上的潛在合作對象。
2. 法國國家海洋開發研究院(Ifremer)以百年尺度進行海洋政策規劃，並以強化海洋知識配合國家發展需求及促進藍色經濟成長為目標，讓民眾有感並支持相關政策之推動。
3. 法國在歐盟中的角色因為英國脫歐的因素而日顯重要，且該國願意與我國進行交流合作，可在既有的基礎上與其相關海洋機構進行關係的深化拓展。

### (二) 建議

1. 法國現由國家海洋開發研究院統合國家海洋研究船隊的管理，以強化船隻維護、航行專業人力培訓及船隻使用需求的運作調配以收整合效益，可供我國未來研究船隻規劃之參考。
2. 法國國家海洋開發研究院及 Pôle Mer 海洋產業聯盟均向歐盟及相關組織的資助計畫爭取經費，其中部分計畫亦開放非歐盟成員組織提案爭取，台灣有關組織亦可評估進行申請。
3. 布列塔尼海洋產業園區匯集相關之產、官、學、研、民等單位，透過科研技術移轉、人才培育、產業創新及區域合作模式來擴散效益，可供台灣推動海洋產業發展之參考。

## (1) France Energies Marines



### SITE ADVANTAGES

#### AUTHORISATION

- The only test site in the Mediterranean authorized to support the development of floating offshore wind.
- The concession is valid until 2026 and renewable for 8 years.

#### LOCATION

- In the Golfe de Fos, between the mouth of the Grand Rhône and Cap Couronne
- 2.8 NM off Napoléon beach, located in the city of Port-Saint-Louis-du-Rhône
- 8 NM off Fos-sur-Mer
- 20 NM off Marseille
- In the vicinity of future floating wind farms

#### SUPPORT

- An engineer dedicated to the development of the site and based on the spot
- Skills and equipment available within France Energies Marines and in the area (Port de Marseille Fos, Pôle Nautisme Mer et Développement of Port-Saint-Louis-du-Rhône...)

### TECHNICAL FEATURES

- Area: 1.7 km<sup>2</sup>
- Bathymetry: 50 to 70 m
- Sea floor type: sediments (sand/mud)
- Average wind speed: > 7 m/s
- Tidal range: 0.6 m
- Maximum current speed (50 years): 0.99 m/s (ESE and SSE)
- Extreme significant height (50 years): 7.5 m (ESE)

### SCOPE OF THE AUTHORISATION

- **Connection:** allowed (not implemented to date), maximum capacity of 10 MW, 2 to 3 connections
- **Simultaneous testing:** maximum of 2 floating wind turbines with their mooring systems (off-grid)
- **Maximum air draft:** 140 m
- **Total power:** 10 MW
- **Other tests included in the licence:** demonstrators, components and methods to improve technical and environmental knowledge



## SERVICE OFFERING ON SITE

- Provide environmental data for resource evaluation and system dimensioning.
- Study the environmental impacts of tested systems.
- Develop methodologies for characterisation and modelling of the marine environment (physical, chemical, biological).
- Develop protocols and means for environmental monitoring.
- Aid developers in the optimisation of system installations and operations.
- Study and develop new equipment and materials (underwater connections, instrumentation, inspection means...) in a known and instrumented environment.
- Test the performance and reliability of floating offshore wind turbines and their subsystems (when site connected).



## INSTRUMENTATION ON SITE

- **Instrumented buoy**: weather station, inertial measurement unit
- **Wave buoy**

## R&D ACTIVITIES ON SITE

- Environmental observatory including continuous measurements:
  - Physics (sea state, wind, current)
  - Physiochemistry (temperature, oxygen concentration, salinity, turbidity...)
  - Biology (biofouling, birds, marine life...)
  - > MEMOFLOW Project
- Improving knowledge and monitoring of biocolonisation on cables and anchor lines
  - > ABIOP+ Project

## PARTNERS AND SUPPORTS



## CONTACT



**Nicolas GERMAIN**  
Engineer and Manager of MISTRAL site

T. +33 (0)6 30 45 76 88  
Nicolas.Germain@ite-fem.org

(2) CLS



## OUR VISION

A global company sharing a common passion  
to design and deploy space-based solutions so that we can understand and  
protect our planet and manage its resources sustainably





# Shareholders



## 5 Strategic Sectors

- ENVIRONMENTAL MONITORING & CLIMATE
- SUSTAINABLE FISHERIES MANAGEMENT
- MARITIME SAFETY
- ENERGY & MINING
- FLEET MONITORING



## CLS: International Network



## Maritime safety and security

From information to maritime intelligence





## Customers: key players in the international maritime sector

- Administrations: maritime authorities, flag states, customs, ministries of maritime affairs, national navies, etc.
- Maritime industry: freight companies, certification firms



## Maritime Safety & Security

A complete, global view

### # Area surveillance

- Better control of fight against illegal fishing and illegal trafficking, pollution detection
- MAS (Maritime Domain Awareness) an innovative big data solution to integrate, merge and analyse multi-source data for complete, global surveillance of maritime activities

### # Optimise shipping fleets

- International regulations, compulsory fleet monitoring
- Data on fleet monitoring solutions (economies, costs, compliance costs)

### # Sea rescue

- Flight migration, search and rescue, etc.
- A complete sea search and rescue solution developed by CLS for the authorities

### # TOMORROW: CO2 compliance

- From 2025, the maritime fleet will be required to reduce its greenhouse gas emissions
- CLS has already developed solutions to measure and control pollution emissions





## # Fighting pollution



### # 6 satellites used to detect pollution

These six commercial and military satellites are compatible with the ground stations operated by CLS, including VIGIRAT.



### # 10,600

Pollution alerts sent to the European Maritime Safety Agency.



### # 6,374 pollution incidents detected in 10 years

Pollution in a sea area ranging from a few dozen metres to dozens of km.

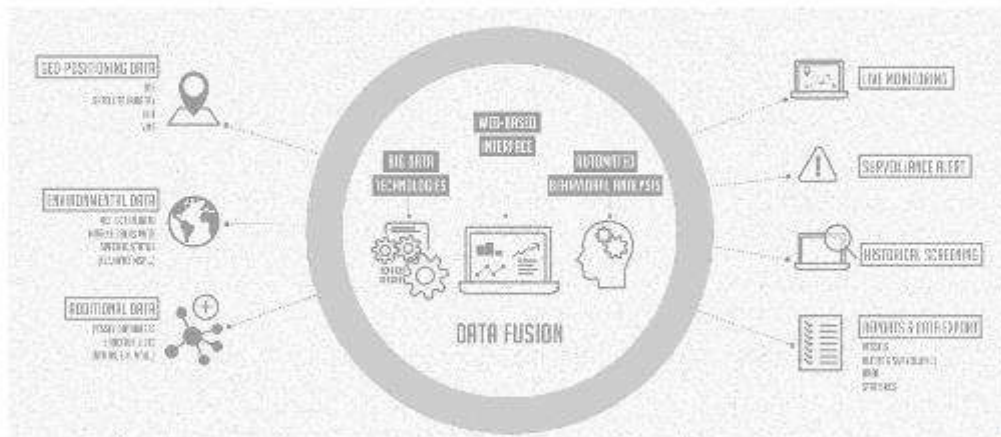
### # 1 dissuasive system

In the space of ten years, the CLEANSEASANT system has halved oil tanker incidents in Europe. Over the past two years, the CLS drone service has detected many pollution incidents in European seas.

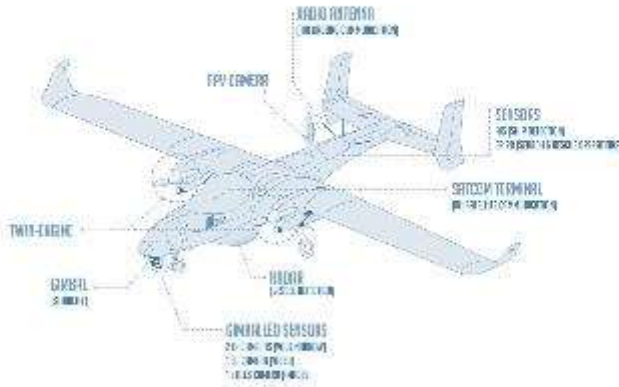


## MARITIME AWARENESS SYSTEM (MAS)

Intelligence for maritime surveillance



# DRONE SERVICES TO COMPLEMENT SATELLITE SERVICES



### # OPERATIONAL & ACTIVE DRONE SERVICES - 2018

- Number of missions (flights): **86**
- Number of flight hours: **468 hrs**
- Number of km covered: **47,615 km**

### KEY FIGURES:

- **2** hydrocarbon pollution incidents
- **1** waste pollution incident (plastic, etc.)
- **5** incidents of abnormal activity
- **100** merchant vessels investigated
- **50** fishing vessels investigated



## Energy & Mining

Man and machine to high standards of efficiency and safety while respecting the environment.



## #CLS, Partner for Offshore Wind

CLS Group has proven expertise in the maritime environment for over 50 years. We work with energy companies, and today, we're helping their transition to renewable energy.

### # OCEAN SERVICES

- Installation, Metocean Measurements
- Reconnaitre, Transport, Maintenance
- Metocean/Oil Horizontal Site Studies
- Maritime Traffic Services
- Measurement Forecasting
- Acoustic Monitoring
- Fleet Tracking

### # WIND SERVICES & WIND R&D

- High-frequency wind dynamics
- Wind Atlas studies
- Turbine Performance Forecasts
- Wind Atlas studies



## # IN SITU MEASUREMENT OF METOCEAN CONDITIONS

### # CONTEXT

During the life cycle of the wind farm:

### # CHALLENGE

Need for continuous measurement of metocean parameters (winds, waves, currents, swell, etc.):

### # CLS SOLUTION

- Design
- Supply
- Installation
- Maintenance of the various instruments
- Real Time calibration services





## # METOCEAN FORECAST

### # CONTEXT

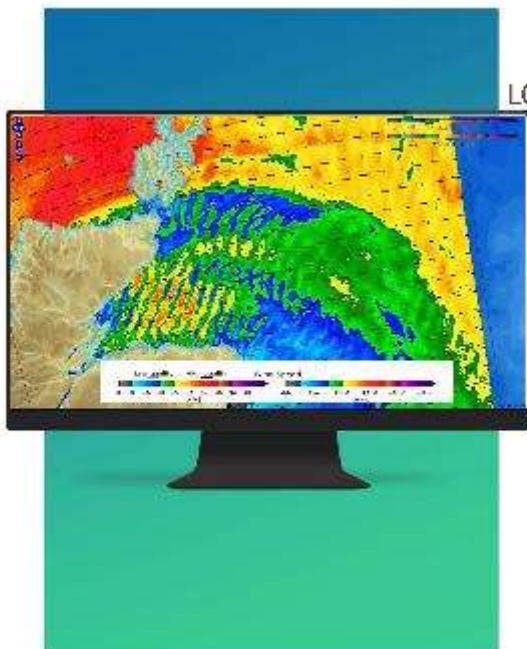
The installation and maintenance phases of equipment on wind farms require knowledge of the meteocean conditions.

### # CHALLENGE

Have a good knowledge of meteocean forecasts: winds, waves, currents, etc.

### # CLS SOLUTION

- Implementation and expertise of existing meteocean models.
- Development of high resolution models (WRF, SWH, ROMS).
- Data availability through dedicated sea altimetry (GOCE, WHO moorings).



## # HIGH FREQUENCY WINDS LOCATION & WIND ENERGY POTENTIAL STUDIES

### # CONTEXT

The meteorological site study of wind farms is colonized by the available wind energy.

### # CHALLENGE

Measure the high frequency dynamics of winds in close coastal proximity.

### # CLS SOLUTION

- Thanks to High resolution satellite Radar (SAR) imagery.
- Characterization of wind regimes.
- Provision of local wind and time wind atlas.
- Studies of energy generation potential.





# CLS Fisheries Division

Everything You Need for Sustainable Management



Flag States and Fisheries Ministries

## Your Trusted Partner

Clients in  
**+100**  
Countries

**30**  
Years of Fisheries  
Expertise



Regional Fisheries  
Management Organisations



Commercial Fishermen & Fleet Owners





## One-Stop Shop for Sustainable Management

<b>VMS</b>  <b>14,000</b> Vessels Reporting to Flag States, RFMOs	<b>ERS</b>  Development of <b>E-Logbooks</b>	<b>FMC</b>  <b>N. 1 Provider</b> Worldwide	<b>STOCK ASSESSMENT</b>  Forecast Impacts of <b>Climate Change &amp; Fishing Efforts</b>
---	--	---	--



## NEW: Electronic Monitoring

### Camera Systems Onboard

- Monitor Working Conditions
- Improve Safety Onboard
- Monitor Bycatch and Discharge
- Easier, Smarter Compliance





## NEW: NEMO System for Small-Scale Fisheries

**+80%**

of the World's Fishing  
Vessels

**50%**

of Global Fish Catches

We must track SSF vessels if we  
want to protect the future of  
fisheries



## NEMO: Hybrid GSM/Satellite Terminal

### Made for Fishermen

- Affordable
- Safety & weather alerts
- Easy to use
- Solar powered

### Reliable

- Built to last
- Tamper-proof
- Cannot be turned off

### Global, seamless coverage



NEAR THE COAST  
2G/4G/ND-IoT



EEZ OR HIGH SEAS  
ARGOS (now)  
KINEIS (from 2022)





THANK YOU

CLS For Earth from Space

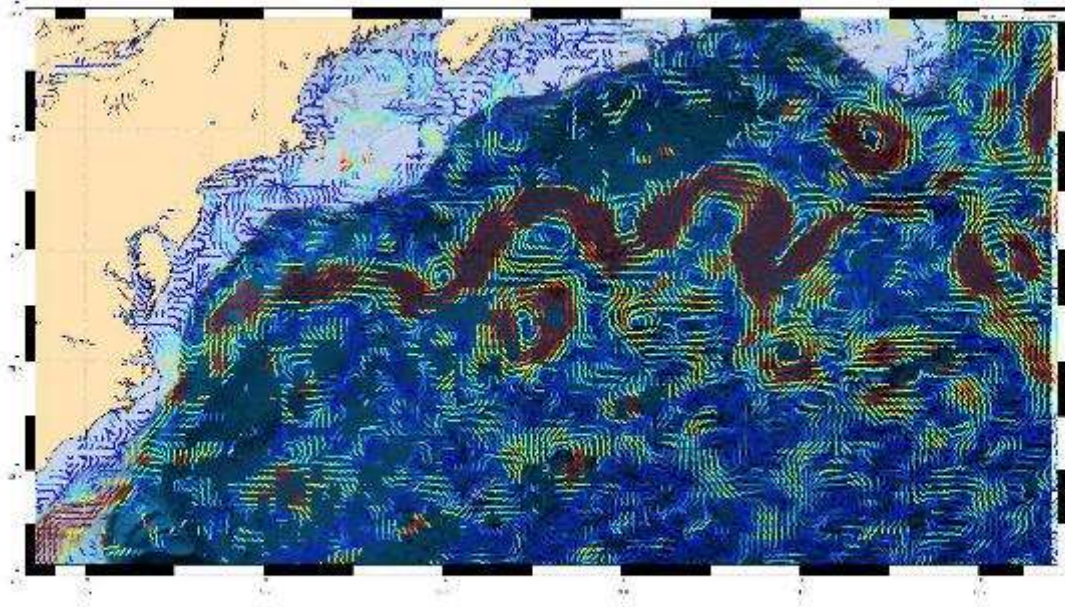
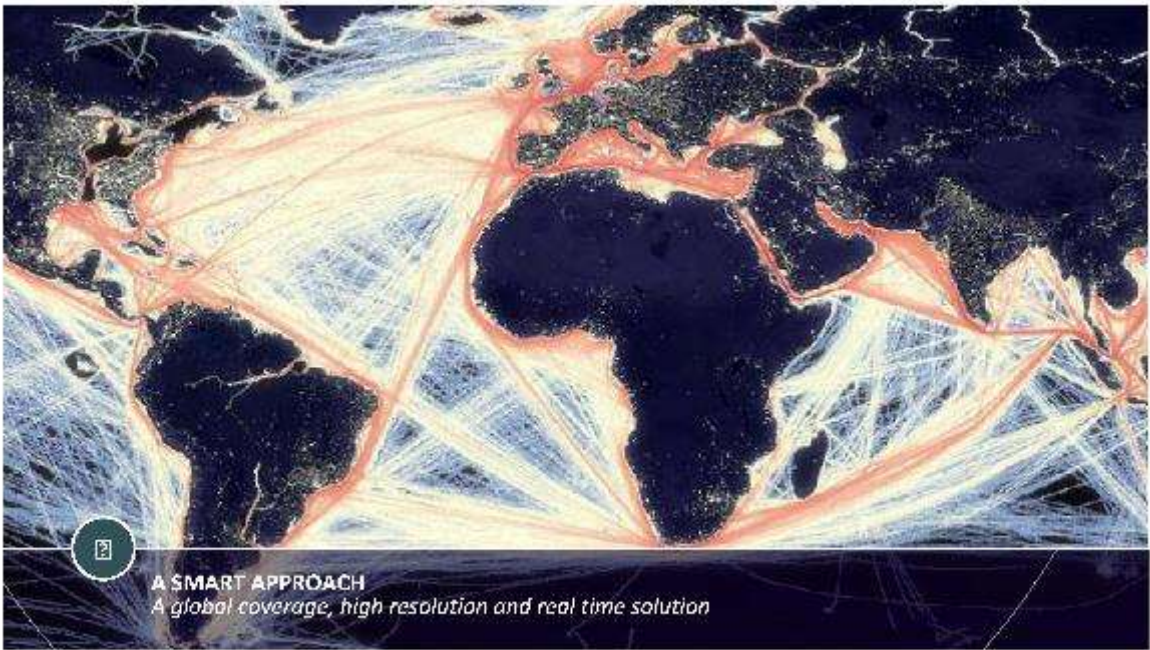
(3) Eodyn





**SHIP USED AS AN IN-SITU SENSOR**  
*Marine traffic used to recover information on ocean surface currents*





## Partnerships

### AREA OF THE STUDIES



### PARTNERS FOR VALIDATIONS/CASE STUDIES

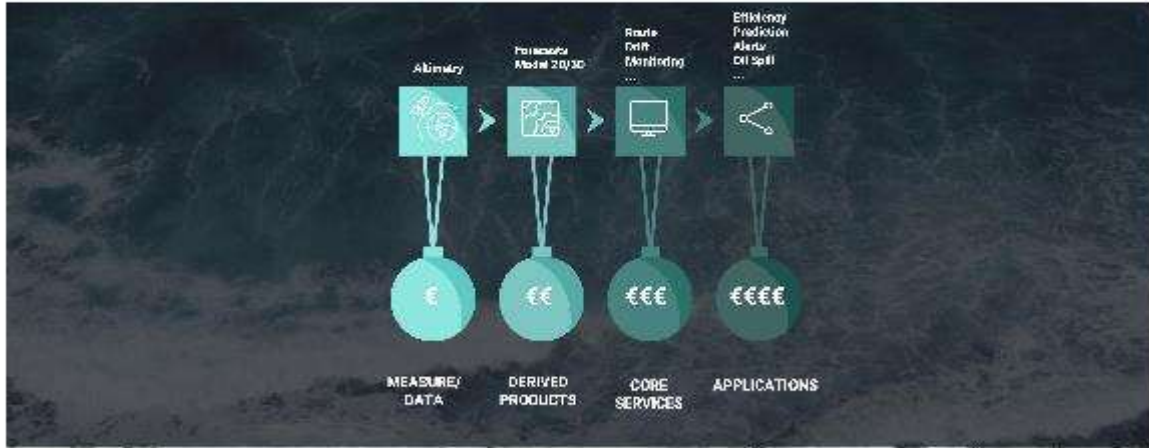


### CONFERENCE AND WORKSHOPS



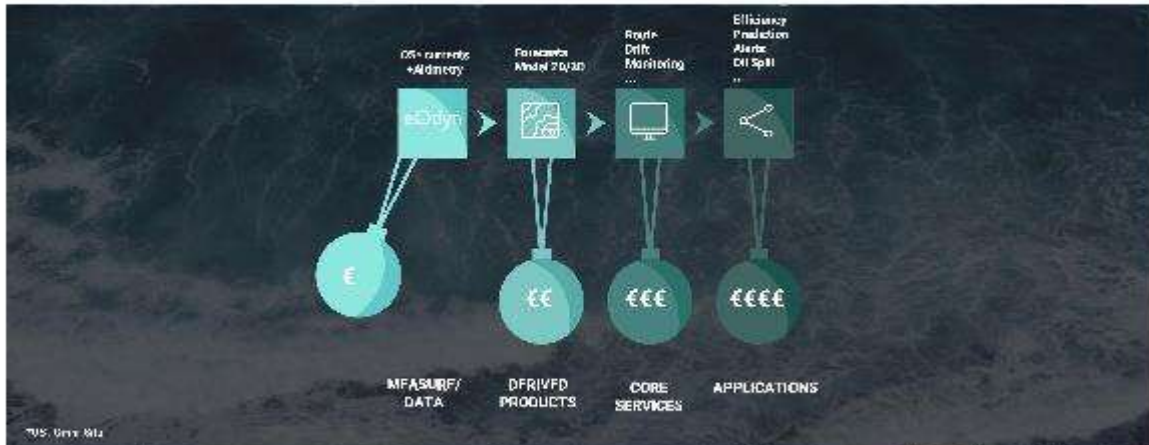
## An Existing Market

Remote sensing: Altimetry surface currents  
From measure to services






## ...Disrupted

Ubiquitous sensing: eOdyn surface currents  
A game changer





## Main Markets

<p><b>Shipping</b> Route/time optimization Fuel-speed performance</p>	
<p><b>Offshore Oil &amp; Gas</b> Supply Operations</p>	
<p><b>Defense</b> Situational awareness</p>	
<p><b>Others</b> Fishing, Trading, Insurance, Harbour Space/Satellite calibration, Environment</p>	



## Total addressable market

Shipping	Offshore Oil&Gas	Defense With/Thru Partners	Environment
			
<p><b>Value proposition</b> Covering 10% of fuel Additional revenue 1-4M\$ Emission cut</p>	<p><b>Value proposition</b> Outsourcing Additional revenue 1-4M\$ Emission cut</p>	<p><b>Value Proposition</b> Situational awareness</p>	<p><b>Brand &amp; Communication</b> Academic and Research programs With local fish community</p>
<p><b>Vessel subscriptions</b> Boschert</p> 	<p><b>Offshore rig subscriptions</b> Boschart</p> 		



# SeaWaze™

Trusted Weather Routing

Join SeaWaze™ Early Adopter Program  
In partnership with Microsoft  
You are a commercial ship owner or a charterer.  
You want to benefit from SeaWaze and put your company ahead of your competitors.  
For free for a 3 to 12 months period.

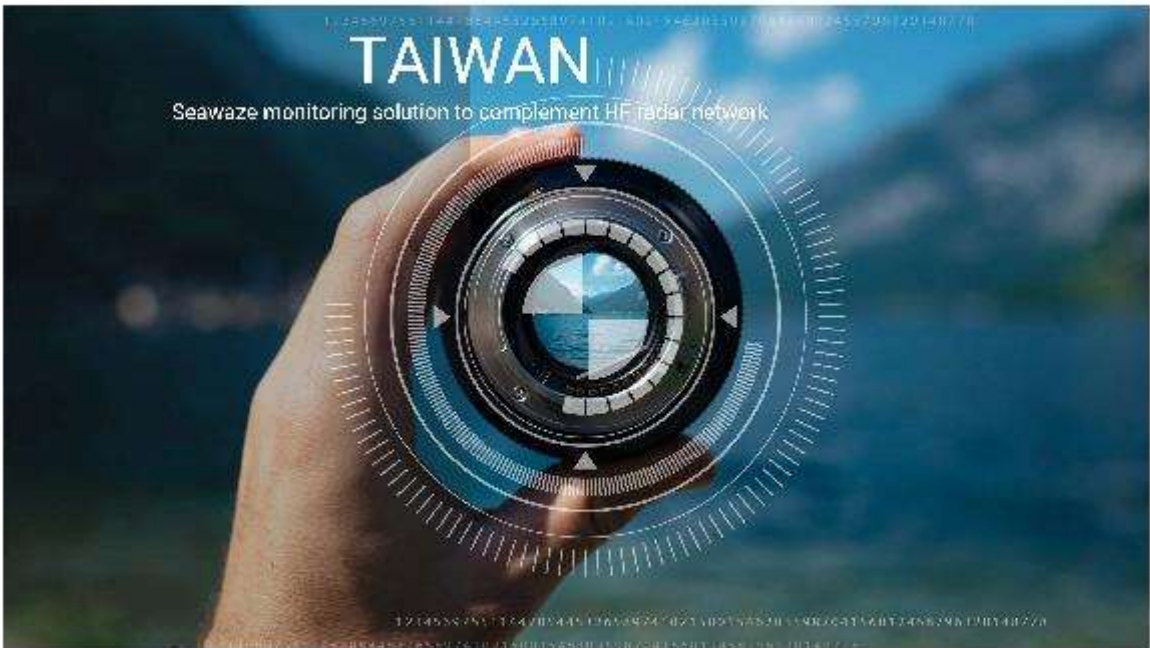
[Apply Now](#)

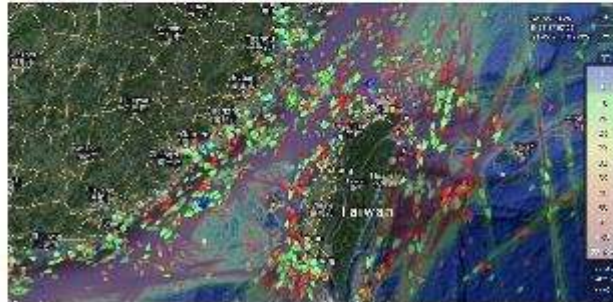
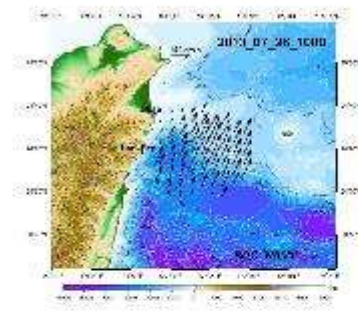


## eObox: on-ship device

Collect additional maritime data  
2 customers: 2 eObox deployed, 13 in progress









**Thank you !**

Any question?

## (4) nke instrumentation

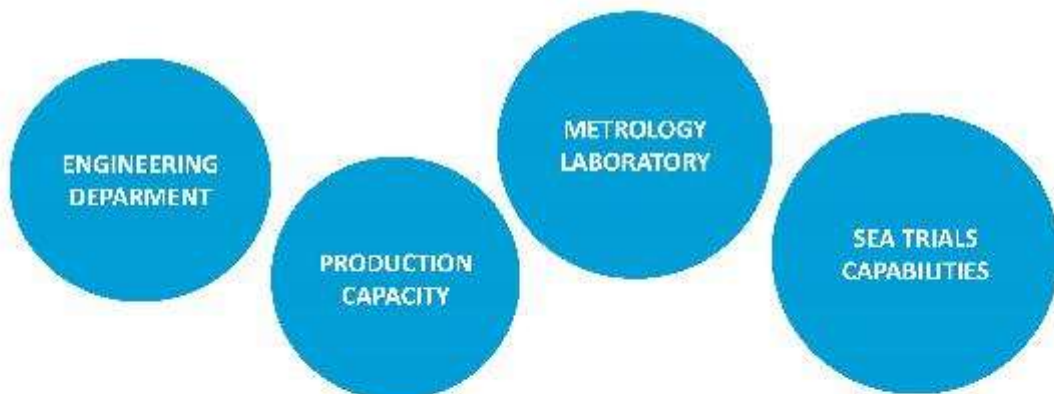


### GENERAL PRESENTATION

Your solution for In situ measurements



nke Instrumentation



*nke instrumentation has more than 25 years of experience of manufacturing oceanographic instruments*

07/05/2016



## Worldwide representation



More than 15 international representation companies

nke instruments are deployed all around the world

Chinese Subsidiary since 2017

02/05/2018



3

## Range of products



### Dataloggers and Multiparameter probes

Autonomous systems dedicated to various applications



### Automated networks

Autonomous measurement networks for water and environmental monitoring



### Floats and drifters



### Deep sea

Instrumented systems designed to monitor the environment or perform measurements in sediments

02/05/2018



4





**Dataloggers and Multiparameter probes**  
Autonomous systems dedicated to various applications



WiSens loggers

**WiSens : 1, 2 or 3 parameter loggers – very easy to use**



- **Easy to use everywhere by anyone from any support and with no software to install**
- **Evolutive standardized range for common useability and accessories**
- **Tending to the highest measuring performances**
- **Flexible access to standardized and reliable data**
- **The most compact and robust loggers in the market for their level of performances**
- **Declineable and evolutive sensors range**

PROBES – WiSens RANGE



WiSens : 1, 2 or 3 parameter loggers – very easy to use










02/05/2018



7

PROBES



	T	D	C	DO	Tbd	Ph	Fluo	Irr	Wave height	Acceleration
 WiSens TD	X	X								
 WiSens Wave	X	X							X	
 WiSens AD		X								X
 WiSens CTD	X	X	X							
 WiSens TBD	X	X	X		X					
 WiSens DO (to come soon)	X			X						
 SPAR (flat sensor)								X		

02/05/2018



8



**Dataloggers and Multiparameter probes**

Autonomous systems dedicated to various applications



ALTUS

**ALTUS : Sediment monitoring in bays and estuaries**



- Acoustic based methodology
- Monitoring of erosion and sediment deposit
- Monitoring of water height
- Evaluation of sediment volumes to dredge
- Operable in tidal environment
- Scientifically approved solution



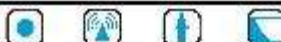


**Dataloggers and Multiparameter probes**

Autonomous systems dedicated to various applications



NOSS sensor



**SENSOR – ABSOLUTE SALINITY & DENSITY**

**NOSS: unique sensor for water absolute salinity and water density measuring system & detection on non-ionic anomalies**



**Multiple outputs:**

- Refractive index
- Temperature, Pressure
- Absolute salinity, (greater than 0,005g/l)
- Water Density

**Communication:**

- RS232 Serial output, Data Format ASCII

**Mechanical features:**

- Dimensions: diam. 100mm height 185mm
- Weight: 2.4kg (in air) 1.7kg (in water)
- 2000 meters depth rated



SUBMERGED ELEMENTS - INTEGRITY MONITORING

SF - TRACTION EFFORTS



- 1T to 35T
- 300 meters depths
- 600,000 measures autonomy
- 100hours continuous 3years at 15min rate

SPCT - CORROSION



- Corrosion and temperature
- 400 meters depths
- 1 Million measures
- 3 years at 10min rate

Range of products



Automated networks

Autonomous measurement networks for water and environmental monitoring



SAMBAT probe

SAMBAT FOR FRESH AND SEA WATER

- > Up to 7 parameters
- > Cleaning system of the sensor by wiper
- > Used as data logger
- or wireless remote GPRS data transmission

- Temperature
- Depth
- Conductivity
- Turbidity
- Dissolved Oxygen
- Fluorescence: Chlorophyll A, Phycocyanin, CDOM
- Ph – redox
- Hydrocarbon



INTEGRATION OF SAMBAT ON FLOATS WITH COMMUNICATION

SAMBAT light float is the best solution for easy long-terms estuaries deployment.

- Light weight
- Single-person deployable
- Easily recoverable from any vessel type
- Very robust antenna
- Resist to all weather conditions

- > GPS geo localization
- > GPRS Data transmission

**Float specifications :**  
 Float diameter: 20 cm  
 Total height: 1.7 m  
 Total weight (including SAMBAT probe): 14 kg  
 Mooring line weight around 30 kg





**Automated networks**

Autonomous measurement networks for water and environmental monitoring



ON REQUEST...

**AUTOMATED MEASUREMENT NETWORKS**

- > Measurement, transmission and retrieval of data
- > Adapted to every medium

- Lakes
- Rivers
- Estuaries
- Coastal areas
- Offshore
- Ships of opportunity



EXAMPLE OF LIDAR INSTRUMENTED BUOY

LIDAR

- Speed gust of wind
- Speedmaxi. Time average wind
- Speed mini. Time average wind
- Average wind speed
- Real wind direction
- ....



Meteorological station

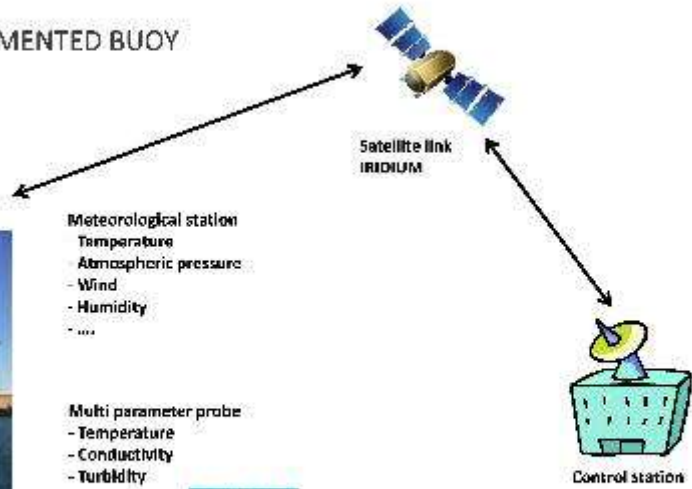
- Temperature
- Atmospheric pressure
- Wind
- Humidity
- ....

Multi parameter probe

- Temperature
- Conductivity
- Turbidity

ADCP

- Hs
- H1/10
- H1/3



OTHER INTEGRATIONS

Profiling system with SAMBAT



Proliphic instrumented buoy



Network on the Seine river

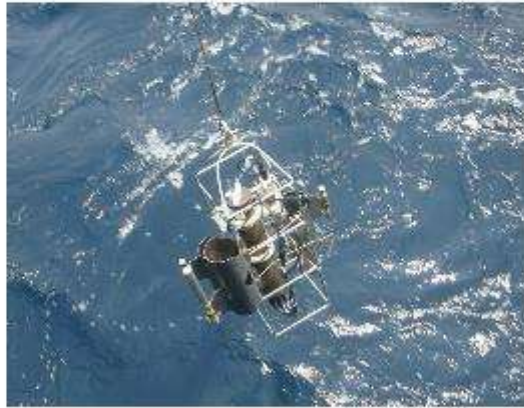






**Deep sea**

Instrumented systems designed to monitor the environment or perform measurements in sediments



DEEP-SEA systems



- > Piezometer
- > Thermal flow
- > Temperature, pH
- > Deep sea observatory

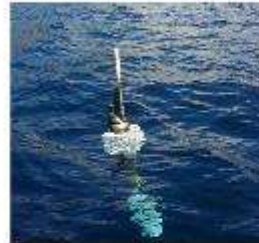


## Projects & partnerships



### EUROPEAN PROJECTS

- Nexos
- SensOcean
- Fixo3
- Atlantos



### NATIONAL RESEARCH PROJECTS

- Equipex - NAOS (associate)
- Pole mer - Blidar
- Pole Mer - Simeo
- CITEPH - Mesda
- RAPID - Cadip
- IAOS (associate)



02/05/2016



23



## Thank you for your attention 😊



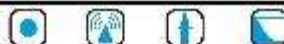
### CONTACT

International Sales Manager

[lsimon@nke.fr](mailto:lsimon@nke.fr)

[www.nke-instrumentation.com](http://www.nke-instrumentation.com)

Rue Gutenberg - ZI de Kerondré - +33 (0)2 97 36 41 31



## (5) Quiet Oceans



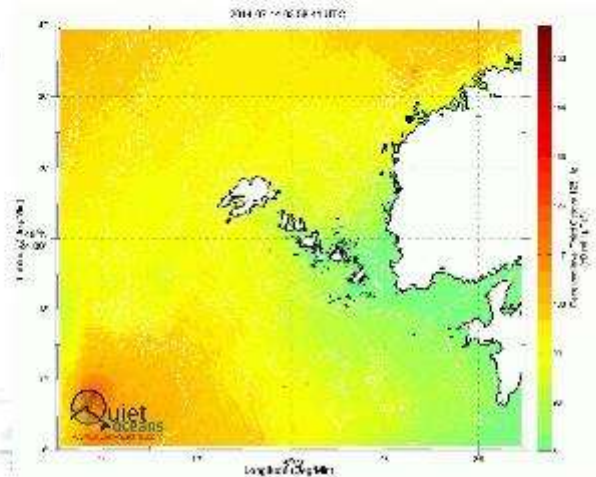
1. Presentation of Quiet-Oceans
2. Action in Taiwan
3. Proposals for cooperation



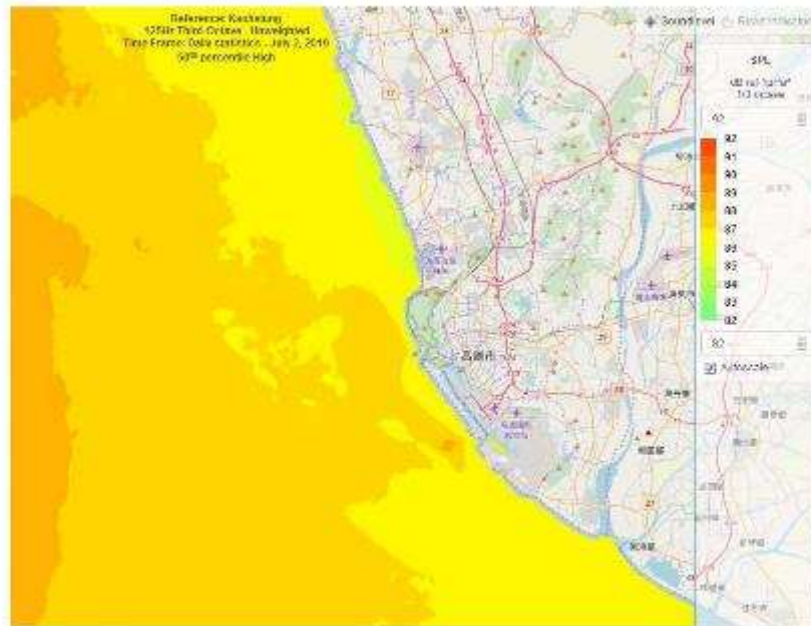
# Noise modelling



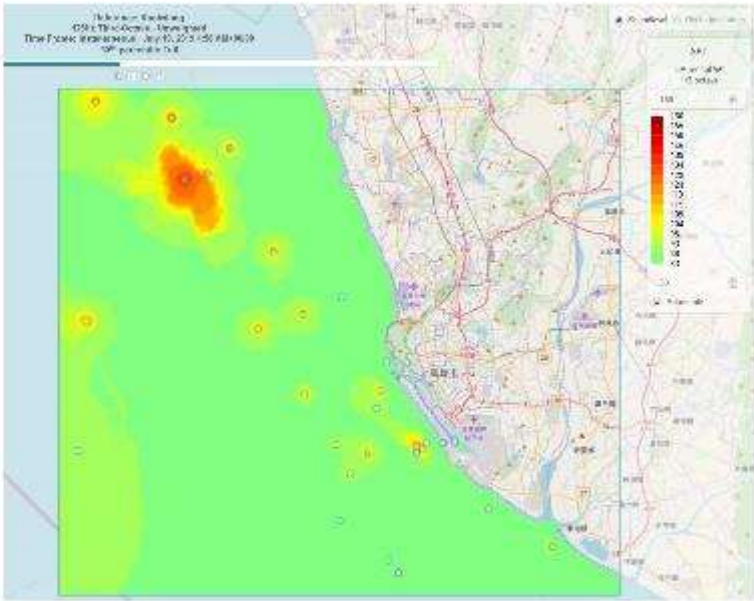
- ✓ One of the most validated
- ✓ Approved by international studies
- ✓ Used by major governmental agencies
- ✓ > 2 millions maps produced



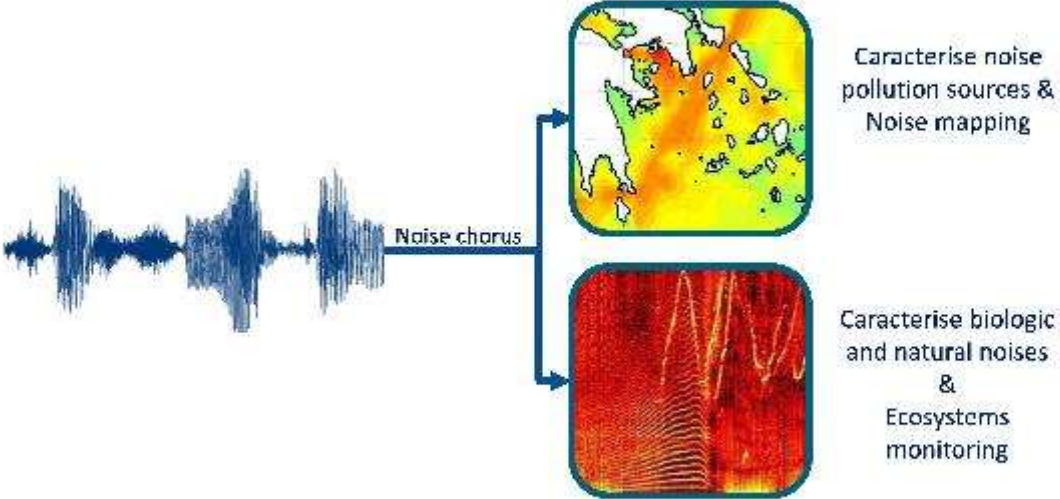
## Modelling – Statistical ambient noise



# Modelling - Live

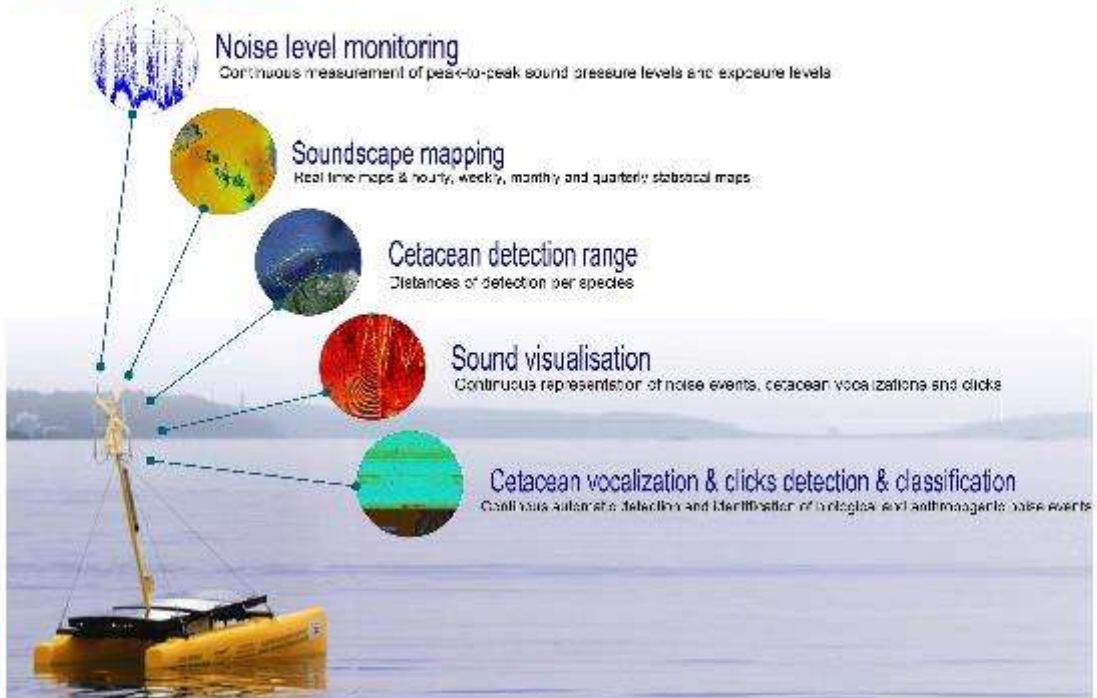


## Noise characterisation





# Operational Monitoring New Generation of Passive Acoustic



## Track records

- Real time noise level measurement and cetacean detection in Marine Protected Areas for the **French Agency for Marine Protected Areas, French Agency for Biodiversity and Navy Hydrographic and Oceanographic Service** since 2016



Données collectées: Monitoring 2016-2017



## Track records

- Real-time Underwater noise monitoring and Detection of marine mammals in **offshore wind, offshore construction and Oil & Gas**, since 2017







## Advising and guidance

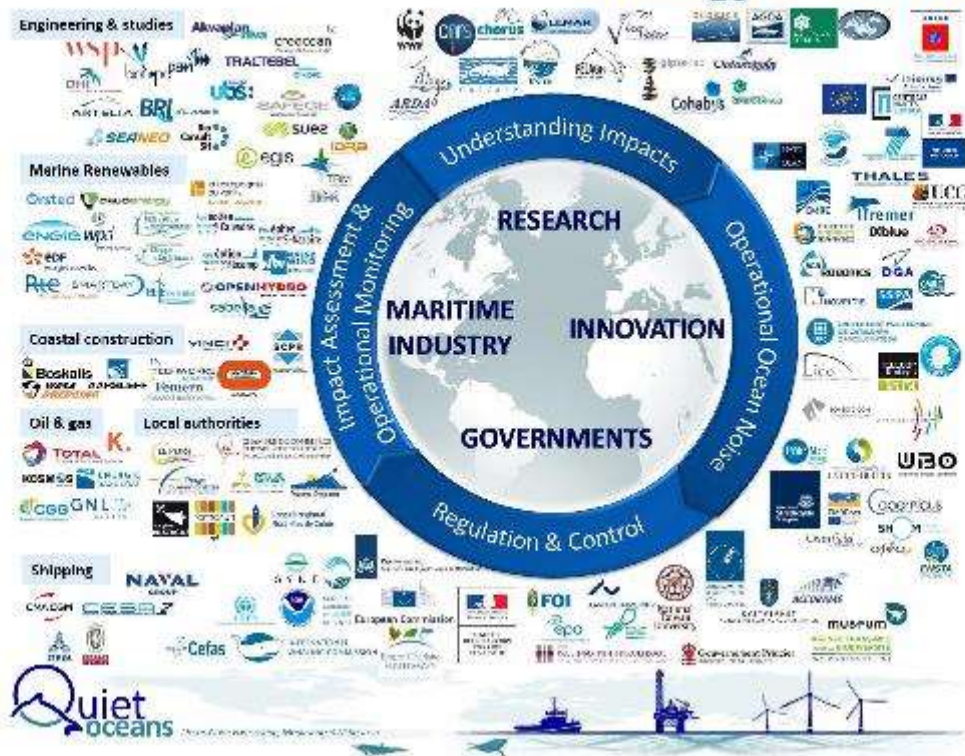






1: EU Marine Strategy Framework Directive

## Strategy & References



## Areas of projects

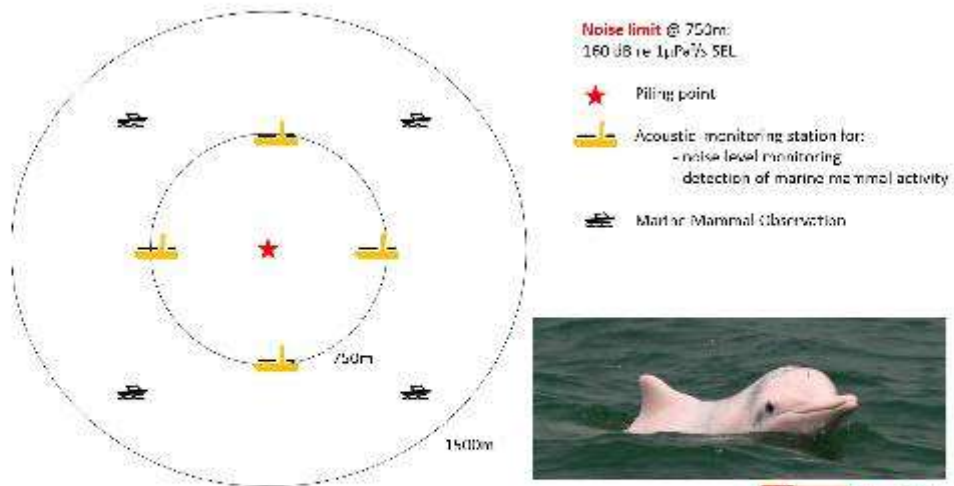




1. Presentation of Quiet-Oceans
2. **Action in Taiwan**
3. Proposals for cooperation



## White dolphin protection scheme



Regulation in Taiwan for piling operations in OWF projects



## Organization in Taiwan

- Partnership with Ocean Sound, NTU spin-off



National  
Taiwan  
University

**OCEAN  
SOUND**



1. Presentation of Quiet-Oceans
2. Action in Taiwan
- 3. Proposals for cooperation**

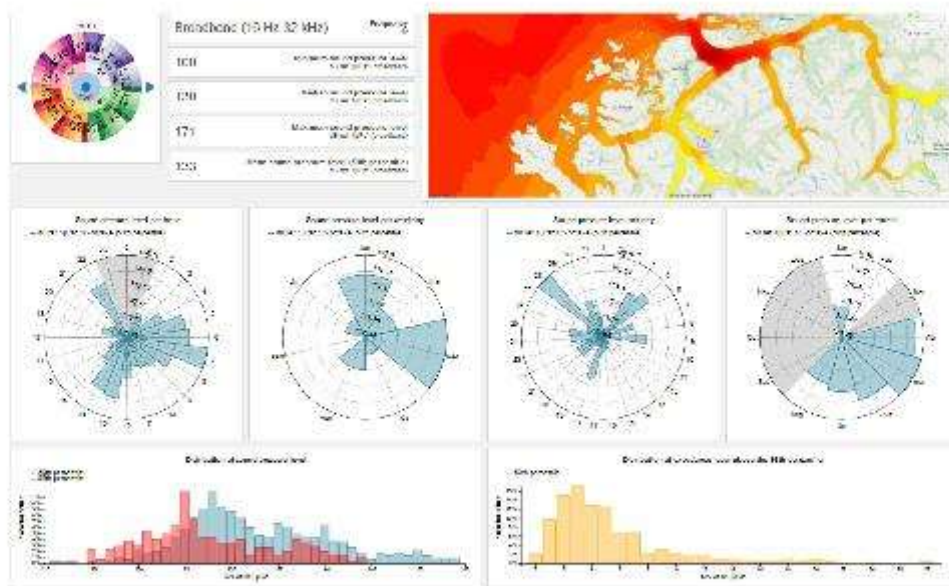


# Underwater noise monitoring

- ⇒ **Monitoring of marine mammals**
- ⇒ **& vessel noise**

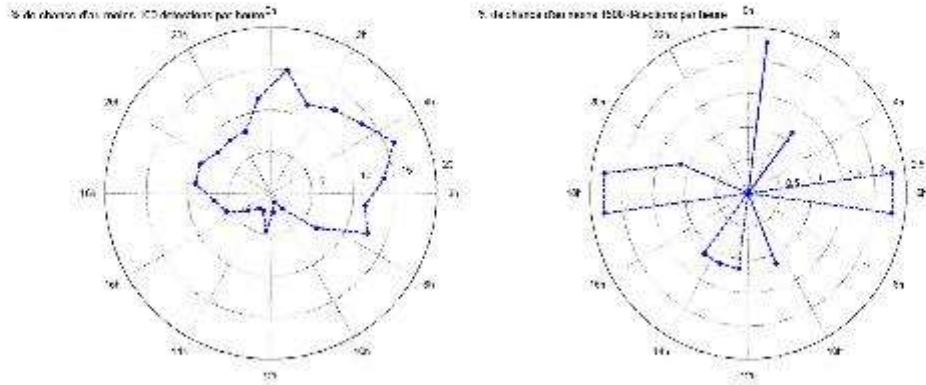


## Underwater noise level statistics

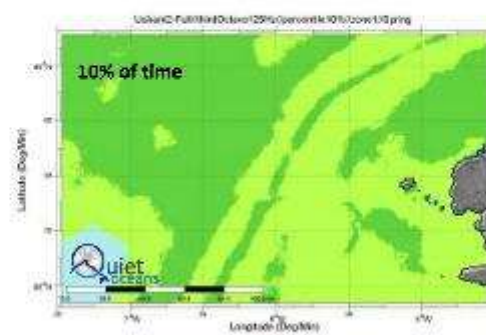
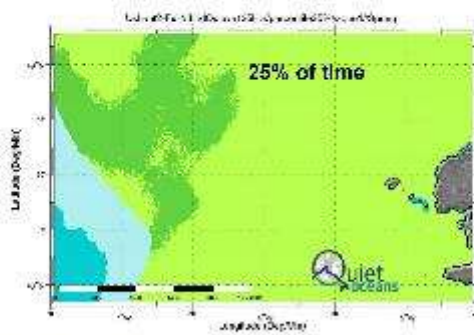
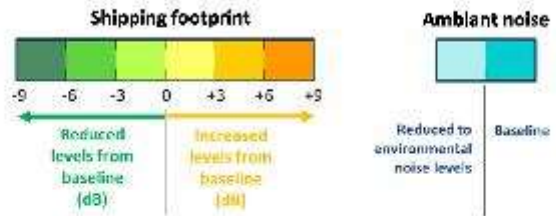


# Habitat baseline study

## Example of habitat baseline study: times of socialisation and hunting



## Studies on shipping noise reduction





Contact

Carl Bois

[carl.bois@quiet-oceans.com](mailto:carl.bois@quiet-oceans.com)

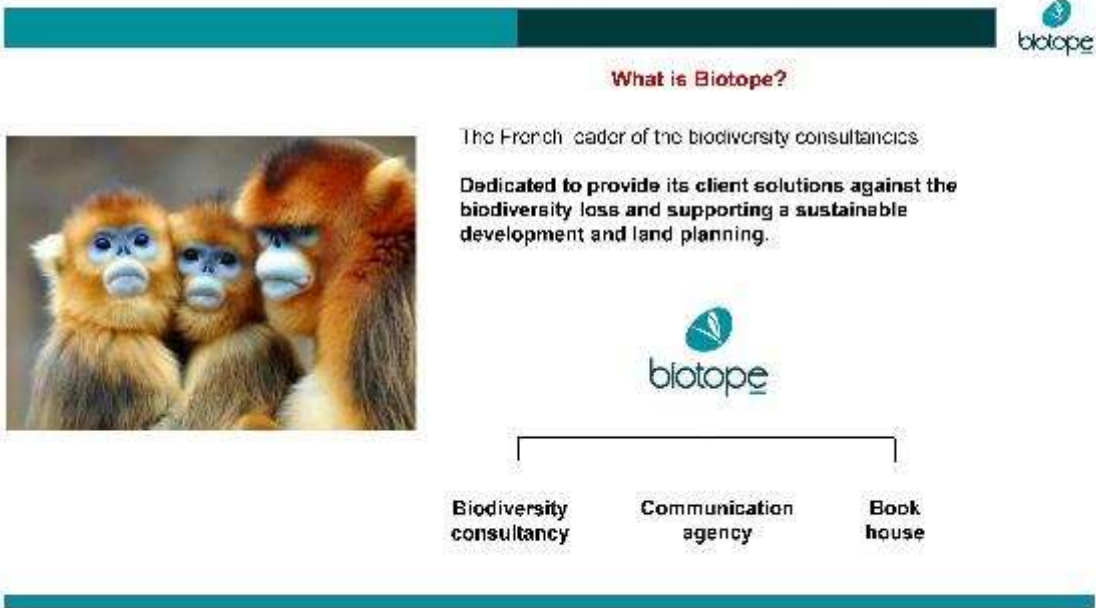
+33 (0) 982 282 123 / +33 (0) 625 23 77 97

[www.quiet-oceans.com](http://www.quiet-oceans.com)

SAR au capital de 100 000 €  
RCS BREST 524 673 603 - Siret : 524 673 603 00010 - APE 7113B



(6) Biotope



### Biotope in figures

- 25 years providing services for biodiversity conservation & sustainable development
- 250 employees in 2018 (more than 100 Biodiversity specialists)
- 20 offices in France & abroad
- Good knowledge of biodiversity issues in the world



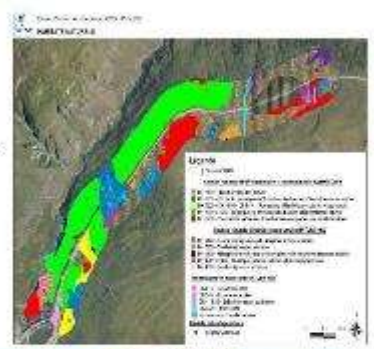
### Main activities & services

- A complete ecological expertise on marine and coastal natural environments (birds, mammals, fish) - baseline surveys, impact assessments, mitigation and offset design, biodiversity action plans) in all sectors ...



Our major : EIA in accordance with Performance Standard 6

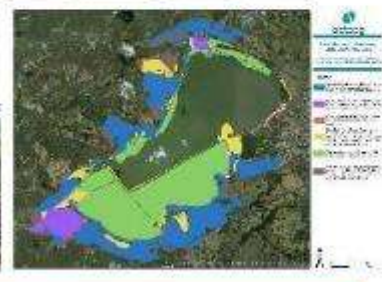
#### Mitigation hierarchy



### Main activities & services



- **Ecological Management Plan** drafting for Protected Areas (National Parks, Natural Reserves...)
- **Training** for Protected Areas Management Staff
- **Technical Assistance** for World Heritage, MAB and Ramsar designation



### Main activities & services

- **Nature Conservation and Restoration:** Wetland restoration. Species or Habitats Conservation program. Endangered species monitoring



before



after



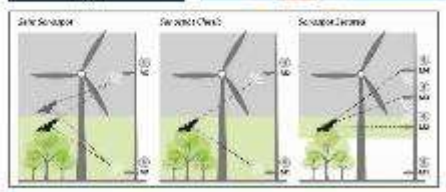


### Main activities & services

- **Technical R&D** (e.g. automatic curtailment of wind power plants for bats protection, radar survey of birds)



- Biotope tools :**
- Chirotech (Bats protection)
  - Shuriken (Biodiversity Data bank App)
  - Aviscan et Aviscope (Radar)
  - Sonochiro, sonospot (Acoustic tools)
  - Biotape connect (Ecological corridor modeling app)

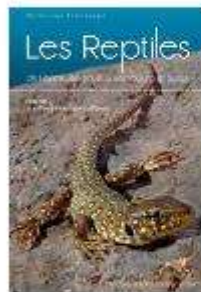


### Main activities & services

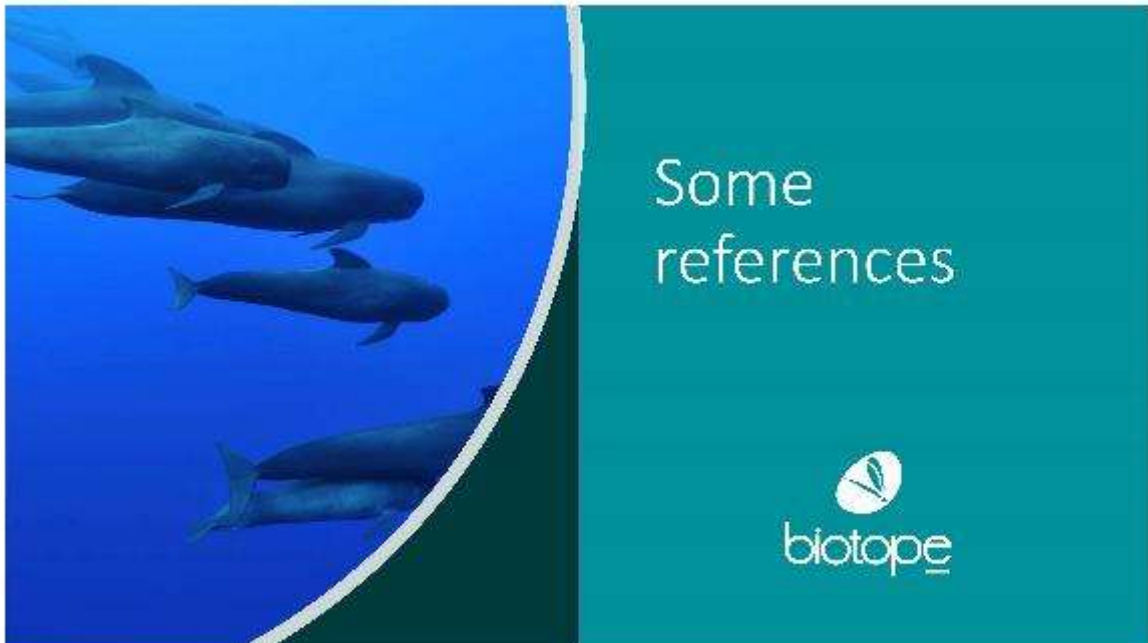
- **Environmental education and communication**



### Examples of materials produced by the book house



- European protected species sheets design
- Reptiles of France, Luxembourg et Switzerland
- Butterflies of Morocco



## Offshore wind power: Biotope's references in France



## Our customers...for offshore projects

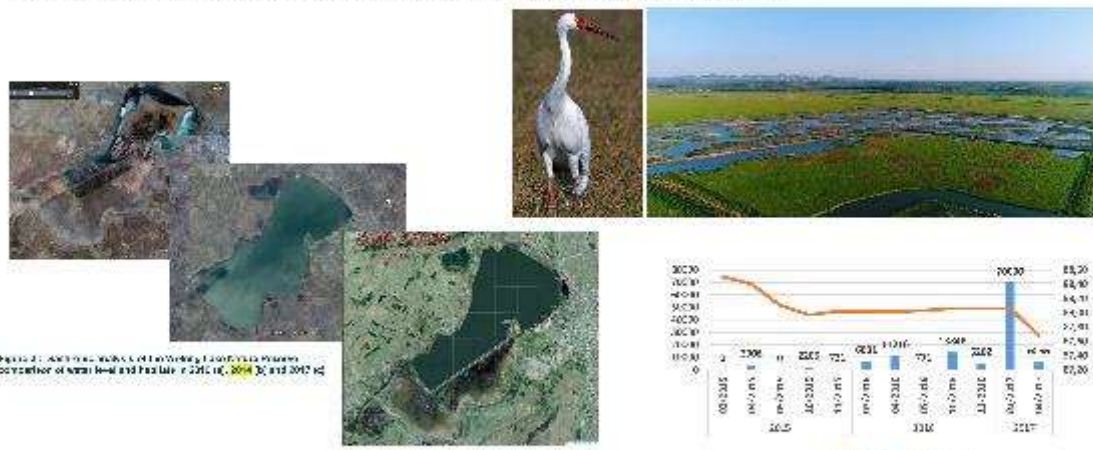


### Technical assistance for the ecological restoration of Wolong Lake, Kangping, Liaoning

- **Name of the project owner:** WLMC
  - **Funding:** FDA (loan)
  - **Area:** 6 000 ha
  - **Year:** 2014-2018
  - **Partnerships:** Phytorestore, Biological station of the Institute of Botany at HUI Group, 苗木基地
- Missions:**
- Environmental and Social Impact Assessment (ESIA)
  - Environmental and Social Management Plan (ESMP)
  - Design
  - Management plan
  - Ecological monitoring
  - Construction work follow-up
  - Capacity building



### Restoration of the Wolong Lake, Liaoning Province, China



## Restoration of the Wolong Lake, Liaoning Province, China



Figure 10: The top left photo is the view from the entrance of the Wolong Lake National Park. The middle left photo is the view from the entrance of the Wolong Lake National Park. The middle right photo is the view from the entrance of the Wolong Lake National Park. The bottom left photo is the view from the entrance of the Wolong Lake National Park. The bottom middle photo is the view from the entrance of the Wolong Lake National Park. The bottom right photo is the view from the entrance of the Wolong Lake National Park.

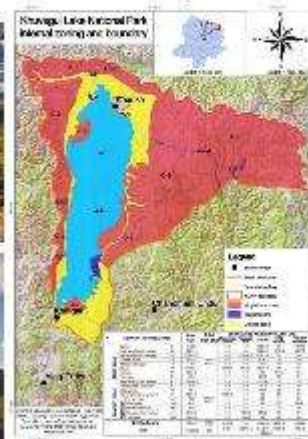
Figure 11: The top middle photo is the view from the entrance of the Wolong Lake National Park. The bottom middle photo is the view from the entrance of the Wolong Lake National Park. The bottom right photo is the view from the entrance of the Wolong Lake National Park.

## Technical assistance on integration of biodiversity conservation in the sustainable Tourism Development project of Khuvsgul Lake National Park

- **Project owner** – Horwath HTL France (Asian Development Bank funding)
- **Funding** – ADB
- **Area** – Khuvsgul Lake National Park (KLNK)
- **Year** – 2017-2018
- **Partnerships** – EGIS

### Missions :

- According to IUCN recommendations and international best practices in terms of protected area management:
  - Gap analysis of management effect, whereas
  - Reviewing of the management plan
  - Writing of the report on the Strengthening of the management of the KLNK, integrating development infrastructures taking into account biodiversity
  - Reviewing of the Initial Environmental Examination report and of the recommendations for ecotourism special at Terms of References (ADB loan)



## Biodiversity Action Plan for the Djéno oil terminal, Republic of Congo

- **Project owner** – Total
- **Funding** – Private (total)
- **Area** – Djéno oil terminal area
- **Year** – 2015-2016
- **Partnerships** – University Maren Cousbi, Brazzaville

- **Missions :**  
According to international best practices (IFC PS6):
- Ecological fieldwork
- Mapping of biodiversity risks
- Environmental Impact Assessment (EIA)
- Realization of the Biodiversity Action Plan
- Identification of mitigation options and priorities through engagement with the operations team and other internal and external stakeholders (government and environmental NGOs).



## Oued Chbika Development (OCD) – Environmental and Social Impact Assessment (ESIA)

- **Project owner** – ERM FRANCE on behalf of CHBIKA DEVELOPMENT SA, Filial of Orascom Development Holding (sponsor)
- **Funding** – Proprietary, DEG and EBRD
- **Area** – Oued Chbika Project
- **Year** – 2015-2016
- **Partnerships** – ERM FRANCE (International consultancy) ; NOVOC (local consultancy)

- **Missions :**  
According to the investors standards:
- Carry out a gap analysis of the existing EIA and supporting documents
- Complete an updated ESIA that addresses the gaps identified and covers the current project design during both the construction and operation;
- Develop an ESIA Disclosure Package that will include the ESIA, Stakeholder Engagement Plan, Biodiversity Action Plan, Non-Technical Summary and an Environmental and Social Action Plan



## International expertise and assistance in the framework of the feasibility study for biodiversity conservation of Maoli Lake National Wetland Park

- **Name of the project owner** – Jinshi Government
- **Funding** – Jinshi Government (in the perspective of an FDA loan)
- **Area** – 4 000 ha
- **Year** – 2016
- **Missions** :
  - ecological fieldwork
  - ecological diagnostic
  - Mapping
  - Report and comments on feasibility of ecological restoration solutions, ecotourism benefiting to local population, integrated watershed management and Governance



## Feasibility study for Lushan restoration project (Lushan, Sichuan)

- **Name of the project owner** – Lushan County
- **Funding** – Lushan County (in the perspective of an FDA loan)
- **Area** – Lushan County territory
- **Year** – 2016
- **Missions** :
  - Restauration écologique de la rivière et valorisation écotouristique 河流生态治理修复及生态旅游开发
  - Gestion des risques naturels et « Smart city » 自然风险治理及智慧城市建设



### Study for the realisation of the urban planning scheme for the sino-french ecocity of Caidian district, Wuhan, Hubei

- **Name of the project owner :** Water Bureau of Caidian
- **Funding :** AFD
- **Area :** 5000 ha
- **Year :** 2015-2016
- **Partnerships :** ARCP, Burocap

- **Missions :**
  - Territorial planning integrating biodiversity and ecosystem services
  - Mapping ecological stakes analysis, ecological sensitivity, Green and blue corridors and ecosystem services
  - Comparative scenario analysis
  - Technical recommendations on infrastructures to implement
  - Recommendations on agricultural and eco-touristic development

