BREST LIFE

CAMPUS MONDIAL DE LA MER

BRETAGNE

# SEA TECH WEEK
BREST-FRANCE

www.seatechweek.eu

**26 - 30 SEPT. 2022**
**BREST EXPO FRANCE**

## MARITIME TRANSPORT
### TOWARDS SMARTER & GREENER SOLUTIONS

**INDIA**
FEATURED COUNTRY

CONFERENCE
EXHIBITION
BTOB MEETINGS

UNION EUROPÉENNE
UNANIEZH EUROPA

L'Europe s'engage en Bretagne / Avec le Fonds européen de développement régional

Région Bretagne

Brest Métropole

TECHNOPÔLE BREST · IROISE

Crédit Mutuel ARKEA

# EDITO

## SEA TECH WEEK®

**JOINT INTERVIEW WITH FRANÇOIS CUILLANDRE, PRESIDENT OF BREST MÉTROPOLE AND MAYOR OF BREST, AND LOÏG CHESNAIS-GIRARD, PRESIDENT OF THE BRITTANY REGION.**

**SEA TECH WEEK® WILL BE HELD FOR THE 13TH TIME THIS YEAR AND WILL BE AN IN-PERSON EVENT ONCE AGAIN. WHAT WOULD YOU SAY IS DISTINCTIVE ABOUT IT?**

**FC:** Coming a few months after the One Ocean Summit hosted here in Brest, this year's Sea Tech Week® will definitely be special. I'm delighted it's going to be in person again – it will provide valuable opportunities for conversations and interaction between local and international stakeholders from the worlds of business and research.

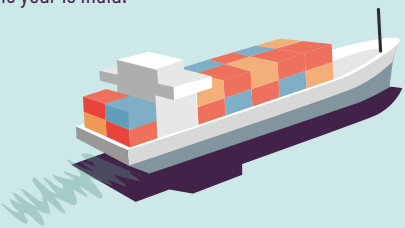
**LCG:** Brittany has a long tradition of hosting international maritime events, especially in Brest. That tradition will be resumed this year with the One Ocean Summit in February and the return of Sea Tech Week® in its original format. These are wonderful opportunities to showcase to the world how much Brittany has to offer in the field of marine science and technology.

**WHAT INSPIRED YOU TO CHOOSE 'MARITIME TRANSPORT: TOWARDS SMARTER AND GREENER SOLUTIONS' AS THE THEME THIS TIME?**

**FC:** When you think that 90% of global trade is transported by sea, you can see that maritime transport is actually at the heart of our day-to-day lives. It seemed natural to choose this topic, since the businesses and laboratories that comprise Campus mondial de la mer offer a wealth of expertise in this area, from ship design for lower environmental impact, to maritime cybersecurity, marine energy production, reducing chemical, plastic and noise pollution, and financing decarbonisation in maritime transport.

**LCG:** What with fishing and other maritime activities, as well as coastal tourism, harbour traffic and ocean racing, it's not just that the ocean is part of our DNA, it also offers us amazing opportunities for the future. We see this as the guiding principle in the management of the ports owned by Brittany Region. In addition, Sea Tech Week® is an important milestone for the wind propulsion sector, launched just under a year ago, and likewise for the renewable hydrogen sector.

Following Australia in 2020, the featured country this year is India.



### Can you explain this choice?

**FC:** India is a major maritime nation and proposing it as the featured country was supported by both the French ambassador in Delhi and the Indian ambassador in Paris. Our two countries have recently adopted a shared roadmap on the blue economy and governance of the ocean. In addition, Sea Tech Week® provides a tangible contribution to working jointly on designing solutions for smarter and more sustainable maritime transport.

**LCG:** Campus mondial de la mer is working in partnership with India, in particular with Goa, to pave the way for joint research projects and to facilitate mobility opportunities for students and researchers. So, having India as the featured country was a logical choice.

### Preparations for Sea Tech Week® 2022 were guided by two priorities. Could you tell us something about that?

**FC:** Women continue to be underrepresented in marine science and technology, especially in the maritime transport sector. We hope that Sea Tech Week® will provide opportunities for their voices to be heard, their expertise to be highlighted and their roles to be better recognised.

**LCG:** We also envisage Sea Tech Week® as a place for conversations and exchanges with the young people who will be the marine professionals of tomorrow. Young people from schools, colleges and universities will therefore have special access to the event so they can take a step towards a potential maritime career.

### What next for Brest and the ocean?

**FC:** A number of European and international maritime events are planned for Brest over the next few years: the European Maritime Day in May 2023, the Brest International Maritime Festival in July 2024, the next Sea Tech Week® in late 2024 and the Oceans Conference in June 2025. I'd be delighted to meet you again at any of these events!

**LCG:** And don't forget that the Port of Brest is continuing to develop – a few weeks ago the port welcomed its first wind turbines which are to be installed in Saint-Brieuc Bay. And that's just the start.

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# PATRONAGES AND SUPPORTS

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2021 2030 United Nations Decade of Ocean Science for Sustainable Development

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# INDIA,
## A MARITIME COUNTRY

India is one of the fastest growing and large economies in the world, with a GDP growth rate of 6.1% as of 2018-19. Approximately 95% of India's merchandise trade is done through seaports. India is one of the biggest peninsulas in the world with a coastline of ~7,516.6 kms and 200+ major and non-major ports. Indian ports are categorised into two parts: Major ports (under central Government administration) and non-Major ports (under state Government administration). The ports in India serve as a backbone for EXIM, international trade, coastal shipping, and cruise shipping.

Government of India (GoI) recognizes its Maritime strengths and has been in the forefront by creating conducive policy environment for promotion of export potential and improve trade and commerce. Development of Special Economic Zones (SEZ) and allowing foreign enterprise participation has helped India in achieving high trade growth.

The ambitious Sagarmala Programme of Ministry of Port Shipping and Waterways (MoPSW) aims to double the share of the port industry in Indian cargo movement. Shri Sarbananda Sonowal, Hon'ble Minister of Ports, Shipping and Waterways & AYUSH, Govt of India has emphasized that, "The new Sagarmala program will also enhance the emphasis on holistic development of coastal areas. There are currently 802 projects worth Rs 5.5 lakh crores [INR 5.5 trillion] under Sagarmala program targeted to be executed by 2035".

This initiative was launched in 2017 to rationalize the freight costs and improve the competitiveness of the export market and is the flagship programme of the Ministry of Ports, Shipping and Waterways, GoI to promote and develop ports in the country by harnessing India's vast coastline and potentially navigable waterways. Sagarmala project is poised to be a gamechanger for the maritime sector due to its focus on port-led development.

Furthermore, the Maritime India Vision (MIV) 2030 has been launched by the Hon'ble Prime Minister of India to ensure coordinated and accelerated growth of India's maritime sector in the next decade with the objective of propelling India to the forefront of the Global Maritime Sector. MIV 2030 has identified initiatives such as developing world-class Mega Ports, trans-shipment hubs and infrastructure modernization of ports. Such initiatives would be instrumental in lowering overall operational costs of ports, reducing turnaround time for vessels, increasing efficiency and throughput, providing ability to handle larger ships, and developing Indian Port's strategic importance in the South Asian region.

## INDIA, FEATURED COUNTRY

Today, as India embarks on a new era of infrastructure reforms with introduction of Prime Minister Gati Shakti National Masterplan, and landmark initiatives like National Infrastructure Pipeline and National Monetisation Plan, a greater private sector participation is envisaged in Maritime sector in the forthcoming years. Several fiscal and non-fiscal incentives to develop, maintain, and operate ports, inland waterways, and shipbuilding are further re-energizing the sector. Additionally, an increased focus on port-led development and Port led industrialization is helping create an industry cluster to support the trade.

Waterways are also being harnessed to ensure Indian products get access to new markets. Besides this gamut of initiatives, pursuing 'Make in India' will further increase tremendous opportunities, especially in the ship repair industry. The shipbuilding policy will further encourage Indian shipyards to get more foreign orders. The Public-Private-Partnership (PPP) model is a revolutionary step in making ports globally competitive, both government and the private sector are increasingly realizing the significant opportunity that lies in reforming the sector and expanding its scale. Amidst, key reforms, India's maritime sector is poised for progress and the industry is all geared up for capacity building and facilitating the sector's growth.

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VIDON


IWSA
International Windship Association

# CONFERENCE OVERVIEW

## CONFERENCES - BREST

### MONDAY 26TH SEPTEMBER 2022

**2PM - PARALLEL SESSIONS**

- **Adapt to climate change**, *by CEREMA (France)*
- **Sustainable polymer materials for marine applications**, *by IFREMER (France)*
- **Installation, operation and maintenance of tidal turbines in commercial projects: how can the transport and logistics supply chain contribute to a reduced cost of tidal energy production**, *by TIGER project*
- **AI in Meteorology and Oceanography**, *by IMT Atlantique (France) and RIKEN (Japan)*
- **Lower environmental impact for the new research vessel of FOF**, *by IFREMER (France)*
- **What does the IMO e-Navigation S-100 bring to maritime transport?**, *by Shom (France)*
- **Indo-french cooperation in marine sciences: opportunities and mechanisms**, *by French Institute in India, French Embassy in India and CNRS India*

### TUESDAY 27TH SEPTEMBER 2022

**9AM - PARALLEL SESSIONS**

- **Wind Propulsion: Blending regional initiatives, national developments, and international networks for sustainable shipping - PART 1**, *by International Wind Ship Association and Bretagne Développement Innovation (BDI) (France)*
- **Navigation and control of Underwater vehicles - PART 1**, *by Indian Institute of Technology (IIT) Goa (India) and National Institute of Technology Silchar (India)*
- **Opportunities offered by Hydrogene in the maritime world**, *by Bretagne Développement Innovation (BDI) (France)*
- **Underwater noises: Understanding and Preventing it - PART 1**, *by IEEE OES France Chapter (France), Technopole Maritime du Québec (Canada) and Institut France-Québec Maritime (France-Canada)*
- **Marine Litter: Solutions for Monitoring, Mitigation and Prevention - PART a and b**, *by IEEE-OES and Laboratory for Ocean Physics and Satellite remote sensing (LOPS) (France)*
- **Latest innovations for tomorrow's greener and smarter maritime transport**, *by Pôle Mer Bretagne Atlantique (France)*
- **New fuels: behavior in aquatic environments and responses to accidental spills**, *by CEDRE (France)*

**1.45PM - SEA TECH WEEK® OFFICIAL OPENING AND PLENARY SESSION #1: NEW PROPULSION SYSTEMS FOR LOW-CARBON SHIPPING**

**3.15PM - PARALLEL SESSIONS**

- **Wind Propulsion: Blending regional initiatives, national developments, and international networks for sustainable shipping - PART 2**, *by International Wind Ship Association and Bretagne Développement Innovation (BDI) (France)*
- **Navigation and control of Underwater vehicles - PART 2**, *by Indian Institute of Technology (IIT) Goa (India) and National Institute of Technology Silchar (India)*
- **Greener maritime transports (French-Norwegian session)**, *by Innovation Norway, Chambre de commerce France-Norvégienne and Ambassade Royale de Norvège en France*
- **Underwater noises: Understanding and Preventing it - PART 2**, *by IEEE OES France Chapter (France), Technopole Maritime du Québec (Canada) and Institut France-Québec Maritime (France-Canada)*
- **Marine Litter: Solutions for Monitoring, Mitigation and Prevention - PART c and d**, *by IEEE-OES and Laboratory for Ocean Physics and Satellite remote sensing (LOPS) (France)*
- **Highly-efficient innovative water-based Sea Water Air Conditioning solutions**, *by EuroSwac Project (UK); Host: ENSTA Bretagne*

**7PM - EXHIBITORS'S DRINK RECEPTION (EXHIBITION HALL) (BY INVITATION ONLY)**

## WEDNESDAY 28TH SEPTEMBER 2022

**9AM - PARALLEL SESSIONS**

- **France India Workshop on Ocean Technology towards advanced Knowledge and sustainable Development - PART 1**, *by IFREMER (France) and India national institute of ocean technology (NIOT) (India)*
- **Enabling Net-Zero through 5G at Sea**, *by JET Engineering System Solutions (UK)*
- **Esprit de Velox: one small step for seaman, one giant leap for mankind's maritime impact**, *by Esprit de Velox (France) and Bureau Veritas Marine & Offshore (France)*
- **HNS Spill prevention: study, inform and train**, *by CEDRE (France)*

**2PM - PLENARY SESSION #2: DATA CHALLENGES APPLIED TO MARITIME TRANSPORT**
**3.15PM - PARALLEL SESSIONS**

- **France India Workshop on Ocean Technology towards advanced Knowledge and sustainable Development - PART 2**, *by IFREMER (France) and India national institute of ocean technology (NIOT) (India)*
- **Energy Transition and Economic Sovereignty - Major Issues of Tomorrow for the Shipping Sector and its Banks**, *by CACIB: Crédit Agricole Corporate and Investment Bank (France) and Crédit Mutuel Arkea*
- **Distributing hydrogen from offshore wind farms as a fuel for ships**, *by France Energies Marines (France)*
- **Sedimentary environments and human activities: Management of dredged sediments, extraction of aggregates, marine renewable energy and sustainable ports**, *by Ifremer (France) (Joint session with the French Congress of Sedimentology)*

**7.30PM - GALA DINNER (LES CAPUCINS)**

## THURSDAY 29TH SEPTEMBER 2022

**9AM - PARALLEL SESSIONS**

- **The Concarneau meeting "Where industry meets science in marine biotechnology" - PART 1,** *by MNHN Concarneau (France)*
- **Technical innovations to reconciliate marine transportation and ecosystems**, *by Office Français de la Biodiversité (France), ISYEB, MNHN and LETG, UBO (France)*
- **Smarter, greener, cyber: why cybersecurity is vital for maritime transport**, *by France Cyber maritime (France)*
- **Challenges of increasing traffic at the poles: Antarctic/Arctic - PART 1**, *by UMR Amure/IUEM (France) and Institut Polaire Français (IPEV) (France)*

**2PM - PLENARY SESSION #3: EVOLUTION OF TRAINING AND JOBS IN MARITIME TRANSPORT**
**3.15PM - PARALLEL SESSIONS**

- **The Concarneau meeting "Where industry meets science in marine biotechnology"- PART 2**, *by MNHN Concarneau (France)*
- **Corrosion monitoring of concrete infrastructures in marine environment**, *by LabSTICC (France) and French Corrosion Institute (France)*
- **University of Plymouth's collaborative projects on Marine Cyber and Decarbonisation**, *by University of Plymouth (UK)*
- **Challenges of increasing traffic at the poles: Antarctic/Arctic - PART 2**, *by UMR Amure/IUEM (France) and Institut Polaire Français (IPEV) (France)*

## CONCARNEAU

## FRIDAY 30TH SEPTEMBER 2022

**9AM-6PM - CONCARNEAU**

- **The Concarneau meeting "Where industry meets science in marine biotechnology"**, *by MNHN Concarneau (France)*

# CONFERENCE PROGRAMME

MONDAY
26TH
SEPT.
2-6PM

PARALLEL SESSION

## ADAPT TO CLIMATE CHANGE | CONVENOR: CEREMA (FRANCE)

The effects of global warming on the coastline, ports and estuaries are already visible and are likely to increase if we do not react in measures to mitigate greenhouse gas emissions. Beyond climate change mitigation actions, territories as well as infrastructure managers and service providers will have to adapt to climate change, and sometimes, locally, in a way that is disruptive compared to what has been done until now.

The environmental transition of transport is an essential point in the mitigation of greenhouse gas emissions, because transport is the first concerned by gas emissions. This concerns both ports and inland waterways. Innovative solutions using new modes of propulsion or the use of data to reduce journeys are being studied.

## PROGRAMME

### OPENING

*Michel Cousquer*[102]

### FINDINGS AND PERSPECTIVES

› **Sea Level evolution scenarios,** *Régis Soenen*[102]

› **Sea and coastal French national strategy,** *Olivier Laroussinie*[102]

### MARITIME TRANSPORT AND ENVIRONMENTAL TRANSITION

› **Eco-designed ships and climate resilient naval shipyards,** *Gaëlle Rousseau*[3] *and Marie Lévêque*[3]

› **$CO_2$ capture system (CCS) on ship – Design and integration study of a post combustion technology on existing container ship in order to reduce CO2 emission and extend ship life,** *Valérie Cariou*[87]

› **Using digitalisation for decarbonisation of the shipping industry,** *Nitin Agarwala*[78]

### EVOLUTION OF THE COASTLINE

› **Coastline management: French call for partners,** *Amélie Roche*[102]

› **Impact of Climate Change on Coastal Morphological Evolution of Kadalur Periyakuppam coast, Tamilnadu using Geo-spatial Techniques and Field Measurements,** *Sankar Sellamuthu*[1], *Lokesh Thiagarajan*[1], *Abhishek Tavva*[1], *Kiran A. S.*[1], *and Vijaya Ravichandran*[1]

› **Mapping under French climate and resilience regulation,** *Marissa Yates*[102]

### PORT ADAPTATION AND MITIGATION MEASURES

› **« Port de Bordeaux » example,** *Fabrice Klein*[151]

› **Assessment of atmospheric carbon dioxide in seashore and port areas of east coast India,** *Madhusmita Dash*[1], *Anandasabari Karthikeyan*[1], *and Rajasekhar D.*[1]

› **Methodology of emission maritime shipping assessment,** *Vincent Nineuil*[102] *and Jean-Marc André*[152]

### CONCLUSION

**French report on ports and inland waterways adaptation to climate change; General overview of the session,** *Geoffroy Caude*[153]

MONDAY
26TH
SEPT.
2-6PM

PARALLEL SESSION

## AI IN METEOROLOGY AND OCEANOGRAPHY | CONVENORS: IMT ATLANTIQUE (FRANCE) AND RIKEN (JAPAN)

The main topic is the fusion of Data Assimilation (DA) with Artificial Intelligence (AI) in the fields of Meteorology, Oceanography, and Climate. The use of AI and statistical techniques such as neural networks in geophysics has a potential to enhance our knowledge and to improve physical models' performance by exploiting more from available observations and by accelerating DA workflow for real time response. This session aims to exchange ideas about potential future research on the fusion of DA and AI with HPC in the research fields of meteorology and oceanography for enhancing future collaborations between RIKEN (Japanese research agency) and IMT-Atlantique (Brest, France) based on the international agreement signed in 2019.

## PROGRAMME

› **RIKEN's activities on fusing AI and data assimilation in numerical weather prediction**,
*Takemasa Miyoshi[31], Arata Amemiya[31], Maha Mdini[31], and Jianyu Liang[31]*

› **Rainfall estimation for extreme events from SAR observations using deep learning models**,
*Aurélien Colin[12][17], Ronan Fablet[12][14], Pierre Tandeo[12], Romain Husson[17], and Charles Peureux[17]*

› **Algorithm development for the 3D precipitation nowcasting with deep learning**,
*Shigenori Otsuka[26][27][28], and Takemasa Miyoshi[26][27][28][29][30]*

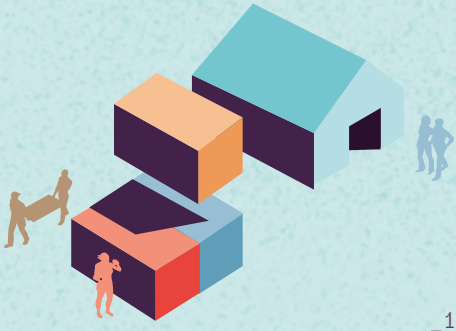
› **Ultra short-term wind forecasting for offshore wind operations and maintenance**,
*Robin Marcille[12][23], Pierre Tandeo[12], Maxime Thiebaut[23], Juan Emmanuel Johnson[24], Florence Lafon[23], Pierre Pinson[25], and Ronan Fablet[12][14]*

› **Data-driven data assimilation to better characterize climate projections: a case study with an idealized chaotic AMOC model**,
*Pierre Le Bras[12][18], Pierre Ailliot[19], Noémie Le Carrer[12][18], Juan Ruiz[20][21], Florian Sévellec[18][22], and Pierre Tandeo[12]*

› **A Machine Learning Approach to the Observation Operator for Satellite Radiance Data Assimilation**,
*Jianyu Liang[26], Koji Terasaki[26], and Takemasa Miyoshi[26]*

› **Fishing gears identification from artificial intelligence applied to geospatial data**,
*Francois Danhiez[15], Mathieu Woillez[16], and Julien Rodriguez[16]*

› **Monitoring In-Situ Wind Speed Using Underwater Acoustics and Deep Learning**,
*Matteo Zambra[12][14], Dorian Cazau[13], Nicolas Farrugia[12], and Ronan Fablet[12][14]*



MONDAY
26TH
SEPT.
2-6PM

PARALLEL SESSION

## INDO-FRENCH COOPERATION IN MARINE SCIENCES: OPPORTUNITIES AND MECHANISMS | CONVENORS: FRENCH INSTITUTE IN INDIA, FRENCH EMBASSY IN INDIA AND CNRS INDIA

In the current global village-like scenario, the societal challenges including health issues, demographic change, climate change, need for clean and efficient energy, smart and integrated transport, food security, and the bio-based economy, are all global. Addressing these challenges warrants answers that are also ought to be global and more importantly, there is a need for urgent solutions. — A significant increase in the global population over the recent decades, extreme industrialization, and increasing human wealth are exerting unprecedented burden on the ocean. Climate change, non-sustainable resource exploitation, pollution, and habitat degradation are leading to a rapid deterioration of good health and sustainable productivity of ocean. India and France both have an enormous coastline and the two nations are highly committed towards appropriate preservation of the marine environment with an objective of a sustainable development approach to coastal resources. — In this context, research in Marine Sciences is critical and will also contribute towards Blue Economy strategies outlines by both the governments. Indeed, both countries have put forward intentions of strengthening scientific cooperation. An efficient bilateral cooperation providing a link between basic research and industrial application is an absolute necessity to address these tasks. In the proposed session/workshop we will discuss the initiatives that the French and Indian government offer to consolidate the scientific cooperation to address the challenges in Marine Sciences, including the contribution of research organizations such as CNRS, Ifremer, IRD, CSIR, DST, DBT or MoES.

## PROGRAMME

### TOOLS FOR INDO-FRENCH COOPERATION

› **Introduction** *by Luisa Terranova*[227]

› **Blue economy and marine sciences in Indo-French bilateral cooperation,** *Olivier Fudym*[227]

› **Indo-French collaborations: the role of CNRS,** *Srini Kaveri*[228]

### SOME OPPORTUNITIES FOR INDO-FRENCH COOPERATION IN THE BLUE ECONOMY

› **Technologies for Ocean Observation and exploration,** *Dr. G A Ramadass*[1]

› **IFREMER, a marine science and technology research institution open to international cooperation,** *Natalia Martin Palenzuela*[16]

› **R&D in Marine Science & Engineering at IIT Goa,** *Prof. B.K. Mishra*[70]

› **Pôle Mer Bretagne Atlantique: a catalyst to serve the maritime innovation,** *Sébastien Cann*[208]

› **Blue Observer, sail-powered scientific platform,** *Amadeus Beaujolin*[97]

› **R&D mutualization to overcome the bottlenecks faced by Offshore Renewable Energy development,** *Yann Hervé De Roeck*[23] *and Jean François Filipot*[23]

### SOME EXAMPLES OF PROJECTS

› **Recent Indo-French Projects of Naval Group,** *Luc Martin*[48]

› **Indo-French collaboration in marine ecology: the example of LECOB CNRS/ CES IIS junction,** *Katell Guizien*[229] *and Kartik Shanker*[230]

› **Indo-French collaboration on tropical Indian Ocean oceanography & climate,** *Matthieu Lengaigne*[231] *and Jérôme Vialard*[232]

MONDAY
26TH
SEPT.
2-5PM

PARALLEL SESSION

## LOWER ENVIRONMENTAL IMPACT FOR THE NEW RESEARCH VESSEL OF FOF | CONVENOR: IFREMER (FRANCE)

The new regional vessel of the French Oceanographic Fleet will be the subject of an ambitious eco-design approach based on in-depth reflection on the stages of a campaign and their impact, and the choice of adjusted technical solutions, aimed at reducing its overall environmental footprint over its entire life.

The construction of the vessel should be carried out with a limited environmental impact. An open and modular design and the choice of innovative solutions will aim to operate the vessel with a reduction in $CO_2$ emissions of up to 60%, with a minimum commitment of 30% reduction compared to the current situation of a vessel of the same size. To achieve this, this vessel will aim to be a "low consumption" vessel, as well as the optimisation of the ship's operation.

## PROGRAMME

### PRESENTATION OF IFREMER'S APPROACH TO THE "LOW CONSUMPTION" SHIP

› **General presentation: approach and objectives,** *Sarah Duduyer*[16]

› **Round table with actors who took part in the approach,** *Louis Marié*[16], *François Perroud*[16], *Erwan Nedelec*[181], *and Sarah Duduyer*[16]; **Moderator:** *Arthur De Pas*[16]

### TECHNOLOGIES STUDIED TO REDUCE THE ENVIRONMENTAL IMPACT OF THE OCEANOGRAPHIC VESSEL

› **Presentation of the innovative technologies that could respond to the problem; and explanation of the proposed choices that can be applied to a semi-capacity Oceanographic Vessel,** *Laurent Mermier*[182]

### REDUCING THE ENVIRONMENTAL IMPACT OF OCEANOGRAPHIC MEASUREMENTS: OTHER CONCEPTS

› **USV approach: choice of robotics without human factors,** *Marc Nokin*[16]

› **Polar POD concept,** *Marc Nokin*[16]

MONDAY
26TH
SEPT.
2-6PM

PARALLEL SESSION

## SUSTAINABLE POLYMER MATERIALS FOR MARINE APPLICATIONS | CONVENOR: IFREMER (FRANCE)

This session will discuss the current status and future prospects of replacing current marine materials, particularly polymers and composites, with more sustainable alternatives. Two aspects will be discussed:

First, the options for reducing the environmental impact of structures such as floating vessels and their equipment (boats, ships, buoys, fishing gear...), which can be recovered at the end of their service life, will be presented. In this case the choice of improvements includes thermoplastic composites which can be recycled and biosourced polymers and fibers which have lower footprints and can be composted.

A second set of applications concerns structures which either risk accidental loss or are deliberately abandoned after service. In this case the ideal material will be completely biodegradable and leave no trace, and the options are more limited. The session welcomes contributions on both aspects.

## PROGRAMME

› **Natural fibre reinforcements,**
*Christophe Baley*[155]

› **Glass or grass? Combining assessment to compare conventional and biologically-based tidal stream turbine blades material data and life cycle,**
*Stuart Walker*[79]

› **SeaBioComp - The effect of recycling of self-reinforced PLA composites on mechanical properties and durability,**
*Elke Demeyer*[156]

› **How MerConcept is working towards the reduction of environmental impact of the maritime industry through collaborative projects,**
*Frédéric Loos*[157]

› **Natural ageing of biopolymer in marine environment,**
*Dalyal Copin, Guy César*[6]*, and Yves Grohens*[7]

› **Innovative filaments for fishing gear,**
*Louis Le Gué*[16]

› **Toward a sustainable Pearl farming industry: exploring new solutions to reduce plastic waste,**
*Margaux Crusot*[8]*, Tutea Richmond*[8]*, Cédrik Lo*[9]*, Jean-Claude Gaertner*[10]*, Marie-Joo Le Guen*[11]*, and Nabila Gaertner-Mazouni*[8]

MONDAY
26TH
SEPT.
2-6PM

PARALLEL SESSION

## INSTALLATION, OPERATION AND MAINTENANCE OF TIDAL TURBINES IN COMMERCIAL PROJECTS: HOW CAN THE TRANSPORT AND LOGISTICS SUPPLY CHAIN CONTRIBUTE TO A REDUCED COST OF TIDAL ENERGY PRODUCTION | CONVENOR: TIGER PROJECT

In the context of European Union climate and energy targets for 2030 and an increasingly tense global energy context the development and industrialisation of renewable energy sectors has become more urgent. Lowering the Cost of Energy (LCOE) is one of the major objectives of the tidal energy sector today to put it on a level footing with other energies in the future.

So what will commercial projects in the tidal sector look like in 2030? Will a transition from individual pilot projects to larger arrays will bring its own economies of scale? And how can transport contribute to the reduction of the cost in this horizon?

During the workshop, site developers, logistics providers and transporters will give us their views on future trends and expectations, suggest where possible costs reductions may come from and flag up the challenges that the sector will face.

Speakers will include TIGER project partners Morbihan Hydro Energies, Sabella and Normandie Hydroliennes, Shipping and logistics provider Inyanga and representatives from the Belgian Offshore Wind Renewable Energy Cluster in Oostende in Belgium.

## PROGRAMME

**INTRODUCTION,** *by Hélène Morin[252], Head of the European affairs department*

› **ORE Catapult - Supply chain development : Tiger project lessons learnt,** *Simon Cheeseman[2], TIGER project coordinator*

› **Morbihan Hydro Energies - site developer,** *Thomas Archinard[4], Project manager*

› **Normandie Hydroliennes - site developer,** *Steve Allsop[234], Loads & Modelling Engineer*

› **Inyanga Maritime - logistics providers,** *Richard Parkinson[261], General manager*

MONDAY
26TH
SEPT.
2-5.30PM

PARALLEL SESSION

## WHAT DOES THE IMO E-NAVIGATION S-100 BRING TO MARITIME TRANSPORT? | CONVENOR: SHOM (FRANCE)

Maritime transport is facing key challenges: densification of traffic, port congestion, cyber security threats, digital and ecological transitions. Environmental data combined with new technologies are the source of new services that will partly address these challenges.

The IHO "S-100" standard is the new standard describing the environment for digital navigation, adopted by the International Maritime Organization. It is considered as a digital revolution in the maritime sector, providing answers to both the challenges of modern e-navigation and the sustainable development of maritime activities.

As part of the S-100 implementation decade (2020-2030), this session is dedicated to innovations brought by digital data and services to navigation and maritime transport. Accessible and interoperable data is supporting informed decisions. Collecting and sharing large amount of data, including real-time data, is also a challenge for hydrographic services, ports and maritime companies. Standardization is vital to ensure integrity and usability of these data. Academic research and industry will keep playing a key role in the development of future intelligent systems, on board of ships and ashore, towards a safer navigation, more efficient and more concerned with the preservation of the marine environment.

**This session is an opportunity to debate around important questions in this fast-moving environment, including: What innovations does the S-100 data service standard support?**

› How can we use digital environmental data and technologies to support maritime transport safely co-existing with all other maritime activities?

› As a new standard, its adoption at the international level requires a coordinated cooperative effort. How can we contribute to this?

## PROGRAMME

### OPENING

*Nathalie Leidinger*[162]

### S-100 IMPLEMENTATION DECADES (2020-2030), TOWARDS NEW DATA AND SERVICES

› **S-100 data services in support of innovation,** *Ronan Pronost*[162]

› **S-100 across the Channel,** *Thomas Richardson*[171] *and Christian Mouden*[162]

› **Regulatory approach, impact on-board equipment,** *Laurent Legoux*[202]

› **Feedback from a first S-100 implementation in an ECDIS,** *Yann Corlay*[172]

### SEAFARERS APPROACH OF FUTURE E-NAVIGATION SYSTEMS

› **Involvement of digital systems in officer of the watch tasks,** *Yann Vachias*[58]

› **Navy's perspectives,** *Ludovic Martinez*[173]

› **S-100 : an additional tool for marine pilots,** *Pavel Pereira*[174]

TUESDAY
27TH
SEPT.
9.30AM-12PM

PARALLEL SESSION

## LATEST INNOVATIONS FOR TOMORROW'S GREENER AND SMARTER MARITIME TRANSPORT | CONVENOR: PÔLE MER BRETAGNE ATLANTIQUE (FRANCE)

Pôle Mer Bretagne Atlantique is a competitiveness cluster dedicated to maritime innovation located in the west of France, in Brest. It supports companies and research laboratories in their willingness to set up innovative and collaborative projects from the idea to funding.

Maritime transport and its related activities represent an important part of the projects that have been launched in recent years notably in relation with green ship, smart ship, ports, ship routing, etc. This Sea Tech Week session aims to highlight the innovations carried out by Pôle Mer's members around these fundamental subjects.

First, Erwan Jacquin, project manager at the French Maritime Cluster will present the assets, issues and challenges of the sector. Then project leaders will present their projects and debate during 2 round tables around these topics. The session will end with a presentation of the European project iFADO which is dealing with new technologies for the management of High Seas. The objective is to show the importance of these innovations for maritime transport in preserving the environment and achieving the good ecological status targeted by the Marine Strategy Framework Directive.

## PROGRAMME

**INTRODUCTION,**
*by Anais Turpault*[208]

› **Maritime transport sector overview: assets, issues and challenges,** *Erwan Jacquin*[213]

**ROUND TABLE 1: INNOVATION FOR A GREENER AND SMARTER SHIP**

› **Moderated by** *Boris Teillant*[208]
*Sylvain Faguet*[188], *Luc Ferral*[209], *Geoffroy Lacoin*[210], Representative of Z&B or Chantiers de l'Atlantique (to be confirmed)

**ROUND TABLE 2: INNOVATION FOR A GREENER AND SMARTER PORT** *Alain Puillandre*[211], Representatives from Fastpoint, Sinay, and Port of Brest or GPMNSN (to be confirmed)

› **Impact of maritime transport on the deep ocean: chasing the Good Environmental Status,** *Francisco Campuzano*[212]

TUESDAY
27TH
SEPT.
9AM-12.15PM

PARALLEL SESSION

## MARINE LITTER: SOLUTIONS FOR MONITORING, MITIGATION AND PREVENTION - PART A AND B | CONVENORS: IEEE-OES AND LABORATORY FOR OCEAN PHYSICS AND SATELLITE REMOTE SENSING (LOPS) (FRANCE)

While quantitative information on production and use of plastics is to some extent available, the amount and fate of plastics discarded or leaked into the environment is highly uncertain. In particular, knowledge of how much plastics, at different scales down to micro and nano levels, reaches the ocean and the pathways and fate of such plastic in the ocean remain poorly known. A focus is needed on how science and technology could quantify the pervasiveness of marine pollution and facilitate an understanding of the mitigating impact of reducing the stock of plastics in the ocean. The goals for meeting such a challenge go through the determination of a strategy for monitoring marine litter in the ocean and develop solutions for addressing the problem.

The session will be divided in four parts. The oral presentations are set for 15', and the posters' ones (magenta highlighted) for 10 minutes, in order to let rooms for discussions. The posters presentation will be interspersed with the oral ones for giving more visibility, and allowing more interactions.

## PROGRAMME

### PART A: KNOWING WHERE AND HOW MUCH

› **Distribution of marine plastics in surface waters of Northern Indian Ocean,** *Janakiram Reddy[1], Keerthivasan Ramasamy[1], Janani R[1], M V Martin[1], Ramasundaram Subramanian[1], Latha Ganesan[1], and Venkatesan Ramasamy[1]*

› **Tools for the monitoring of micro and macro plastics at sea,** *Marc Pavec[68], Sébastien Smet[68], and Fanny Chenillat[68]*

› **WERA HF Radar to support monitoring of marine litter and pollutants,** *Roberto Gomez[69], and Sebastien Smet[68]*

› **[POSTER] Remote Sensing Spectral Visibility of Plastics under laboratory conditions,** *James Delaney[81][111]*

› **Towards the use of the giant clam T.maxima, as a biological integrator of environmental contamination in French Polynesia,** *Irène Godéré[8], Tiare Belamy[8], Jean-Claude Gaertner[10], Magalie Baudrimont[71], and Nabila Gaertner-Mazouni[8]*

### PART B: WHERE DOES IT COME FROM?

› **Quantifying the Use Chains of Plastics and the Sources of Plastic in the Ocean,** *Hans-Peter Plag[72][73], and Daniel Martin[72]*

› **[POSTER] Fish & Click: how participatory science helps to map and inventory lost fishing gear,** *Marie Morfin[16], Fabien Morandeau[16], Sonia Méhault[16], and Dorothée Kopp[16]*

› **Towards a new decision support tool for marine litter monitoring in the eastern English Channel,** *Sloane Bertin[77], Alexei Sentchev[77], and Elena Alekseenko[77]*

› **Deep Learning approaches to simulate Lagrangian particle dynamics at sea surface,** *Daria Botvynko[74], Carlos Granero-Belinchon[12], Abdesslam Benzinou[74], Ronan Fablet[12][14], and Simon van Gennip[76]*

› **[POSTER] Monitoring and modelling the circulation of marine debris in Indonesia,** *Christophe Maes[18], Tonia Capuano[106], Delphine Dobler[18], Claire Dufau[17], Riza Farhan[107], Olivia Fauny[17], Budhi Gunadharma Gautama[107], Marine Herrmann[106], Ariane Koch-Larrouy[106], Marc Lucas[17], Elodie Martinez[18], Rinny Rahmania[107], Jean-Baptiste Voisin[17], Emilie Strady[108], Yannis Cuypers[109], and Edmond Dounias[110]*

TUESDAY
27TH
SEPT.
9AM-12PM

PARALLEL SESSION

# NAVIGATION AND CONTROL OF UNDERWATER VEHICLES PART 1 | CONVENORS: INDIAN INSTITUTE OF TECHNOLOGY (IIT) GOA (INDIA) AND NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR (INDIA)

In the recent years, research on navigation and control of Autonomous Underwater Vehicles (AUVs) has become challenging for scientific and economic reasons in view of their several applications e.g. deep-sea operations, off-shore installations inspection, mapping of sea floor, environmental data gathering and sampling, and defence.

This special session is intended to invite research contributions made by peers actively involved in navigation and control of AUVs addressing issues such as communication constraints in acoustic medium, uncertainties and disturbances. In the last decade, the new area of research has emerged related to cooperative control between several marine vehicles and heterogeneous marine vehicles.

## PROGRAMME

**SESSION CHAIR** *Dr. Koena Mukherjee[31]*

› **Guest Lecture "Control of Autonomous Underwater Vehicles",** *by Prof. Bidyadhar Subudhi[70]*

› **Heading Control of an Autonomous Underwater Vehicle using Unfalsification Approach,** *Tabassum Rasul[31], and Koena Mukherjee[31]*

› **Performance analysis of Doppler-shift estimation and time of flight algorithm for AUV positioning and navigation,** *Raphaël Garin[32], Pierre-Jean Bouvet[32], Beatrice Tomasi[32], Philippe Forjonel[32], and Charles Vanwynsberghe[32]*

› **Underwater exploration by an autonomous robot with the method of stable cycles,** *Luc Jaulin[13]*

› **AUV deep navigation challenges,** *Hélène Tonchia[34], and Sébastien Tauvry[34]*

› **Intelligent Robot Exploration by integrating onboard processing capabilities,** *Rafael Garcia[35], Narcis Palomeras[35], Jan Opderbecke[16], Aurélien Arnaubec[16], Josep Quintana[16], and Natàlia Hurtós[37]*

› **R&D Activities on Marine Science & Technology at IIT GOA,** *by Prof. B.K.Misra[70], Director*

› **R&D Activities on Marine Science & Technology at NIT Silchar,** *by Prof. S. Bandyopadhyay[31], Director*

TUESDAY
27TH
SEPT.
9.30AM-
12.30PM

PARALLEL SESSION

## NEW FUELS: BEHAVIOR IN AQUATIC ENVIRONMENTS AND RESPONSES TO ACCIDENTAL SPILLS | CONVENOR:CEDRE (FRANCE)

Synthesis of the behavior in aquatic environment and the risks in terms of transport by sea of new fuels (Ammonia; LSFO: Low Sulphur Fuel Oil; VLSFO: Very Low Sulphur Fuel Oil; ULSFO: Ultra-Low Sulphur Fuel Oil; HVO: Hydrotated Vegetable Oil; LNG: liquefied natural gas; etc), whether they are used for the propulsion of ships or for the supply of distribution plants. Presentation of the European IMAROS project (new generation of LSFO).

## PROGRAMME

**Introduction and Cedre presentation,**
*by Christophe Logette[199], Director*

› **Improving response capacities and understanding the environmental impacts of new generation low sulphur MARine fuel Oil Spills (IMAROS),** *Fanny Chever[199]*

› **Fate, Behaviour and Impact Assessment of New Generation of Biodiesels and Biofeedstocks in Case of an Accidental Spill,** *Ronan Jézequel[199]*

› **Ammoniac and LNG,** *Olivier Gentilhomme[200]*

TUESDAY
27TH
SEPT.
9.30-11.30AM

PARALLEL SESSION

## OPPORTUNITIES OFFERED BY HYDROGENE IN THE MARITIME WORLD | CONVENOR: BRETAGNE DÉVELOPPEMENT INNOVATION (BDI) (FRANCE)

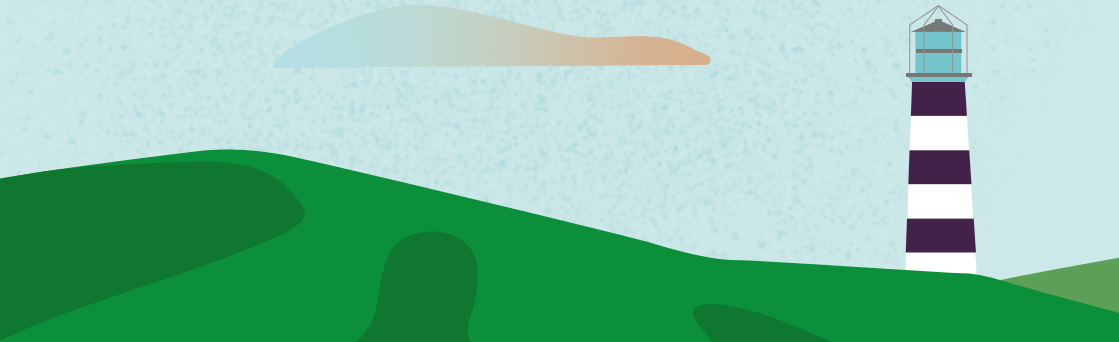
Decarbonization of maritime transport and hydrogen. Two round tables will focus on shipbuilding and hydrogen technologies, and the ecosystems needed for hydrogen shipbuilding.

## PROGRAMME

**MODERATOR:** *Jennifer Ramsay, Green Talk*

› **Round table on shipbuilding and hydrogen technologies with two shipyard owners,** *Yannick Bian[175] and Louis-Noël Vivièss[214]*

› **Round table on the ecosystems needed to make Brittany a leading region in France and Europe for hydrogen shipbuilding,** *Bruno Paris (to be confirmed)[142], Olivier Ticos[176] and Philippe Thieffry[177]*



TUESDAY
27TH
SEPT.
9AM-12.20PM

PARALLEL SESSION

## UNDERWATER NOISES: UNDERSTANDING AND PREVENTING IT - PART 1 | CONVENORS: IEEE OES FRANCE CHAPTER (FRANCE), INSTITUT FRANCE-QUÉBEC MARITIME (FRANCE-CANADA) AND TECHNOPOLE MARITIME DU QUÉBEC (CANADA)

In the past hundred years, the anthropogenic noise introduced into the marine environment has reached unprecedented levels. Effects of shipping noise on individuals and populations range from communication masking, behavioural disturbance. Production of stress hormones, etc. which consequently negatively affect both the animal individual fitness and population dynamics.

The purpose of this session concerns, on the one hand, all the systems or methods enable to prevent or reduce the pressure of shipping Underwater Radiated Noise (URN) on the marine environment and, on the other hand, all the methods allowing the quantification of the URN level. The latest advances in marine acoustics research will be presented: passive and active acoustics, impacts of anthropogenic noise on marine organisms (from invertebrates to marine mammals) and also at ecosystem level. Various stakeholders will be likely to participate in this session: researchers, manager of natural environments, public decision makers, entrepreneurs, shipping companies, etc.

## PROGRAMME

› **Plenary talk on "The acoustic world of silence",** *by Cédric Gervaise[55]*

› **Plenary talk on the project Life PIAQUO,** *by Eric Baudin[53]*

› **SubSea Quieter® Pile Driving: A disruptive, low cost and highly efficient Noise Mitigation System,** *Céline Drouet[56], Damien Demoor[56], Damien Marigliano[56]*

› **PIAQUO: practical implementation of the European project AQUO,** *Christian Audoly[48], Philippe Courmontagne[48], Laetitia Roux[48], Eric Baudin[53], Thomas Folegot[54], and Cedric Gervaise[55]*

› **On the role of the tailored Green's function within underwater radiated ship noise prediction,** *Nicolas Trafny[48], Gilles Serre[48], Benjamin Cotté[49], and Jean-François Mercier[50]*

› **SHIP URN: UNIGE activities in the context of LIFE-PIAQUO Project,** *Stefano Gaggero[51], Tomaso Gaggero[51], Giorgio Tani[51], Diego Villa[51], Enrico Rizzuto[51], and Michele Viviani[51]*

TUESDAY
27TH
SEPT.
9.15AM-12PM

PARALLEL SESSION

## WIND PROPULSION: BLENDING REGIONAL INITIATIVES, NATIONAL DEVELOPMENTS, AND INTERNATIONAL NETWORKS FOR SUSTAINABLE SHIPPING - PART 1 | CONVENOR: INTERNATIONAL WIND SHIP ASSOCIATION AND BRETAGNE DÉVELOPPEMENT INNOVATION (BDI) (FRANCE)

Wind propulsion has a significant air and noise pollution reduction impact and three key trends are developing within the sector: tweaking (retrofitting of existing vessels with wind propulsion systems), transition (replacement with wind optimised wind-assist & primary wind vessels) and transformation (replacement of existing vessels with primary wind vessels). These trends are at different stages of development; however they hold various levels of promise across numerous SDG objectives especially in the smaller vessel segments with the return of fuel costs into local economies, the opportunities to revitalise smaller ports, reduce pressure on fisheries and revitalise local shipping services and employment.

This is the vision we are trying to put into action with the International Windship Association, the French Wind Ship Association, Bretagne Developpement Innovation and the "Région Bretagne". Local communities of industrial groups, start-ups, ports, local government, academics and civil society driven by IWSA, IWSA hub, and BDI are part of a French, European and global network of wind propulsion ecosystems of innovators and enablers. This is leading to a reemergence of wind propulsion as a major technology development in 21st shipping that should be shared worldwide.

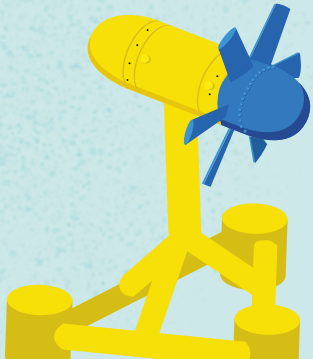
### PROGRAMME

**INTRODUCTION,** *by Lise Detrimont[183] and Carole Bourlon[177]*

› **Panel discussion "The example of existing or emerging Wind shipbuilding sector in South India and Brittany (France)" - Testimonies on the maritime wind power industry sector: regional dynamics that are maintained or emerging, Innovative Wind Assist Propulsion cum Wind energy Harvester System for Ships/Boats,** *Sandip Patil[45] (recorded presentation) Carole Bourlon[177], Denis Vidal[184], Sandith Thandasherry[185], Philippe Pallu[186] and Arthur Landormy[187]*

› **Smart Shipping: weather routing and WASP simulation,** *David Gómez-Ullate[46], Daniel Precioso[46], Francisco Amor[46], Javier Jimenez de la Jara[46], and Victor Gallego[47]*

› **Presentation of a seafarers training project,** *Maël Le Garrec[188], Thomas Omnes[189], and Lise Detrimont[183]*



TUESDAY
27TH
SEPT.
1.45-3PM

PLENARY SESSION#1

# NEW PROPULSION SYSTEMS FOR LOW-CARBON SHIPPING

Plenary sessions consist in a 1h-panel discussion about prospective topics regarding maritime transport. High-level panellists from Campus mondial de la mer community, national and international organisations will exchange and give their views according to whether they come from research centre, academia, company or public institution.

## PROGRAMME

**SEA TECH WEEK® OFFICIAL OPENING**

**ROUND-TABLE DISCUSSION**

*Jacques Barreau, CEO, Grain de Sail, France*

*Jason A. MacFarlane, CEO, Hyke, Norway*

*Jérôme Majcher, R&D Process Engineer, IFP Energies nouvelles, France*

**> The plenary sessions are organised together with:**

Cluster Maritime Français
*Cap sur la croissance bleue*

WISTA FRANCE

Armateurs de France

TUESDAY
27TH
SEPT.
3.30-6.30PM

PARALLEL SESSION

## GREENER MARITIME TRANSPORTS (FRENCH-NORWEGIAN SESSION) | CONVENORS: INNOVATION NORWAY, CHAMBRE DE COMMERCE FRANCE-NORVÉGIENNE AND AMBASSADE ROYALE DE NORVÈGE EN FRANCE

Presentation of the newest solutions, trends and discuss opportunities for bilateral cooperation and funding mechanisms of innovative projects, also within EU frame. Main topics to be addressed: battery-powered, hydrogen, ammonia, hybrid, retrofit...

## PROGRAMME

**OPENING** *by H.E. Niels Engelschiøn, Norwegian Ambassador to France*

**KEYNOTE – Decarbonation of the Norwegian Maritime industry and opportunities for bilateral cooperation** *by Daniel GARDEN – CEO of the GC Blue Maritime Cluster*

**ROUND TABLE – Bilateral technological cooperation on greener propulsion solutions; themes: Hydrogen, ammonia, hybrid, sail, retrofit... for Ferries and Cargos.** *Panellists: representatives from Kongsberg, Pôle Mer Bretagne Atlantique, Naval Group, etc.*

**ROUND TABLE – Financing Green Innovative solutions for the maritime industry; Themes: French, Norwegian, European public, and private funding mechanisms**

› **Pitch of Norwegian innovative solutions**

TUESDAY
27TH
SEPT.
3.30-6PM

PARALLEL SESSION

## HIGHLY-EFFICIENT INNOVATIVE WATER-BASED SEA WATER AIR CONDITIONING SOLUTIONS | CONVENOR: EUROSWAC PROJECT (UK); HOST: ENSTA BRETAGNE

SWAC (Sea Water Air Conditioning) at a glance: It is a technology based on thermodynamics principles using the hydrographic system. It is made to produce thermal energy dedicated to buildings (air conditioning heat/climatization, hot water) or for industrial processes (cold rooms, drying, ice production, etc.).

While the need for cooling in coastal regions and ports is increasing, cooling is still mainly produced through chillers, a technology using large amounts of electricity generated partially by fossil fuels, slowing down the ability to meet EU energy-climate objectives. Sea Water Air Conditioning cooling technology requires often to work closely with the maritime industry to develop innovation technology aspects such as self-burying system, flexible pipe concept, corrosion potential, and temperature data logger, etc.

## PROGRAMME

› **Mitigation, Adaptation, Resilience: Understanding the SWAC Climate Risk and Response,**
*Shrey Goyal[84], and Bruno Garnier[85][86]*

› **Environmental impact assessment and identifying the governments' environmental regulations for the development of a group of shallow water-based Sea Water Air Conditioning systems in the English Channel area,**
*Amir Bordbar[81], Konstantinos Georgoulas[81], Ming Dai[81], Simone Michele[81], Frank Roberts[82], Nigel Carter[82], and Yeaw Chu Lee[81]*

› **Sea Water Air Conditioning (SWAC) optimisation solutions for the maritime facilities,**
*Aleksandra Zawalna-Geer[79], Prathyush P. Menon[79], Lars Johanning[79], and Jean-Yves Pradillon[80]*

› **SWAC innovations to increase the installation and materials profitability while limiting impact on the environment (self-burying innovation and flexible pipe innovation),**
*Bruno Garnier[85] and Benjamin Rousse[126]*

› **Can effluent from Seawater Air Conditioning (SWAC) be used in aquaculture?,**
*Theo Johns[83], and Emma Theobald[83]*

› **The Upscaling of SWAC systems from a Circular Economy Perspective,**
*Jamie Wheaton[79], Allen Alexander[79], Aleksandra Zawalna-Geer[79], and Lars Johanning[79]*

TUESDAY
27TH
SEPT.
3.30-6.30PM

PARALLEL SESSION

# MARINE LITTER: SOLUTIONS FOR MONITORING, MITIGATION AND PREVENTION - PART C AND D | CONVENORS: IEEE-OES AND LABORATORY FOR OCEAN PHYSICS AND SATELLITE REMOTE SENSING (LOPS) (FRANCE)

See abstract page 21.

## PROGRAMME

### PART C: PREVENTING AND REDUCING

› **Deep learning-based approaches to detect floating marine debris for reducing marine pollution,** *Ramnath Prabhu Bam[70], Rajesh Prabhu Gaonkar[70], and Clint Pazhayidam George[70]*

› **Preventing Plastic Pollution – a catchment based approach to reducing the stock of plastics in the ocean,** *John Iwan Jones[60], Gaël Durand[61], Gloria Francalanci[62], Rozenn Lhermitte[63], Kim Goonesekera[64], Oumayma Airiau[65], Gwen Mainwaring[66], and Marie-Amélie Neollier[67] and the Preventing Plastic Pollution Consortium*

› **Managing marine pollution by using Artificial Intelligence,** *Nitin Agarwala[78]*

› **An agent-based modelling approach for maritime plastic recovery optimization,** *Loic Salmon[32], and Thierry Le Pors[32]*

### PART D: PANEL SESSION ON COMMUNICATION AND DECISION SUPPORT

› **Towards Mitigation of Marine Litter: Increasing Social Capital Through an Ecosystem of Virtual Community Centers for Marine Litter,** *Hans-Peter Plag[72][73]*

**[POSTER] Environmental Stewardship of the Data Buoy Cooperation Panel,** *Karen Grissom[103], Boris Kelly-Gerreyn[104], and Long Jiang[105]*

TUESDAY
27TH
SEPT.
3.30-6PM

PARALLEL SESSION

## NAVIGATION AND CONTROL OF UNDERWATER VEHICLES - PART 2 | CONVENORS: INDIAN INSTITUTE OF TECHNOLOGY (IIT) GOA (INDIA) AND NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR (INDIA)

See abstract page 22.

## PROGRAMME

**SESSION CHAIR:** *Prof. Bidyadhar Subudhi[70]*

› **Video Lecture,** *by Dr. Antonio Poscoal[154]*

› **Optimization of Underwater Acoustic Communication Parameters for a Swarm of AUVs,** *Camila M. G. Gussen[12], Christophe Laot[12], and François-Xavier Socheleau[12]*

› **Star tracking for low altitude positioning,** *Loïc Barbot[38], Marc Ferrari[39], Johan Montel[40], Yannick Roehlly[41], Jean-Luc Gach[39][42], William Thuillot[43], and Kjetil Dohlen[39]*

› **AUV navigation & sparse LBL: from the planning to the post processing of navigation data,** *Ludovic Bazin[44]*

TUESDAY
27TH
SEPT.
3.15-6.30PM

PARALLEL SESSION

## UNDERWATER NOISES: UNDERSTANDING AND PREVENTING IT - PART 2 | CONVENORS: IEEE OES FRANCE CHAPTER (FRANCE), TECHNOPOLE MARITIME DU QUÉBEC (CANADA) AND INSTITUT FRANCE-QUÉBEC MARITIME (FRANCE-CANADA)

See abstract page 25.

## PROGRAMME

› **Plenary talk on the MARS project: the Marine Acoustic Research Station (MARS) project: a unique infrastructure to determine the noise generated by ships and search for mitigation solutions,** *by Guillaume St-Onge[179] and Sylvain Lafrance[179]*

› **MARS project contribution: Detection of propeller cavitation with non-intrusive methods thanks to measurement of in board vibration,** *Kamal Kesour[178]*

› **MARS project contribution: Potential mitigations of ship noise with simultaneous measurements of underwarter radiated noise and in board vibration,** *Jean-Christophe Gauthier-Marquis[178]*

› **Silence of Global Oceans: Acoustic Impact of COVID-19 Lockdown,** *Artash Nath[57]*

› **Underwater noises monitoring using DORI underwater acoustic recorders,** *Caroline Magnier[52]*

› **Experimental study and control of a hydrofoil generating a tonal noise,** *Paul François[58], Jacques-André Astolfi[58], and Xavier Amandolese[59]*

TUESDAY
27TH
SEPT.
3-6.15PM

PARALLEL SESSION

# WIND PROPULSION: BLENDING REGIONAL INITIATIVES, NATIONAL DEVELOPMENTS, AND INTERNATIONAL NETWORKS FOR SUSTAINABLE SHIPPING - PART 2 | CONVENORS: INTERNATIONAL WIND SHIP ASSOCIATION AND BRETAGNE DÉVELOPPEMENT INNOVATION (BDI) (FRANCE)

See abstract page 26.

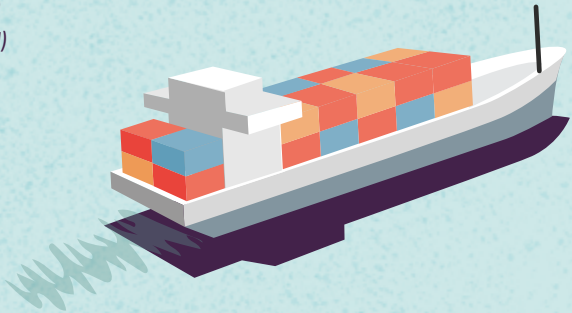
## PROGRAMME

› **Working group "Call to action part: how to include wind propulsion in my projects? Wind propulsion for retrofitting: opportunities/ obstacles",** *Gavin Allwright[190] and Romain Grandsart[191]*

› **Working group "Call to action part: how to include wind propulsion in my projects? Wind propulsion implementation for small vessels (even fishing vessels)?,** *Gavin Allwright[190], Simon Wattin[192] and Denis Juhel[193]*

› **Working group "Call to action part: how to include wind propulsion in my projects? Wind ship & newbuild pathways; what are the key points for a successful project?",** *Gavin Allwright[190] and Guillaume Le Grand[194] (to be confirmed)*

› **Key challenges of decarbonisation, general wind propulsion potential and the solution pathways under consideration,** *Gavin Allwright[190], Jose Matheickal[195] (recorded presentation), Vincent Bernatets[197], Lise Detrimont[183], Daniel Cueff[198], and representative from Bureau Veritas France OR Bureau Veritas Solutions[53]*



WEDNESDAY
28TH
SEPT.
9.30-10.45AM

PARALLEL SESSION

## ENABLING NET-ZERO THROUGH 5G AT SEA | CONVENOR: JET ENGINEERING SYSTEM S OLUTIONS (UK)

With the world's push towards Net-Zero, transport is a key sector working to cut greenhouse gas emissions at a rapid pace. Global mobile coverage - on land and at sea - has the potential to aid in such decarbonisation. Telecommunications have obvious benefits of increased collaboration between people and organisations, as well as greater awareness and ability to study the environment. However, implementing 5G infrastructure at sea also brings with it the opportunity to deliver tailored, real time data, specific to maritime industry needs. The collection of data at this scale can not only show evidence of carbon reductions, but can provide insight into how certain areas can be made more efficient.

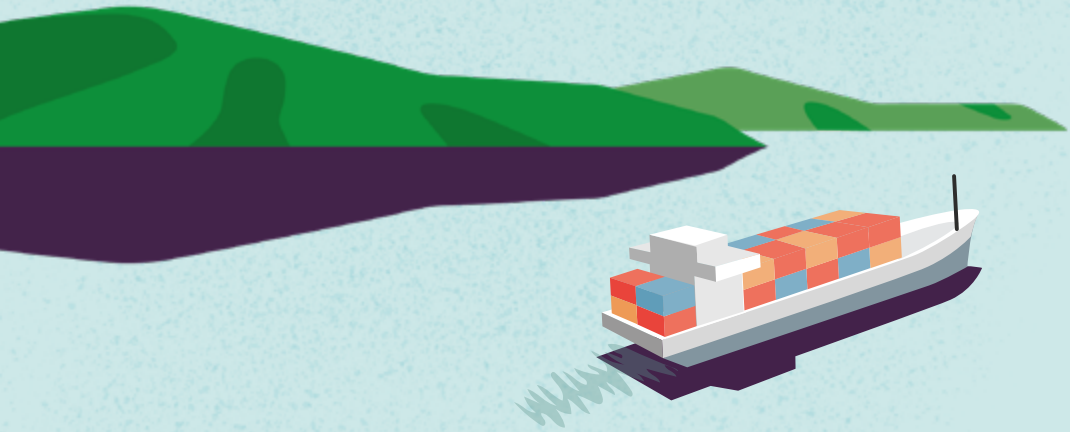
This session will go into detail on development, challenges and subsequent applications of the emerging technology of 5G at sea, showing how the move to industry 4.0 in off-grid environments can enable substantial decarbonisation of the transport and energy production industries. The utilisation of these sensor packages can extend beyond aiding in more sustainable transport and energy. It has the potential to help in the sustainability of food production in industries such as fishing and aquaculture, measuring anthropogenic impacts on marine environments, and enforcing Marine Protected Areas (MPAs) which can aid industries in carbon-offsetting.

Attendees from across all maritime based sectors, including ports and shipping, offshore energy, aquaculture, and safety, are encouraged to join the session to explore this new maritime connectivity solution and how it will support you. Attendees will also be invited to share thoughts, feedback and questions during the session.

## PROGRAMME

› **5G at sea Sustainable Solutions,** *Erin Browne*[233]

› **5G at Sea in Industry,** *Maxim Ruffels*[233]



WEDNESDAY
28TH
SEPT.
8.45AM-
12.30PM

PARALLEL SESSION

## ESPRIT DE VELOX: ONE SMALL STEP FOR SEAMAN, ONE GIANT LEAP FOR MANKIND'S MARITIME IMPACT | CONVENORS: ESPRIT DE VELOX (FRANCE) AND BUREAU VERITAS MARINE&OFFSHORE (FRANCE)

Endorsed by the UN Decade of Ocean Science, Esprit de Velox is a Responsible Research and Innovation programme that crosses the scientific world's requirement and the vision carried out by the companies engaged in the maritime ecological transition.

› 30 crucial years for climate and biodiversity,
› Emerging of the Ocean's key role in the metamorphosis of the Earth system,
› Shared need for an exemplary scientific presence at sea,
› Need to collect clean data and produce interdisciplinary knowledge from the vessel itself.

These are both the observations and ambitions that are guiding an extraordinary path to the 70-metre ocean-going, positive impact vessel, designed to embark 50 people on board for transdisciplinary research campaigns from pole to pole, on the front line of climate and biodiversity.

### PROGRAMME

› **The path to Esprit de Velox: need for interdisciplinarity in Ocean Science and quest of Zero Operational Impact Research Vessel,** *François Frey[216] and Chloé Le Cam[216]*

› **R&D Inductions: brut Zero CO2, GHG, waste; energy selfproduction and autonomy; noise reduction; and recyclable composites,** *François Frey[216] and Eric Baudin[53]*

› **R&D Method: interdisciplinarity; building a community for the communities; anticipating the regulation needs; and agenda of the programme,** *François Frey[216] and Chloé Le Cam[216]*

› **Round table: "Which pertinence and why contributing to Esprit de Velox?" Ambitions and opportunities of transition in maritime activities, from market transformation to science-based strategy,** *Roland Dubois[217], Sofien Kerkeni[188], Jan-Christoph Napierski[218], Julien Ollivier[219], Ziad Tarabay[202], and representatives from Akema and Bureau Veritas*

› **Scientific issues: Needs/expectations for Brut Zero Research Vessels; and current limitations,** *Jean-François Bourillet[16] and Laurent Chauveau[220]*

› **Social impacts: Resonance with the EDV vision; engaging early career scientists; ocean field community; and building the science/industry/education cooperation from the boat,** *Marie-Noëlle Rimaud[221][222]*

› **"What Ziphia tells us": study case from the dead body of a whale: building the community; Involving the parties; practical issues and impact for sonar trials at sea; elaborating the Esprit de Velox embarked research process,** *Gaëlle Rousseau[48] and Jérôme Spitz[223]*

› **Scientific projection at sea: the Atlantic 100 mission, 100 days at sea from tropical to polar zones: brut Zero CO2, URN and onboard interdisciplinarity issues,** *Nadia Deckert[224] and Laurent Chauveau[220]*

› **Round-table: "The quest of a Zero Impact Ocean Science" Ambitions and opportunities,** *Patricia Ricard[225], Jean-François Bourillet[16], Frederic Menard[110] or Eric Machu[110], Frederic Olivier[130], and Brett Phaneuf[226]*

WEDNESDAY
28TH
SEPT.
8.30AM-12PM

PARALLEL SESSION

# FRANCE INDIA WORKSHOP ON OCEAN TECHNOLOGY TOWARDS ADVANCED KNOWLEDGE AND SUSTAINABLE DEVELOPMENT - PART 1 (UNDERWATER VEHICLES AND INSTRUMENTATION) | CONVENOR: IFREMER (FRANCE) AND INDIA NATIONAL INSTITUTE OF OCEAN TECHNOLOGY (NIOT) (INDIA)

A session gathering scientists and engineers from France and India to discuss avenues for cooperation in marine science and technologies, echoing the bilateral roadmap on the blue economy and ocean governance which has been established in the wake of the French government's Indopacific strategy and the government of India's Deep Ocean Mission program.

Topics: Underwater Vehicles and Marine Instrumentation (including sensors, instruments/tools, systems for ocean exploration); Ocean Observation Platforms and Data Acquisition (focus on deep-sea extreme environments); Technologies for Coastal Zone Management; Blue Economy; Deep-sea Ecosystems.

## PROGRAMME

**WELCOME AND INTRODUCTION** *by the co-convenors NIOT and IFREMER*

**OPENING SPEECHES,** *by Dr. G.A.Ramadass, Director, NIOT India, and Patrick Vincent, Deputy Director, IFREMER*

**PART 1 – UNDERWATER VEHICLES AND INSTRUMENTATION**

› **Keynote,** *by Jan Opderbecke[16]*

› **Mechanical Engineering Challenges in the development of Polar remotely operated vehicle (PROVe),** *D.Sathianarayanan[1], S.B.Pranesh[1], Tamshuk Chowdhury[1], E.Chandrasekar[1], M.Murugesan[1], M.Radhakrishnan[1], S.Ramesh[1], and G.A. Ramadass[1]*

› **Development and sea trials of Ifremer's 6000m depth rated AUV UlyX,** *Jan Opderbecke[16]*

› **EuroFleets+: Equipment innovations for deep sea operations from vessels,** *Arturo Castellon[122]*

› **Design and development of a dual mode low frequency sonar and its preliminary performance,** *D. S. Sreedev[1], K. Arumugam[1], P. M. Rajeshwari[1], M. Sankar[1], Shibu Jacob[1], Dhilsha Rajapan[1], and G A Ramadass[1]*

› **Habitat mapping of deep-water coral habitats using underwater vehicles multibeam data,** *Ridha Fezzani[16]*

› **Qualification of buoyancy foam for underwater structure,** *Maeleen Le Gall[16]*

› **Challenges in the design and development of electrical systems for deep water manned submersible - MATSYA 6000,** *Subramanian Annamalai[1], Harikrishnan Gopalakrishnan[1], Vedachalam Narayanaswamy[1], Ramesh Sethuraman[1], Ramadass G.A[1]*

WEDNESDAY
28TH
SEPT.
9.30AM-
12.30PM

PARALLEL SESSION

## HNS SPILL PREVENTION: STUDY, INFORM AND TRAIN | CONVENOR: CEDRE (FRANCE)

The maritime traffic of Hazardous and Potentially Hazardous Substances is constantly increasing. In order to better understand the risks in case of accidental spills, we will describe this traffic and then focus on the chemical substances that are transported in liquid form and evaporate in case of a spill at sea. The authorities in charge of the response must then face a toxic cloud, potentially explosive, risking to reach the civilian population. The session will present different preparation tools: a synthesis of work on the behavior of HNS in the aquatic environment (behavioral modeling, laboratory analysis and floating cell tests), presentation of results following the captations by hyper spectral camera) and training tools (e-learning modules, chemical operational guides, etc.).

## PROGRAMME

› **Manifest Project : HNS Field trial with the support of the French Navy,**
*Stéphane Le Floch*[199]

› **Tackling the behaviour of volatile HNS: A key challenge for Marine Pollution response,**
*Laura Cotte*[199]

› **Quantification of gas evaporation from HNS spills at sea by a multispectral infrared remote sensing system: SIMAGAZ,**
*William Giraud*[199]

› **Modelling of volatile HNS,**
*Sébastien Legrand*[201]

WEDNESDAY
28TH
SEPT.
2-3PM

PLENARY SESSION #2

# DATA CHALLENGES APPLIED TO MARITIME TRANSPORT

Plenary sessions consist in a 1h-panel discussion about prospective topics regarding maritime transport. High-level panellists from Campus mondial de la mer community, national and international organisations will exchange and give their views according to whether they come from research centre, academia, company or public institution.

## PROGRAMME

### ROUND-TABLE DISCUSSION

*Rajesh Alla, CMD at IIC Technologies, India*
*Eric Bustarret, Head of IT Architecture at Brittany Ferries, France*
*Amadeus Beaujolin, Managing Director at Blue Observer, France*

**> The plenary sessions are organised together with:**

Cluster Maritime Français
*Cap sur la croissance bleue*

WISTA FRANCE

Armateurs de France

WEDNESDAY
28TH
SEPT.
3.30-5 PM

PARALLEL SESSION

## ENERGY TRANSITION AND ECONOMIC SOVEREIGNTY - MAJOR ISSUES OF TOMORROW FOR THE SHIPPING SECTOR AND ITS BANKS | CONVENORS: CRÉDIT AGRICOLE CORPORATE AND INVESTMENT BANK (CACIB) (FRANCE) AND CRÉDIT MUTUEL ARKEA (FRANCE)

› Description of the current carbon footprint of maritime transport
› State of play of regulations aiming at reducing the sector's carbon emissions (IMO, ETS, etc)
› Challenges and opportunities of decarbonisation (fuels, infrastructure, renewal of the merchant fleet)
› What role for shipping banks in supporting the decarbonisation of the sector?
› Maritime transport, a key element of the economic sovereignty (and energy security) of nations
› State of play of the fleet & renewal needs to ensure tomorrow's energy security
› Is energy security compatible with the decarbonisation objectives of the maritime sector?
› What role for blue finance players in this equation?

## PROGRAMME

*Thibaud Escoffier[148] and Nicolas d'Avout[148]*
*Vincent Picarello[127]*

*Representatives from Geogas Maritime[250] and France LNG[251] (to be confirmed)*

WEDNESDAY
28TH
SEPT.
3.15-5.30PM

PARALLEL SESSION

## DISTRIBUTING HYDROGEN FROM OFFSHORE WIND FARMS AS A FUEL FOR SHIPS | CONVENOR: FRANCE ENERGIES MARINES (FRANCE)

There is a global interest for hydrogen as a complementary energy medium for industrial and mobility applications. In the offshore sector, coupling between wind farms and hydrogen production units is under active consideration. One key aspect of the on-going reflections is the production and distribution of hydrogen at sea. Offshore distribution of renewable hydrogen or ammonia, close to their production area, could be a great opportunity both for the wind industry and the shipping industry, optimising the supply of green energy for maritime transport.
The purpose of this panel discussion is to explore the mutual benefits and challenges for the set-up of a network of offshore renewable hydrogen/ammonia filling stations.

## PROGRAMME

› **General context,** *François Daniel*[213]

› **Presentation of an offshore distribution platform: SEAGUEL: Conceptual design of a bunkering station offering decarbonized fuels for ships,** *Gwenaelle Benoit*[87]*, and Emeline Belin*[87]

› **A tool for offshore hydrogen production analysis,** *Marie Robert*[23]

› **Working on marinisation of electrolysers,** *Annie Le Gall La Salle*[149]

› **Opportunities for offshore wind energy developer,** *Davit Otarishvili*[180]

WEDNESDAY
28TH
SEPT.
3.15-5.30PM

PARALLEL SESSION

# FRANCE INDIA WORKSHOP ON OCEAN TECHNOLOGY TOWARDS ADVANCED KNOWLEDGE AND SUSTAINABLE DEVELOPMENT - PART 2 (TECHNOLOGIES FOR A SUSTAINABLE OCEAN AND ENVIRONMENT, AND BLUE ECONOMY) | CONVENORS: IFREMER (FRANCE) AND INDIA NATIONAL INSTITUTE OF OCEAN TECHNOLOGY (NIOT) (INDIA)

See abstract page 37.

## PROGRAMME

› **Keynote of** *Prof (Dr). M.A.Atmanand, IIT-M,Chennai,* **India on Blue economy**

› **Deep-sea hydrothermal vent ecosystem functioning: the case of the MAR shrimps Rimicaris,** *Marie-Anne Cambon[123], Florence Pradillon[123], and collaborators*

› **Design and development of sampling tools for the deepwater remotely operated vehicle (ROSUB 6000),** *Sathianarayanan.D[1], Pranesh S.B[1], Chanrasekar E[1], Murugesam.M[1], Radhakrishnan[1], S.Ramesh[1], and Ramadass.G.A.[1]*

› **Fiber resin composite for underwater structure,** *Mael Arhant[16]*

› **Coastal zone management through sustainable techniques – case studies on erosion and accretion impacts,** *Lokesh Thiagarajan[1], Kiran A S[1], and Vijaya Ravichandran[1]*

› **Performance of oceanographic sensors used in deep sea moored buoy systems in the Bay of Bengal and Arabian Sea during normal and extreme events,** *Kesavakumar B[1], Arul Muthiah M[1], Ramesh K[1], Vengatesan G[1], Jossia Joseph K[1], and Venkatesan R[1]*

WEDNESDAY
28TH
SEPT.
3-6.15PM

PARALLEL SESSION

# SEDIMENTARY ENVIRONMENTS AND HUMAN ACTIVITIES: MANAGEMENT OF DREDGED SEDIMENTS, EXTRACTION OF AGGREGATES, MARINE RENEWABLE ENERGY AND SUSTAINABLE PORTS | CONVENOR: IFREMER. JOINT SESSION WITH THE FRENCH CONGRESS OF SEDIMENTOLOGY

Maritime transport and, more broadly, human activities at sea and on land generate pollution and nuisances in the marine environment and on the coast that need to be controlled: discharges from activities in the catchment area, discharges from maritime and port activities (dredging, careening, maritime traffic, ...), accidental pollution, disturbance of habitats, etc. The objective of this session is to present different actions, such as those carried out by Cerema or Ifremer, in the framework of its missions to support the implementation of environmental public policies in port and coastal areas.

## PROGRAMME

› **Introduction by** *David Menier[158] and Laure Simplet[16]*

› **Presentation of the marine aggregates dredging activity by** *the UNPG, Frédéric Suire[159]*

› **Activities of DREAL Bretagne in marine aggregates and MRE,** *Christophe Girard[160]*

› **Assessment of the integrity of the seabed in the context of the Marine Strategy Framework Directive,** *Olivier Brivois[161], Franck Desmazes[161], Cécile Capderrey[161], and Sylvain Elineau[161]*

› **Activities - Pressures - Impacts: the case of turbidity modification in the MSFD,** *Marie Cachera[162] and Valérie Cariou[162]*

› **Public environmental policies. What actions have been taken in the ports?,** *Julie Droit[102] and Pierre-Yves Belan[102]*

› **Sediment as a support for the assessment of the chemical quality of marine ecosystems,** *Anne Grouhel[16]*

› **Search for microplastics in harbour sediments from the REPOM network,** *Julie Droit[102] and Valérie Yeuc'h[61]*

› **Establishing the quality of a sediment before returning it to the environment: the contribution of ecology,** *Eric Armynot Du Chatelet[163], Alain Trentesaux[163], Vincent Bouchet[163], Fabio Francescangeli[163], Guillaume Arnouts[163], Denys Hura[163], and Eric Masson[164]*

› **Consideration of sedimentary processes in future marine renewable energy parks,** *Jehanne Prevot[23], Maëlle Nexer[23], Olivier Blanpain[23], and Thierry Garlan[162]*

› **Dynamics of underwater dunes in the context of the construction of an offshore wind farm via in situ data acquisition, morphometric analysis, and their numerical and physical modeling,** *Mathilde Bary[23](165), Nicolas Michelet[23], Maëlle Nexer[23], Sophie Le Bot[165], Alice Lefebvre[166], Thierry Garlan[162], and Olivier Blanpain[23]*

› **Study of the morpho-sedimentary resilience of a former marine aggregate extraction site,** *Alissia Rieux[167], Laure Simplet[167], Danaé Texier[167], and Jérôme Goslin[167]*

› **Cumulative anthropogenic impacts on the sedimentary bed: first results of the ECUSED (Effets CUmulés sur le SEDiment) project in the eastern part of the Seine Bay,** *Valentin Le Goff[168], Anne Murat[168](169), Yann Mear[168](169), Gwendoline Grégoire[168](169), Jean-Philippe Pezy[170], Emmanuel Poizot[168](169), Clément Frigola[168], Pierre Weill[170], Sandric Lesourd[170], Christoph Mensens[170], Magalie Legrain[170], and Léo Pancrazzi[170]*

THURSDAY 29TH SEPT. 8.30AM-12.20PM

PARALLEL SESSION

## CHALLENGES OF INCREASING TRAFFIC AT THE POLES: ANTARCTIC/ARCTIC – PART 1 | CONVENORS: UMR AMURE/IUEM (FRANCE) AND INSTITUT POLAIRE FRANÇAIS (IPEV) (FRANCE)

Polar navigation is inherently risky, not only because of specific geography and climate, but also because of inadequate mapping. The polar regions (Antarctica and the Arctic) are subject to intensifying maritime traffic. More numerous and bigger ships cruise the area, whether scientific research vessels, state ships, freight ships, fishing vessels or cruise ships. Traffic intensification in polar waters increases the risk of incidents and accidents, endangering passengers and crews as well as threatening the fragile natural environment. This calls for strategic risk management of human safety as well and environmental protection.

### PROGRAMME

**INTRODUCTION,** *by Anne Choquet*[207]

› **French Polar Strategy (recorded video),** *by Olivier Poivre d'Arvor*[238]

› **Charter for "responsible" polar navigation,** *Anna Lannuzel*[124] *and Adrien Potin*[124]

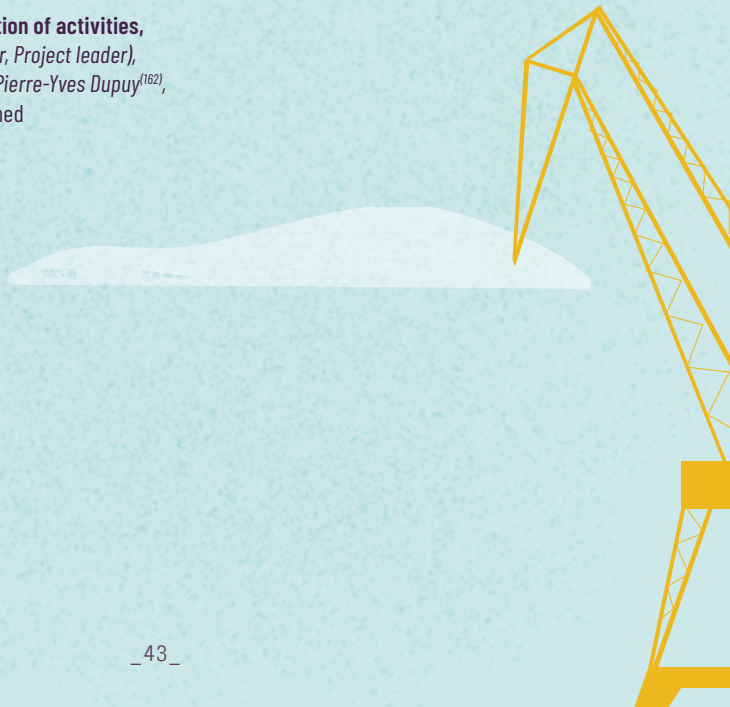
› **Trends in polar navigation (recorded video),** *Fréderic Lasserre*[204]

› **Panel discussion: Intensification of activities, new risks?,** *Anne Quemere (Sailor, Project leader), Vladislav Sidorenkov-Duprez*[239]*, Pierre-Yves Dupuy*[162]*, and other panelists* to be confirmed

› **Arctic new investments? (recorded video),** *Mads Qvist Frederiksen*[240]

› **Panel Discussion: Polar navigation issues,** *Vice-Admiral Olivier Lebas*[241]*, Jean-Charles Larsonneur*[242]*, Laurent Mayet*[243]*, Yan Ropert-Coudert*[244]*,and Viginie Saliou*[58]

› **Polar navigation observations,** *Eric Brossier*[245]



THURSDAY
29TH
SEPT.
9AM-12PM

PARALLEL SESSION

# TECHNICAL INNOVATIONS TO RECONCILIATE MARINE TRANSPORTATION AND ECOSYSTEMS | CONVENORS: OFFICE FRANÇAIS DE LA BIODIVERSITÉ (FRANCE), ISYEB, MNHN AND LETG, UBO (FRANCE)

Marine transportation affects ecosystems through many processes: disturbance from underwater noise, collisions with animals, chemical contamination from hulls, engines or ballast water, atmospheric pollution from exhaust gaz, dissemination of non-indigenous species, etc. This session will highlight ongoing efforts to develop, test and promote solutions to reduce these pressures to levels that do not threat the marine ecosystem health as a whole. Technological devices, environmental monitoring and practical changes will be addressed, in order to draw an international state-of-the-art of the most promising solutions to achieve the ecological transition of shipping in the very next years.

Focus on Marine traffic - cetaceans interactions: Collisions with ships have become an important threat for cetaceans. The growing trends of marine traffic worldwide reinforces this concern. Large whales such as fin whales (Balaenoptera physalus), humpback whales (Megaptera novaeangliae) and NA right whales (Eubalaena glacialis) are particularly susceptible but smaller species are also impacted. Lethal encounters occur mainly with large vessels such as cargos, while smaller vessels can be responsible of trauma, cut and amputations. Speed of the vessels is particularly important. Identifying areas of strong interaction between ships and cetaceans, estimating the actual mortality magnitudes and thinking about mitigations measures are main points of present studies, and reflection.

## PROGRAMME

**NON EXHAUSTIVE LIST OF SPEAKERS:**

› **Ecofriendly filtration technology for treating ballast water reconciles shipping impacts on the coastal ecosystem,**
*Jebarathnam Prince Prakash Jebakumar[1], Ganesan Nandhagopal[1], Bose Rajan Babu[1], Shunmugavel Ragumaran[1], and Vijaya Ravichandran[1]*

› **Blue Observer, sailing for science,**
*Amadeus Beaujolin[97]*

› **SEMMACAPE: Monitoring and study of marine megafauna in wind farms by automatic characterization,** *Sébastien Lefèvre[98], Minh-Tan Pham[98], Deise Santana Maia[98], Paul Berg[98], Hugo Gangloff[98], Gwénaël Duclos[99], Pierre Allain[99], Sylvain Michel[100], Anouck Viain[100], Karine Heerah[23], and Tristan Rouyer[16]*

THURSDAY
29TH
SEPT.
9.10AM-12PM

PARALLEL SESSION

## THE CONCARNEAU MEETING "WHERE INDUSTRY MEETS SCIENCE IN MARINE BIOTECHNOLOGY" – PART 1 | CONVENOR: MNHN CONCARNEAU (FRANCE)

The international symposium « Les Rendez-Vous de Concarneau » takes place every two years at the Concarneau Marine Station. It is intended to be part of a continuum between the fundamental research developped within the laboratories concerned and the applications of this research in marine biotechnologies. The symposium brings together a group of experts from the world of fundamental and applied research and industrials with a link to the maritime field with multidisciplinary and complementary skills in biology (molecular biology, microbiology), embryology, ecology, ecophysiology, plant science and aquaculture.

For this 2022 edition, the main theme is Bio-inspiration. We will focus on biomimetics on maritime transport during the session on Thursday 29 September as part of the Sea Tech Week at Brest: « Les Rendez-Vous de Concarneau invite themselves to Brest ». The 12th edition of the « Rendez-Vous de Concarneau » will be held on Friday 30 September at the Marine Biological Station of Concarneau. The meeting at Concarneau will be focused on biomaterials and bioadhesives with a visit to a structure with a bioinspiration project in Concarneau.

### PROGRAMME

**BIOMIMICRY IN MARITIME TRANSPORT**

› **Moderator:** *Guillian Graves*[128] *and Tarik Chekchak*[129]

› **Bioispiration from marine biodiversity and ecosystems,**
*Jian-Sheng Sun*[130]

› **BLUEFINS: a foil to decarbonize maritime transport,**
*Olivier Giusti*[131][132]

› **The Manta, a versatile bio-inspired ship,**
*Gwenaële Coat*[133]

› **FinX, the nautical revolution through bio-inspiration,**
*Harold Guillemin*[134]

› **#Floating Reef : Bio-inspired mooring buoy to sustainably preserve Mediterranean marine life and ecosystems,**
*Gwen Lechat*[135] *and Olivier Bocquet*[135]

THURSDAY
29TH
SEPT.
9.10AM-12PM

PARALLEL SESSION

## SMARTER, GREENER, CYBER: WHY CYBERSECURITY IS VITAL FOR MARITIME TRANSPORT | CONVENOR: FRANCE CYBER MARITIME (FRANCE)

Smarter and greener ships and maritime infrastructures will inevitably be more digitized and more connected. This trend will broaden the surface of attack and bring new vulnerabilities which could be exploited by cybercriminals. The aim of this session is to explore how to reconcile this digital transformation with cybersecurity requirements, in order to develop green, smart and cybersecure solutions for maritime transport.

## PROGRAMME

**INTRODUCTION,** *by Xavier Rebour*[258]

› **Cybersecurity for autonomous ships and drones: what consideration?,**
*Alexandre Luczkiewicz*[213]

› **The teleoperated vessel,**
*Sébastien Haution*[266] *and Guillaume Le Bras*[266]

› **Contribution of the cyber-range to the resilience of autonomous ships,**
*Yvon Kermarrec*[12]

› **The SEANATIC project and connected objects for cybersecure ships,**
*Fulup Ar Foll*[267]

› **The NAIAD project, detection of illegal activities in maritime transport,**
*François Paulus*[268]

› **Cybersecurity of smart port,**
*Representative from Schneider Electric*[269]

THURSDAY
29TH
SEPT.
2-3PM

PLENARY SESSION #3

# EVOLUTION OF TRAINING AND JOBS IN MARITIME TRANSPORT

**Plenary sessions** consist in a 1h-panel discussion about prospective topics regarding maritime transport. High-level panellists from Campus mondial de la mer community, national and international organisations will exchange and give their views according to whether they come from research centre, academia, company or public institution.

## PROGRAMME

**> Round-table discussion**

*› Claire Jolly, Head of Unit - Space & Ocean, Directorate for Science, Technology and innovation, OECD*
*› Sanjam Sahi Gupta, Director of Sitara Shipping Ltd. and Representative of WISTA India*
*› Lénaïc Segalen, President of Campus des Industries Navales, France*

**> Pitches of Alumni**

**> The plenary sessions are organised together with:**

Cluster Maritime Français
*Cap sur la croissance bleue*

WISTA FRANCE

Armateurs de France

THURSDAY
29TH
SEPT.
3.05-5PM

PARALLEL SESSION

# CHALLENGES OF INCREASING TRAFFIC AT THE POLES: ANTARCTIC/ARCTIC – PART 2 | CONVENORS: UMR AMURE/IUEM (FRANCE) AND INSTITUT POLAIRE FRANÇAIS (IPEV) (FRANCE)

See abstract page 44.

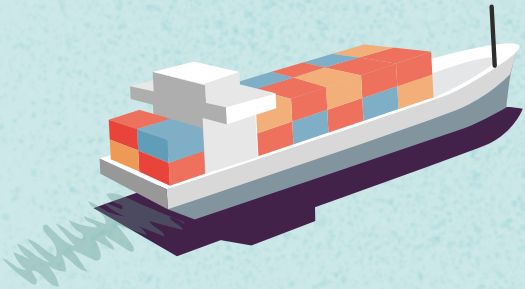
## PROGRAMME

› **Polar Code (recorded video),**
*Hervé Baudu*[246]

› **Panel discussion: Safety, environmental protection and other responsible behaviors,**
*Alban Simon*[247], *Patrice Godon*[248], *Nicolas Dubreuil*[249]

**AND OTHER PANELISTS TO BE CONFIRMED**

› **"Brest, a polar city" Presentation of the mapping of polar actors**



THURSDAY
29TH
SEPT.
3.15-6PM

PARALLEL SESSION

## CORROSION MONITORING OF CONCRETE INFRASTRUCTURES IN MARINE ENVIRONMENT | CONVENORS: LABSTICC (FRANCE) AND FRENCH CORROSION INSTITUTE (FRANCE)

This session organized by the labSTICC laboratory and the French Corrosion Institute focus on structural health monitoring (SHM) methods and related technologies applied to corrosion and degradation of reinforced concrete infrastructures in marine environment. Experts from all around the world are invited to discuss the latest achievements, from the sensing methods to their deployment in field through smart solutions. This will be a unique opportunity for port and public authorities, companies and academic institutions to imagine innovative solutions. Applications are associated with, but not restricted to, coastal and offshore concrete infrastructures such as port, nuclear plants, bridges, platform, wind turbine, etc.

## PROGRAMME

› **Global review of steel corrosion in concrete structures,**
*Xavier Hallopeau*[95]

› **Structural Health Monitoring of a competitive foundation for tidal turbine - Durability of Fibre Bragg Grating sensors,**
*Natalie Williams Portal*[96], *Miguel Prieto Rábade*[96], *and Carolina Franciscangelis*[96]

› **Development of Autonomous UHF-RFID Sensors Embedded in Concrete for the Monitoring of Infrastructures in Marine Environments,**
*Karim Bouzaffour*[89][12], *Benoit Lescop*[89], *François Gallée*[12], *Philippe Talbot*[89], *and Stéphane Rioual*[89]

› **Real time monitoring of the chloride ingress in concrete and rebar corrosion using electrical resistance, Ag/AgCl and Ultra High Frequency sensors,**
*Erwan Diler*[88], *Karim Bouzaffour*[89], *Johan Becker*[88], *Victor Grassin*[196], *Benoit Lescop*[89], *and Stéphane Rioual*[89]

› **Upgrade of a test side at the isle of Helgoland by real-time corrosion monitoring,**
*Marita Büteführ*[90], *and Jürgen Frick*[90]

› **CAHPREEX: RFID technology for bridge monitoring,** *Stéphane Rioual*[89], *Cheikh A.T. Sarr*[91], *Benoit Lescop*[89], *Yannick Falaise*[91], *Sylvain Chataigner*[91], *Laurent Gaillet*[91], *Romain Pittet*[92], *Jean-Luc Dabert*[92], *Pierre-Alain Lhote*[93], *and Pierre-Yves Guarini*[93]

THURSDAY
29TH
SEPT.
3.20-5.30PM

PARALLEL SESSION

# THE CONCARNEAU MEETING "WHERE INDUSTRY MEETS SCIENCE IN MARINE BIOTECHNOLOGY" – PART 2 | CONVENOR: MNHN CONCARNEAU (FRANCE)

See abstract page 46.

## PROGRAMME

### BIOMIMICRY IN MARITIME TRANSPORT

**Moderator:**
*Jian-Sheng Sun*[130]

› **Marine Biomimicry, an opportunity for sustainable innovation in nautical field,** *Juliette Verseux*[136]

› **Flying on Water: Air-induced friction-reducing ship coatings,** *Elisabeth Banken*[137]

**Presentation,** *by Gary Bagot*[138]

**Presentation,** *by Sabrina Hammouti*[139]

› **Overview of biomimetic patented inventions in the maritime field, as derived from patent mapping analysis,** *Damien Guiffant*[215]

THURSDAY
29TH
SEPT.
3.30-5PM

PARALLEL SESSION

# UNIVERSITY OF PLYMOUTH'S COLLABORATIVE PROJECTS ON MARINE CYBER AND DECARBONISATION | CONVENOR: UNIVERSITY OF PLYMOUTH (UK)

The University of Plymouth is involved in several leading projects with strong collaborations, enabling world leading research and development activities to take place. Join us to hear about some of our projects and also partners activities that link into collaboration for leading Maritime capabilities. The afternoon will provide informative presentations and opportunities for round table discussions on the projects.

## PROGRAMME

› **Cyber-SHIP Lab,** *Kimberly Tam*[81] *and Avanthika Vineetha Harish*[81]

› **The University of Plymouth's Marine e-Charging Living Lab,**
*Sarah Fear*[81]

› **Overview of the Centre for Coastal Technologies and Smart Sound Plymouth of the PML Applications Ltd,**
*Tim Fileman*[264] *and Samuel Fawcett*[264]

› **The Ocean Futures programme, outline by Maritime UK South West,**
*Sheldon Ryan*[265]

FRIDAY
30TH
SEPT.
9AM-6PM

PARALLEL SESSION

# THE CONCARNEAU MEETING "WHERE INDUSTRY MEETS SCIENCE IN MARINE BIOTECHNOLOGY" – PART 3 | CONVENOR: MNHN CONCARNEAU (FRANCE)

See abstract page 46.

IN CONCARNEAU

## PROGRAMME

**Introduction by** *Nadia Ameziane*[130] *and Hélène Salin*[130]

### BIOMIMICRY AND BIOMATERIALS

**Moderator:** *Tarik Chechak*[129]

**Innovations inspired by nature,**
*Guillian Graves*[128] *and Alain Renaudin*[140]

**A look back at 10 years of biobased composites exploration,**
*Emmanuel Poisson-Quinton*[141]

**From nature's design to marine bio-based materials for regenerative medicine,**
*Susanna Fernandes*[143] *and David Grégoire*[143]

### BIOMATERIALS AND BIOADHESIVES

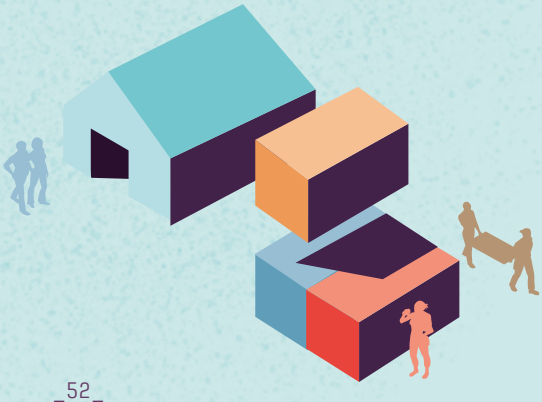
**Moderator:** *Catherine Boyen*[150]

**The sea urchin: a great source of inspiration for turning the invisible into the visible,**
*Marion Padioleau*[144] *and Claire Hellio*[145]

**Aiming for the stars: Characterization and production of sea star adhesive proteins for bio-inspired materials,**
*Patrick Flammang*[146]
*End by Jean-Paul Cadoret*[147]

### VISIT TO LOCAL INDUSTRIES

**Explore and Mer Concept (Concarneau)**




EXHIBITION
27-29 SEPTEMBER

# CAMPUS MONDIAL DE LA MER PAVILION

**Campus mondial de la mer** is the first French community dedicated to the knowledge and development of marine resources.

Our strength lies in the synergy between our network of academic, scientific, economic and institutional stakeholders working across marine science and technology and the wider maritime economy.

We aim to promote innovation and convert the existing concentration of marine science and technology expertise in Brest and Brittany into the creation of more companies and more jobs, and the development of strong international collaborations.

Among other actions, **Campus mondial de la mer** organizes **Ocean Hackathon®**, manages the Marine research infrastructures and facilities portal, publishes twice a year the **SONAR** international journal, provides access to local marine expertise and hosts new-born startups within the Narwhal challenge.

**Campus mondial de la mer** also organizes **the Sea Tech Week®** every 2 years in Brest in order to foster collaborations between local and international marine experts and imagine new solutions to protect our ocean.

**Campus mondial de la mer** is managed by **Technopôle Brest-Iroise**.

## KEY FIGURES

2,700+ PUBLIC AND PRIVATE ORGANISATIONS

42,600 JOBS

8,500 PEOPLE TRAINED EVERY YEAR

1,850 RESEARCHERS

1,000 SCIENTIFIC PUBLICATIONS EVERY YEAR

## CONTACT

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# INDIAN PAVILION, MANAGED BY FICCI

Established in 1927, **FICCI** is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, **FICCI** is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, **FICCI** articulates the views and concerns of industry. It serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies.

To know more on the infrastructure initiatives at FICCI, please write to infra@ficci.com

**FICCI**'s Infrastructure Division run an active committee working on infrastructure that has representation from relevant stakeholders, policymakers, key industry players, government agencies, community participants, project collaborators, and technology and solution providers. The infrastructure vertical at **FICCI** holds regular engagements with Central Ministries to promote policy advocacy and influence decisions of policymakers. We act as an interface between the industry and the government to suggest recommendations and policies for the benefit of the industry at large.

# AD TERRA ENERGY

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## ACTIVITY>

Ad Terra specialises in the exploration, storage and development of energy and mineral resources.
From fossil fuels to renewable energy sources, from extraction to storage; we help businesses, authorities, and public bodies respond to the needs of society today, in order to benefit the world of tomorrow.

## EXPERTISE>

We analyse your project's potential from all perspectives: methodological, geological, technical, economic, legal, and financial. We support you throughout all stages of your project: feasibility studies, exploration phase, sizing of infrastructure, economics and forecasting, and verification of legal and administrative frameworks.

Key Disciplines: Geophysics, Petrophysics, Geology, Reservoir Modelling, Reservoir Engineering, Drilling Engineering, Production & Facility Engineering.

## LATEST NEWS>

The GeoCogen Eclépens deep geothermal project (in launching phase) is led by Ad Terra Energy and aims at producing heat and electricity (100 GWh of base load) in Eclépens area (Switzerland) by 2027.

# BRETAGNE DÉVELOPPEMENT INNOVATION

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## ACTIVITY>

Regional development agency of Brittany.

## EXPERTISE>

Renewable Hydrogen, Offshore Renewable,
Wind Propulsion for shipping

## LATEST NEWS>

Bretagne Développement Innovation participates in the organisation of three parallel sessions of the conference (see pages 18, 24, 26 and 34).

# CADDEN

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## ACTIVITY>

CADDEN is a French supplier, integrator and manufacturer of precise positioning systems for geosciences and precision navigation systems. The company has established itself as the specialist in the supply of sensors and acquisition systems for geolocation, navigation, remote sensing and hydrography. CADDEN has proven its expertise and created its own R&D department and developed a range of high-performance reliable solutions under the brand name GEOD®.

## EXPERTISE>

Building from our extensive experience in selling and integrating high-precision measurement sensors, we have designed our own line of products manufactured in France, under the brand name GEOD®, to provide highly-tech GNSS solutions.

The GEOD® products are used worldwide for mission-critical applications where accuracy and reliability are key to success. CADDEN's technical team provides relevant technical advice, before, during, and after delivery.

## LATEST NEWS>

The BALI V3 bathymetry system comes with new facilities: a web server with an intuitive integrated interface, new accessories and models... BALI V3 remains compatibility with marine drones.

# CELADON

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## ACTIVITY>

CELADON has developed an innovation platform for sea trials including land based and marine facilities for ocean science and technology. Its status as an association allows it to bring together a large number of players in the field of maritime innovation. This association is involved for more than 10 years in many missions as Naval defense and maritime security, Renewable energy, scientific research, environmental monitoring, oil, and gas industry projects, Celadon is also in charge of the pilotage, maintenance of large USV prototype developed for marine by a major in French defense stakeholder. Many resources are available on the SEA TEST BASE site as:

- Land-based facilities at the French Naval academy, Lanve´oc, France including meeting room and marine workshop.
- Research vessel fully equipped,
- Remotely Operated Vehicle (ROV): SAAB Seaeye Falcon for inspection, research and salvage up to 300 m depth
- Instrumented pontoon at sea serving as coastal observatory as a development platform for marine instrumentation.

## EXPERTISE>

Ocean science and technology innovation testing center.  Test at sea

## LATEST NEWS>

Aerial drone capacity

# CEREMA

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## ACTIVITY>

Cerema is a public institution under the supervision of the Ministry of Ecological Transition, present throughout mainland France and the French overseas territories thanks to its 26 sites and 2,400 employees. With its national expertise, Cerema supports the State and local authorities in the ecological transition, adaptation to climate change and territorial cohesion through the cooperative development, deployment and evaluation of public planning and transport policies. With a strong potential for innovation and research, embodied in particular by its Carnot institute Clim'adapt, Cerema is active in 6 fields of activity.

## EXPERTISE>

Regional expertise & engineering, Building, Mobility, Transport infrastructure, Environment & risk, Sea & coast.

## LATEST NEWS>

The "Port du futur" conference brings together the operator of the harbour sector. The objective is to reflect on the future of French harbour, to promote innovation and to encourage exchanges of experience.

**WWW.PORTDUFUTUR.FR**

# CRÉDIT MUTUEL ARKÉA

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## ACTIVITY>

More than 2,200 maritime companies are supported by one or other of the Crédit Mutuel Arkéa group's entities: Crédit Mutuel de Bretagne, Crédit Mutuel du Sud-Ouest, Arkea Capital, Arkea Banque Entreprises et Institutionnels, Arkea Crédit Bail, PhiNoE, etc. Crédit Mutuel Arkéa has always supported maritime players in close collaboration with the regions and local authorities.

## EXPERTISE>

By supporting innovation and R&D in sea-tech, Crédit Mutuel Arkéa is choosing to support those who will help meet the challenges of the maritime transition: decarbonisation of fleets, greening and electrification of ports, preservation of resources and development of renewable marine energies... The maritime economy and its innovations are at the heart of the future transitions that Crédit Mutuel Arkéa intend to support.

## LATEST NEWS>

In May 2022, Crédit Mutuel Arkéa has launched a marine sector to support maritime players in their day-to-day work and in their transition. Crédit Mutuel Arkéa is sponsoring the Sea Tech Week® 2022.

# DEEP BLUE TECHNOLOGY

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## ACTIVITY>

DeepBlue Technology provides complete oceanographic measurement solutions for diverse applications such as, environmental monitoring, navigation safety, maritime works, aquaculture, and renewable marine energy. From its base in Bordeaux, France. DeepBlue Technology works to create a bridge between global equipment manufacturers and the French market.

## EXPERTISE>

Its strong technical background allows DeepBlue Technology to have a deep understanding of its customers' challenges and opportunities, so that it might propose the most relevant solution among its suppliers and to advise on installation and maintenance.

## LATEST NEWS>

DeepBLue Technology represents the following equipment manufacturers:

- **YSI** (Xylem Analytics) with flexible instruments for water quality measurements.
- **Aanderaa** (Xylem Analytics) with a very large and high quality panel of solutions for water's physical properties measurements.
- **DeepWater Buoyancy** which propose standard and customized flotation solutions from shallow to very deep waters.
- **Seaber** the french developer of the highly innovative micro AUV YUCO
- Nexsens Technology with a wide range of instrumented buoys.
- **AML Oceanographic** with the high accuracy probes.

# ECA GROUP

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## ACTIVITY>

ECA Group has been renowned for its expertise in robotics, automated systems, simulation and industrial processes. In the field of naval robotics, ECA Group offers interoperable mission-oriented integrated systems for security missions at sea: surveillance, reconnaissance, mine clearance, etc. Those are based on a wide range underwater (AUV/ROV), surface (USV) & air (UAV) drones.

## EXPERTISE>

Moreover, ECA Group designs & provides vessels systems & equipment, magnetic ranging & treatment facilities for ships, and develops advanced electric propulsion systems, steering & engine control systems.

## LATEST NEWS>

ECA Group opens a Mine Counter Measures factory in Belgium. This facility will be dedicated to the production and support of the Mine Warfare Drones of ECA Group, one of the world leaders in MCM.

# ECOLE NAVALE

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## ACTIVITY>

For more than 200 years the École Navale has been training sailors and officers who, from the moment they join the forces, will be responsible for implementing - at sea - systems considered as among the most complex designed by man. The cadets are those who will fight in the future, under the sea, on the sea, and above the sea, to preserve peace and defend France's national interests. Training lean on a research activity organized around two pools (sciences, humanities) and two industrial chairs: the resilience and leadership chair and the naval systems cyberdefence chair. The French Naval Academy Research Institute (IRENav) is a multidisciplinary research centre geared towards topics in the maritime field such as hydrodynamics, energy conversion, geographic information systems or AI.

## EXPERTISE>

Training, Marine Science and Technology, Data, Mechanics and Energy in the Naval Environment, Modelling and Maritime Information Processing, Cyberdefence of Naval Systems, Artificial Intelligence.

## LATEST NEWS>

Ecole Navale has developed, in conjunction with its academic partners, a Master's level course (BAC+6) in "Ship Maintenance".

# EUROSWAC

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## ACTIVITY>

The EUROSWAC is a highly innovative project (co-financed by the European Regional Development Fund, total budget of €3.9 millions) aiming at demonstrating the ability of using the Channel seawater for cooling and heating by adapting an existing technology to the low depth and temperate climate of the Chanel Area. It involves eleven UK and French partners, from academic and industrial fields.

## EXPERTISE>

The SWAC (Sea Water Air Conditioning) technology is exploiting temperature difference between sea water and external air temperature to produce cold or heat by pumping water and transferring its thermal power to a secondary loop via a heat exchange station. The 11 partners of the EuroSWAC project are working on environmental impact assessment, technical innovations development, demonstration sites design and market analysis to foster the replication of this technology.

## LATEST NEWS>

The flexible and self-burying pipes innovations are being tested, the SWAC design for our demonstration sites is over, environmental and optimisation studies are starting to deliver outputs.

# FRANCE CYBER MARITIME

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## ACTIVITY>

France Cyber Maritime is a non-profit organization. Its main purposes are to increase the resilience of maritime and port operations to cyber threats and to develop a network of expertise in maritime cyber security. To complete these tasks, France Cyber Maritime fosters the creation of tailored cyber security solutions and operates the M-CERT (Maritime Computer Emergency Response Team), a national centre which provides information and assistance to all maritime and port operators.

## EXPERTISE>

With the support of its members, France Cyber Maritime analyzes the needs of maritime operators and advises them in order to identify the most suitable and efficient solutions: audits and mapping, Bug Bounty, intrusion detection, training, awareness... France Cyber Maritime also operates the M-CERT (Maritime Cyber Emergency Response Team). This national centre, based in Brest (France), is in charge of monitoring and analysing cyber threats as well as sharing information to alert maritime and port operators.

## LATEST NEWS>

France Cyber Maritime will host webinars from September 2022. The aim is to organize each month, a webinar which satisfy the cyber security needs of the maritime and port sector. The association members will run these monthly meetings to discuss about the most suitable and efficient solutions for the maritime sector.

# FRENCH SEDIMENTOLOGISTS ASSOCIATION AND UMR GEO-OCEAN

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## FRENCH SEDIMENTOLOGISTS ASSOCIATION

The French Sedimentologists Association (Association des Sédimentologistes Français) was created in 1965 to gather people interested in the study of sediments, sedimentary rocks and all geological processes in relation to sedimentation. It has over 450 members in France and French speaking countries. Since 1987, it organises national meetings gathering over 400 scientists every two years. The ASF organises field trips, specialized workshops, field schools and training for students, teachers and scientists as well as publications. The association is open to teaching and research staff, students, and the general audience.

## UMR GEO-OCEAN

Geo-Ocean is a Joint Research Unit (UMR) with three main supervisory bodies: the CNRS, the University of Brest (UBO), Ifremer, and a secondary supervisory body: the University of Southern Brittany (UBS). The partner organisations include the French Naval Hydrographic and Oceanographic Service (SHOM), France Energies Marines and Sedisor. Our core specialities are Geosciences and our main application domain is Ocean. Our research interests are multi-scales and multi-approaches including, among others, mechanical coupling chemical transfers, transfers between solid Earth and superficial envelopes, coastal risks or sedimentological archives

# GEOMOD

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## ACTIVITY>

Geomod is a software developer and distributor for terrestrial and marine geomatics. We are also distributor of software in the field of water modelling.

## EXPERTISE>

Geomod Brest has built a recognized expertise on Software development based on IHO marine cartographic and hydrographic products and standards. Geomod aims at providing support to harbours and mariners by giving them a reliable and user-friendly access to cartographic and hydrographic information in compliance with IHO standards. After having built their services and Software products on the current S-57 IHO standard, Geomod is now working on expanding their expertise on the new S-100 universal hydrographic data model.

## LATEST NEWS>

GEOMOD was recently purchased by COEXYA group to expand both companies' expertise on Software development and Geomatics. This new collaboration will enable new perspectives on their fields of expertise. Geomod is now working on developing their expertise on the new IHO hydrographic and cartographic standard S-100.

# IEEE-OES

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## ACTIVITY>

IEEE is the world's largest technical professional association, with over 400,000 members from more than 190 countries. As an international body, we play a vital role in impactful technology development and standardization, and our members continue to shape the world to advance technology for the benefit of humanity. By bringing a technology and engineering base to the ocean community, IEEE Oceanic Engineering Society (OES) provides important and transverse actions in support of its Strategic Goals.

## EXPERTISE>

In particular, through its series of workshops ASOF (Antarctic and Southern Oceans Forum) and ANOF (Arctic and Northern Oceans Forum), part of the "IEEE in the North and South Poles" (INSP) initiative, OES is supporting the GEO Cold Regions Initiative.

IEEE France, supported by OES is leading an effort supported by the EU projects AtlantOS, CAPARDUS, JERICO-S3, EuroSea and ILIAD as organizations such as UNESCO/IODE to create a sustainable repository of ocean observation best practices. This aligns with our contributions to GEO BluePlanet and the ocean elements of GEO.

## LATEST NEWS>

Since 2018 OES has been organising, in partnership with GEO BluePlanet and UNEP a series of workshops dedicated to "Marine debris & litter in the Oceans" with, this year, a workshop on "Marine litter: Solutions for a Cleaner Ocean".

# IM SOLUTIONS

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## ACTIVITY>

IM Solutions is a small size business based in Britany France, IM Solutions design and manufacture Unmanned Surface Vehicle from 1.3m to 7 m and also custom project.

Our Unmanned surface Vehicle are able to navigate in open sea for all kind of application like hydrographic survey but also coastal and water column monitoring.

## EXPERTISE>

IM solutions as a wild range of expertise from Hardware to software and system. IM Solutions has a strong R&D team able to develop custom project and continuously improve our product. We have knowledge in electronic we design all our board, Mechanical, we are able to integrate any kind of sensor on our USV but also in System and in telecommunication (from Radio to Satellite).

## LATEST NEWS>

2022 is a very productive year for IM Solutions in January we are launch the IM1300 our smallest USV for lake and river but we also have launch our IM3000 MK2 with a lot of new feature like 2 inboard Electrical engine, rugged hull and 100 m Winch.

Follow all our latest news on LinkedIn: **www.linkedin.com/company/innovativemarinesolutions/**

# IODP FRANCE

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## ACTIVITY>

The International Ocean Discovery Program (IODP) is the most important multidisciplinary international collaboration in marine geology since the 1950s (Mohole project). It explores Earth's history and dynamics using ocean-going research platforms to recover data recorded in seafloor sediments and rocks and to monitor subseafloor environments. The IODP's research themes address fundamental questions about Earth's climate, deep life, geo-dynamics, and geohazards, will facilitate a long-term, global perspective on some of today's most pressing environmental issues.

## EXPERTISE>

IODP uses sophisticated technologies to collect sediment, rock, microbial, and fluid samples from beneath the seafloor and deploys state-of-the-art measurement devices and long-term observatories within subseafloor boreholes. These activities supply critical details about geologic processes as well as natural hazards that pose risks to society. Analyses of samples recovered establish the geologic context for interpreting human impact on climate and the environment, providing the data needed to improve the models that predict the pace of rising sea levels.

## LATEST NEWS>

Today, IODP has achieved around 400 expeditions which made possible the exploration of ~ 1750 sites. The new 2050 Science Framework guides scientists to push forward the frontiers of knowledge through.

# IXBLUE

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## ACTIVITY>

iXblue is a global high-tech company specializing in the design and manufacturing of advanced marine, photonics and autonomy technologies. The group in-house expertise includes innovative systems and solutions devoted to inertial navigation, subsea positioning, and underwater imaging, enabling its Civil and Defense customers in carrying out their sea operations with maximum safety, efficiency and reliability. Employing a workforce of 750 people worldwide, iXblue conducts its business in over 60 countries.

## EXPERTISE>

Our fields of expertise include: Inertial navigation for subsea operations, Underwater USBL acoustic positioning solutions, Underwater LBL positioning solutions, Subsea positioning software, Acoustic Releases, Synthetic aperture and mapping sonars, Sub-bottom profilers.

## LATEST NEWS>

Based on data collected by Ifremer, iXblue has recently demonstrated that softwares help plan AUV missions and reduce the number of transponders to be deployed on the seabed while maintaining positioning performance.

# MACARTNEY FRANCE

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WWW.MACARTNEY.COM

## ACTIVITY>

MacArtney France is part of the MacArtney Underwater Technology Group specialising in fully integrated systems and innovative custom solutions, from design to installation, for marine renewable energy, offshore oil and gas, ocean science institutes, and navies.

## EXPERTISE>

MacArtney's expertise ranges from subsea connectors and cables, through hydrographic, sonar and telemetry systems to complete ROV launch and recovery systems and oceanographic instrumentation packages.

## LATEST NEWS>

The MacArtney Group recently announced the launch of its latest connectivity series. TrustLink Metal Shell Connectors are now in stock across the globe.

# MAINT&SEA

SÉBASTIEN GALES

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29 120 PONT L'ABBÉ
FRANCE
S.GALES@ANDSEA.FR
+ 33 6 98 63 9 756
WWW.MAINTANDSEA.FR

## ACTIVITY>

The mobile and web application for monitoring ship maintenance.

## EXPERTISE>

Machine and regulatory maintenance tracking with web-based fleet management interface.

## LATEST NEWS>

Installation in our new premises Quai d'Estienne d'Orves in Guilvinec.

# MARITECH

JEAN-FRANÇOIS BOUCULAT

57 RUE FRANCOIS GERNELLE
84 120 PERTUIS
FRANCE
JFBOUCULAT@MARITECH.FR
+33 6 79 56 73 06
WWW.MARITECH.FR

## ACTIVITY>

For over 36 years, Maritech has been providing the subsea industry with robust and reliable solutions for the most challenging environments and applications. Our product portfolio consists of a suite of sonar, sensor, camera, sampling, wave measurement, communication, software and other equipment.

## EXPERTISE>

Oceanography and hydrography.

## LATEST NEWS>

Maritech informs you of the arrival of the Micron Gemini from Tritech which replaces the Gemini 720im. The Micron Gemini offers:

> Powerful sonar imaging in real time,
> a horizontal vision of 90°,
> a range of 50m,
> a depth of 300m up to 750m,
> 128 beams,
> an effective angular resolution of 0.7°,
> a refresh rate of 20Hz,
> compact dimensions.

# MARITIME UK SOUTH WEST

**SHELDON RYAN**

ISAAC YOUNG THE CASHIERS OFFICE,
COUNTY HALL
TA1 4DY TAUNTON
UNITED KINGDOM
**SHELDON.RYAN@MARITIMEUKSW.ORG**
**+ 44 788 69 89 084**
**WWW.MARITIMEUKSW.ORG**

## ACTIVITY>

Maritime UK SouthWest is a public, business, research partnership which brings together the breadth of the ocean economy, working in partnership to champion, grow and clean the sector.

The cluster aims to champion and promote the SW Ocean Economy, internally, nationally, and abroad, drive clean growth and build centres of excellence to maintain regional competitive advantage.

Champion and Promote: Create evidence-based strategy, profile and lobbying Promote regional excellence Drive Clean Growth Increase collaboration, investment in R&D and clean growth Increase investment in skills and promote careers in marine and maritime.

## EXPERTISE>

Build centres of excellence Building supply chain capability in offshore renewables and bring forward investment in floating offshore wind in the Southwest. Create a world leading centre for marine autonomy and geospatial data innovation. Drive investment in our sustainable ocean economy.

Cluster strengths:

- Marine Autonomy and Geospatial Data,
- Offshore Renewables,
- Ocean Technology and Aquaculture,
- Clean marine tech,
- Defence.

# NEOTEK

CATHERINE NICOLAS

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+33 2 97 89 87 21
WWW.NEOTEK-WEB.COM

## ACTIVITY>

NEOTEK is your leading technology specialist for providing integrated marine solutions for subsea monitoring over the French markets. We design, distribute, integrate and warranty the quality of provided solutions.

## EXPERTISE>

Environmental monitoring and surveys, underwater sensors, passive and active acoustics, marine sciences, offshore industry, marine renewables.

## LATEST NEWS>

NEOTEK has provided a large number of embedded marine equipments to academics, governmental agencies, and marine industries for their environmental assessments (floating, subsea and seabed mounted).

# NKE INSTRUMENTATION

OCÉANE BARRE

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ZI DE KERANDRÉ
56 700 HENNEBONT
FRANCE
OBARRE@NKE.FR
(+33) 7 64 55 75 88
WWW.NKE-INSTRUMENTATION.COM

## ACTIVITY>

NKE Instrumentation is a French company based in Lorient, near the Atlantic coast. For more than 30 years, NKE Instrumentation designs, manufactures and sells underwater monitoring instruments providing high quality measurements. The company is involved in large scale projects that bring together the company's know-how multiplicity from the study to the operational maintenance of the solutions provided.
The company's priority is the development of new instruments to contribute to the protection of our environment.

## EXPERTISE>

NKE Instrumentation develops three distinct ranges of products. The underwater monitoring instruments designed to measure in situ the main physico-chemical parameters. Buoys and instrumented systems to measure, transmit and retrieve data in any type of environment. Profiling floats that are used for oceanographic and environmental studies of the evolution of oceans and climate. The company is involved in the international ARGO program. NKE Instrumentation is constantly pioneering new technologies to satisfy and meet the standards in place and the environmental requirements.

## LATEST NEWS>

A new range of multiparameter probe that can be used manually or for long-term monitoring has recently been developed. The profiling floats range is also developed to grow the biogeochemical range and measure more parameters into the ocean.

# NORTEKMED

CAROLINE VALMORI

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+ 33 6 74 79 46 26
WWW.NORTEKMED.COM

## ACTIVITY>

Experts in physical oceanography, NortekMed was founded in 2008 by André DOLLE. His aim was to create a high-performance oceanographic company while keeping a human dimension to ensure high reactivity. NortekMed is a subsidiary of Nortek Group, the world leader in acoustic Doppler current meters and wave sensors.

## EXPERTISE>

NortekMed's two main activities include the marketing of Nortek sensors in France and Africa as well as the provision of services relating to physical measurements in a marine environment. Our aim is to offer customized service thanks to our wide range of services, from simply leasing sensors to setting up a field measurement campaign over several months at the other end of the world, or the provision of complex offshore measurement systems providing real time data directly to the client.

## LATEST NEWS>

NortekMed supplied and deployed two Alize buoys for several wind farms (Fécamp, Courseulles, S$^{t}$ Nazaire). The oceanographic and meteorological data transmitted in real time by iridium facilitate maritime operations on site during the work. All data are provided to the customer via a web application, with storage on two independent servers (back-up).

# NOVACAVI

FRANCESCA FAVERIO

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+30 33 568 17 250
WWW.NOVACAVI.IT

## ACTIVITY>

Specialist in custom design and manufacturing of extra performance electrical cables for specialized application including harsh and demanding environments since 1975. Focused on technologically advanced cable solutions for marine and subsea, Novacavi develops and produces Aquancable®, wide range of special electrical cables for underwater technologies: ROV tethers, drones & robot cables, FO hybrid cables, umbilicals, subsea armoured and detection & instrumentation cables.

## EXPERTISE>

Novacavi offers great experience in subsea, material expertise, engineering versatility and production flexibility, prototyping development, low volume & high mix production of custom, reliable, in fit for purpose quantity, lengths and packaging. ISO 9001 certified design and production process since 1995.

## LATEST NEWS>

Recently supplied a specially engineered electrical armoured cable for data acquisition buoy operating in hostile environment with a unique double armour stainless steel configuration.

# OUEST VALORISATION

ANNE GUEDON

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WWW.OUEST-VALORISATION.FR

## ACTIVITY>

Ouest Valorisation – Office of Technology Transfer (OTT) was created in the "Future Investments" project call managed by Ministry of Higher Education and Research. Its aim: to propose to companies, attractive innovation means from the public research. Ouest Valorisation's team simplifies the access of the companies to research laboratories in order to develop good collaborative projects or to get access to high professional skills and high level scientifical equipment.

## EXPERTISE>

Ouest Valorisation SAS is the private affiliate of 28 academic institutions in the western part of France. Founded in July 2012, the company is responsible for the maturation, licensing and the transfer of technologies of six french major campuses to the commercial sector. Granted in the framework of a national initiative called "SATT" (société d'accélération du transfert de technologies), Ouest Valorisation SAS protects and manages the intellectual property developed by more than 7000 full time equivalent faculty members, researchers, and technologists from universities, engineering schools hospitals and national research institutions locally present in academic reserch labs.

## LATEST NEWS>

**www.ouest-valorisation.fr/nos-actualites**

# PÔLE MER BRETAGNE ATLANTIQUE AND IFADO

**PAULINE BENEAT**

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+ 33 6 88 84 48 22
WWW.POLE-MER-BRETAGNE-ATLANTIQUE.COM

## ACTIVITY>

Pôle Mer Bretagne Atlantique is a competitiveness cluster dedicated to maritime innovation located in the West of France, in Brest. iFADO "Innovation in the Framework of the Atlantic Deep Ocean" is an Interreg Atlantic project which aims to pool the marine environment monitoring services of five European countries in order to support the authorities in the implementation of the MSFD "Marine Strategy Framework Directive".

## EXPERTISE>

PMBA provides support and maritime expertise to its 430 members for their innovative maritime project. The skills possessed by the Pôle Mer Bretagne Atlantique are organised into six major strategic areas as part of the cluster's strategic road map that covers the emerging needs identified by the clusters' members: Defense, safety and security, Shipbuilding and marine leisure industry, Marine energy and mineral resources, Marine biological resources, Environment and coastal development and Maritime Ports, logistics and transport. In a transnational approach, the iFADO project allows pooling ocean information from the Atlantic region of the EU while ensuring comparability of approaches and assessment methods. For this purpose, the partners rely on the latest technologies in data collection and processing.

## LATEST NEWS>

In order to raise awareness of ocean conservation and to involve the general public in the iFADO project, the PMBA in partnership with "Educational Passages" has accompanied the students of the Saint-Vincent secondary school of Brest in the construction of a mini-sailboat called Korrigan.

# PRIMEGPS

CÉCILE DRUON

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+33 6 83 69 83 55
WWW.PRIMEGPS.FR

## ACTIVITY>

PrimeGPS is the marine division of SITECH France, specialized in the digitization of hydrography, maritime and river construction projects.

## EXPERTISE>

Hydrography, Positioning, Machine control, Software, Topography.

## LATEST NEWS>

New bathymetric drone Apache3 for surveys in all aquatic areas.

# RBR

DIDIER CLEC'H

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RBR-GLOBAL.COM

## ACTIVITY>

Since 1973, RBR has been designing and manufacturing oceanographic instruments in Ottawa, Canada, and has steadily expanded to include offices in Atlantic Canada, and China, with direct sales in USA, France, and Australia. From the ocean abyss to the polar ice cap; lakes, rivers and coastal zones, RBR's sensors and loggers track water parameters including conductivity, temperature, depth, salinity (CTD), dissolved gases, pH, and many others.

## EXPERTISE>

Sensors, Loggers, Systems, OEM.

## LATEST NEWS>

RBR launches new Radiometer sensor with RBRcoda3 rad and Photosynthetically active radiation with RBRcoda3 PAR. Launching the calibration program "Calibration in three weeks or less. Guaranteed".
We are pleased to announce the opening of RBR France as a new partner for ocean technology in Europe.

# SERCEL

PIERRE BABAN

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44 470 CARQUEFOU
FRANCE
PIERRE.BABAN@SERCEL.COM
WWW.SERCEL.COM

## ACTIVITY>

Sercel designs and manufactures high-tech solutions for subsurface exploration. Capitalizing on its world-leading position in the seismic acquisition industry, Sercel also provides innovative solutions for structural monitoring, defense and underwater acoustics applications. Headquartered in Nantes (France), Sercel operates worldwide and employs more than 1,500 people.

## EXPERTISE>

Sercel is a major player in underwater acoustic communications and stands out for its ability to communicate over long ranges, using stealth communication. Its expertise ranges from a wide and advanced knowledge base in underwater acoustics to industry certified industrial processes, with sensors down to 6,000m water depth capacity. Sercel also provides innovative solutions for underwater acoustic positioning, passive acoustic surveillance, as well as automatic detection, localization and classification of marine mammals.

## LATEST NEWS>

Sercel is proud to support US oceanographic and seismological research with the delivery of MicrOBS 4C nodal ocean bottom seismometers to the Woods Hole Oceanographic Institution. This new generation of MicrOBS combines a three component, Sercel proprietary, QuietSeis® broadband high-sensitivity MEMS sensor with a high-performance hydrophone. These are integrated into a very compact package that enables fast deployment at sea. Operating in water depths down to 6,000 meters, MicrOBS allows for free-fall deployment and pop-up on demand, making it a highly flexible tool for the research team.

# SHOM

NICOLAS WEBER

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WWW.SHOM.FR

L'océan en référence

## ACTIVITY>

The Shom, national hydrographic service is a public administrative establishment (EPA) under the supervision of the Ministry of the Armed Forces. It is the public operator for maritime and coastal geographic information. The Shom's mission is to know and describe the physical marine environment in its relationship with the atmosphere, with the seabed and coastal areas, to forecast its evolution and to ensure the dissemination of corresponding information.

## EXPERTISE>

Its fields of expertise are multiple: bathymetry (seabed morphology), sedimentology (geology and dynamics of the seabed), coastal hydrodynamics (tides, currents), oceanography, engineering of sea-based acquisition systems (integration of hydro-oceanographic equipment, in particular in partnership with French shipyards), maritime and coastal geographic information, training (specific school for civilian, military and foreign staff).

## LATEST NEWS>

The data.shom.fr portal allows to consult online geographical information: bathymetry, cartography, maritime limits, wrecks, nature of the seabed, etc.), oceanographic forecasts and tidal observations.

# SMART SHIPPING

DAVID GOMEZ-ULLATE

C/ MANANTIAL, 13. POL.
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SPAIN
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+34 6 29 00 91 95
WEB.SMARTSHIPPING.ES

## ACTIVITY>

AI powered optimization for cleaner, safer and more efficient maritime transport.

## EXPERTISE>

Ocean and weather data, modeling and performance monitoring, route optimization, fuel savings, GHG reduction, better safety.

## LATEST NEWS>

MVP and demo now available.

# THALES

JUSTINE COTTY

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WWW.THALESGROUP.COM

## ACTIVITY>

Thales is a global high-technology leader with more than 81,000 employees on every continent. Thales provides solutions, services and products that help its customers - companies, organizations and governments - in five major markets that are vital to the functioning of our societies: digital identity and security, defense, aeronautics, space and transportation. In the defense market, Thales provides equipment, solutions and services related to electronic combat, surveillance and reconnaissance, naval combat, surface combat and undersea combat systems.

## EXPERTISE>

In the field of anti-submarine warfare, Thales designs and provides acoustic and communication systems and subsystems for anti-submarine warfare and mine warfare. The solutions and associated services are designed for all types of platforms: submarines, surface ships, helicopters, maritime patrol aircraft, mine warfare vessels and naval drones.  Today, Thales equips more than 500 naval platforms belonging to more than 40 navies, making it the world's number one supplier of a complete range of sonar systems.

# THALOS

DELPHINE ROBINET

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8 RUE GALILÉE
56 270 PLOEMEUR
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+33 2 97 88 18 00
WWW.THALOS.FR

## ACTIVITY>

Designer of connectivity solutions and innovative analysis systems for the maritime world. The company supports fishermen on a daily basis to enable them to communicate, make decision and supervise operations.

## EXPERTISE>

THALOS accompanies and equips more than 900 ships worldwide with an R&D team dedicated to solutions in house development, a commercial team that advice and supports the clients and a technical team that takes care of the deployment and maintenance of the solutions.

## LATEST NEWS>

THALOS team is growing! We are looking for a Linux DevOps & a Full Stack Developer ready to join our team.

# THERMO FISHER SCIENTIFIC

HÉLÈNE DELAVAULT

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CEDEX FRANCE
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+33 6 76 73 69 86
WWW.THERMOFISHER.COM

## ACTIVITY>

For decades, Thermo Scientific has always been innovative with Isotope Ratio Mass Spectrometers (TIMS, MC-ICP-MS, Gas-IRMS, Noble gas systems and HR-ICP-MS) and have helped geoscientists gaining new insights into the application of isotope ratio analysis in earth and environmental sciences, enabling them to make exciting discoveries and overcome tough analytical challenges. Isotope ratio mass spectrometers have also helped laboratories in the areas of food analysis and doping by providing reliable analytical results.

## EXPERTISE>

Isotope Mass Spectrometry and High Resolution Elemental Analyses.

## LATEST NEWS>

Thermo Fisher Scientific introduced the new Neoma MC-ICP-MS. When compared to previous generation instruments, many of the enhancements in the Neoma are to features, such as the ICP and vacuum system, which directly impact sensitivity and stability. The greater level of integration of sample introduction systems with the Neoma MC-ICP-MS, using the Qtegra ISDS software, made it significantly easier to achieve optimum conditions. The Neoma is designed to accommodate a MS/MS solution with collision/reaction cell, equipped with a unique pre-cell mass filter. This option when combined with reactive gases such as O2, N2O, NH3 and SF6, alongside H2 and He, gives access to an extra library of dedicated applications.

# THIN SECTION LAB + NEW TEC SCIENTIFIC + BROT LAB

MARJORIE DIDIER

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WWW.THINSECTIONLAB.COM

## ACTIVITY>

Thin Section Lab (TSL) is specialized in the preparation and analysis of geological samples. Created in 2010, the company has produced more than 100,000 thin sections for hundreds of customers around the world. Since its creation, the catalog of services has grown and now includes various technical services (sawing, grinding, mineral separation, thin sections) and analytical services (petrography, cathodoluminescence, geochemical analysis, X-ray diffraction).

## EXPERTISE>

With his experimented team and large international network, Thin Section Lab (TSL) collaborates with many academic and industrial actors from all fields of geology (oil & gas, mining industry, aggregates, archeology, academic research...) to answer any problem in geosciences.

## LATEST NEWS>

Recently equipped with an X-ray diffractometer and a cathodoluminescence microscope,
Thin Section Lab (TSL) can provide a full mineralogical analyze for every type of sample (rocks, cuttings...).

# POSTERS LIST

### PASSport project: safety and security to support ports operations

Marco Nisi[101], and Loic Gourmelen[102]
[101] Sistematica S.p.A., Italy
[102] Cerema, France

### Fish & Click: how participatory science helps to map and inventory lost fishing gear

Marie Morfin[16], Fabien Morandeau[16], Sonia Méhault[16], and Dorothée Kopp[16]
[16] Ifremer, France

### Environmental Stewardship of the Data Buoy Cooperation Panel

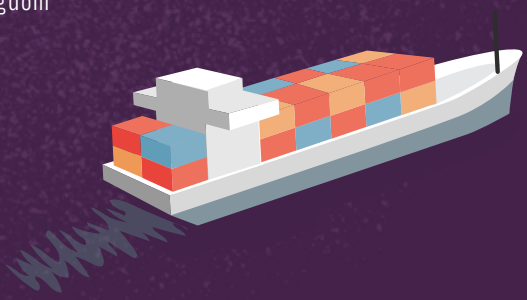
Karen Grissom[103], Boris Kelly-Gerreyn[104], and Long Jiang[105]
[103] National Data Buoy Center, USA
[104] Bureau of Meteorology, Australia
[105] OceanOPS, France

### Monitoring and modelling the circulation of marine debris in Indonesia

Christophe Maes[18], Tonia Capuano[106], Delphine Dobler[18], Claire Dufau[17], Riza Farhan[107], Olivia Fauny[17], Budhi Gunadharma Gautama[107], Marine Herrmann[106], Ariane Koch-Larrouy[106], Marc Lucas[17], Elodie Martinez[18], Rinny Rahmania[107], Jean-Baptiste Voisin[17], Emilie Strady[108], Yannis Cuypers[109], and Edmond Dounias[110]
[17] CLS, France
[18] LOPS-IRD, France
[106] LEGOS-IRD, France
[107] KKP BRIN, Indonesia
[108] MIO-IRD, France
[109] Sorbonne University, France

### Remote Sensing Spectral Visibility of Plastics under laboratory conditions

James Delaney[81][111]
[81] University of Plymouth, United Kingdom



# POSTERS LIST

[111] ARGANS Ltd, United Kingdom

### Increasing the autonomy of an underwater ROV

Marko Vukšić[112], Tonko Kovacevic[112], Barbara Džaja[112], Predrag Đukić[112], Predrag Đukić[112], Hai Nam Tran[89], Vincent Rodin[89], Laurent Lemarchand[89], Valérie-Anne Nicolas[89], Alain Plantec[89], and Frank Singhoff[89]
[89] University of Western Brittany (UBO), Lab-STICC, UMR CNRS 6285, France
[112] Department of professional studies/University of Split, Croatia

### MBES bathymetric data sound velocity error correction

Marianne Avoustin[113], Lilian Bocher[113], Jérémie Lambert[113], and Juliette Garric[113]
[113] ENSTA Bretagne filière Hydrographie-Océanographie, France

### CARES a model-based and component-based framework for AUV simulation

Pierre-Yves Pillain[89], Goulven Guillou[89], and Jean-Philippe Babau[89]
[89] University of Western Brittany (UBO), Lab-STICC, UMR CNRS 6285, France

### Understanding the effect of marine emissions on air quality in Goa

Saswot Nayak[117], Thaseem Thajudeen[118], and Clint George[117]
[117] School of Mathematics and Computer Science, Indian Institute of Technology Goa, India
[118] School of Mechanical Sciences, Indian Institute of Technology Goa, India

### Experimental demonstration of a zero-emission hybrid drive marine vehicle

Brian Lambert[119], Joseph Wright[119], Ian Gray[119], Gianmario Rinaldi[119], Prathyush P. Menon[119], Christopher Smith[119], Angelito Barbierato[120], Anthony Bennett[120], Eugene Bari[120] and Anna Millington[120]
[119] The Centre for Future Clean Mobility, University of Exeter Engineering Research Centre, United Kingdom
[120] Ecomar Propulsion, United Kingdom

### The conditions for implementing Short Sea Shipping from the Guiana Shield to the Caribbean Sea

Sherline Dumano[121]
[121] Aix-Marseille University, LEST, France

### Machine learning for fault detection in HVAC systems for building reliable, smarter and greener marine transportation vehicles

Ramnath Prabhu Bam[70], Rajesh Prabhu Gaonkar[70] and Clint Pazhayidam George[70]
[70] Indian Institute of Technology Goa

# ORGANISATIONS INVOLVED IN THE CONFERENCE PROGRAMME

**(1)** National Institute of Ocean Technology, India
**(2)** TIGER Project
**(3)** Naval Group Technical Direction of Innovation, France
**(4)** Sabella, France
**(5)** IRMA, France
**(6)** POLYBIOAID, France
**(7)** ComposiTIC, Université Bretagne Sud, France
**(8)** Univ. Polynésie Française, IFREMER, ILM, IRD, EIO UMR 241, Tahiti, French Polynesia, France
**(9)** CIV, Direction des Ressources Marines, Tahiti, French Polynesia, France
**(10)** IRD, Univ. Polynésie Française, IFREMER, ILM, EIO UMR 241, Tahiti, French Polynesia, France
**(11)** Scion, New Zealand
**(12)** IMT Atlantique, Lab-STICC, UMR CNRS 6285, France
**(13)** ENSTA Bretagne, Lab-STICC, UMR CNRS 6285, France
**(14)** INRIA team Odyssey, France
**(15)** Capgemini Engineering Brest, France
**(16)** Ifremer, France
**(17)** Collecte Localisation Satellites, France
**(18)** Laboratoire d'Océanographie Physique et Spatiale, IUEM, Univ. Brest, CNRS, IRD, Ifremer (UMR 6523), France
**(19)** Laboratoire de Mathématiques de Bretagne Atlantique, Univ Brest (UMR CNRS 6205), France
**(20)** Centro de Investigaciones del Mar y la Atmósfera, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, CONICET-UBA, Argentina
**(21)** UMI-IFAECI (CNRS-CONICET-UBA), Argentina
**(22)** Ocean and Earth Science, University of Southampton, United Kingdom
**(23)** France Energies Marines, France
**(24)** Institut des Géosciences de l'Environnement, France
**(25)** Technical University of Denmark, Department of Technology, Management and Economics, Denmark
**(26)** RIKEN Center for Computational Science, Japan
**(27)** RIKEN Cluster for Pioneering Research, Japan
**(28)** RIKEN Interdisciplinary Theoretical and Mathematical Sciences Program, Japan
**(29)** University of Maryland, USA
**(30)** Japan Agency for Marine-Earth Science and Technology, Japan
**(31)** Department of Electronics and Instrumentation Engineering, National Institute of Technology Silchar, India
**(32)** L@bISEN ISEN Yncréa Ouest Brest, France
**(33)** OECD
**(34)** ECA Group, France
**(35)** University of Girona, Spain
**(36)** Coronis Computing SL, Spain
**(37)** IQUA Robotics SL, Spain
**(38)** École Nationale Supérieure Maritime, France
**(39)** Aix-Marseille-Université-CNRS-CNES-LAM, France
**(40)** Centre National d'Études Spatiales, France
**(41)** CeSAM, France
**(42)** First Light Imaging, France
**(43)** IMCCE-Observatoire-de-Paris, France
**(44)** iXblue, France
**(45)** Indian Register of Shipping, India
**(46)** UCA Datalab, Universidad de Cádiz, Spain
**(47)** Komorebi AI technologies SL, Spain
**(48)** Naval Group, Naval Research, France
**(49)** IMSIA, ENSTA Paris, CNRS, CEA, EDF, Institut Polytechnique de Paris, France
**(50)** POEMS, ENSTA Paris, CNRS, INRIA, Institut Polytechnique de Paris, France
**(51)** Università degli studi di Genova, Italy
**(52)** ABYSSENS, France
**(53)** Bureau Veritas, France
**(54)** Quiet-Oceans, France
**(55)** Chorus acoustics, France
**(56)** GREENOV-ITES, France
**(57)** Monitor My Ocean, Canada
**(58)** Ecole Navale, France
**(59)** CNAM, France
**(60)** Queen Mary University of London, United Kingdom
**(61)** Labocea, France
**(62)** South East Rivers Trust, United Kingdom
**(63)** Établissement public de gestion et d'aménagement de la baie de Douarnenez, France
**(64)** Environment Agency, United Kingdom
**(65)** Brest métropole, France
**(66)** the Rivers Trust, United Kingdom
**(67)** Parc naturel marin d'Iroise, France
**(68)** Actimar, France
**(69)** Helzel Messtechnik GmbH, Germany
**(70)** Indian Institute of Technology Goa, India
**(71)** Université de Bordeaux, UMR 5805 EPOC, France
**(72)** MARI Old Dominion University, USA
**(73)** Tiwah UG, Germany
**(74)** ENIB, Lab-STICC, UMR CNRS 6285, France
**(75)** WISTA India
**(76)** Mercator Ocean International, Departement d'océanographie operationnelle, France
**(77)** Laboratoire d'Océanologie et de Géosciences (LOG), UMR 8187, CNRS, ULCO, ULILLE, IRD, France
**(78)** National Maritime Foundation, India
**(79)** University of Exeter, United Kingdom
**(80)** École Nationale Supérieure de Techniques Avancées de Bretagne (ENSTA Bretagne), France
**(81)** University of Plymouth, United Kingdom
**(82)** Brixham Laboratory, United Kingdom
**(83)** The National Lobster Hatchery, United Kingdom
**(84)** Sustainable Growth Initiative, India
**(85)** DeProfundis, France
**(86)** Club Swac France, France
**(87)** Sofresid Engineering, France
**(88)** Institut de la Corrosion, France
**(89)** University of Western Brittany (UBO), Lab-STICC, UMR CNRS 6285, France
**(90)** Materials Testing Institute University of Stuttgart, Germany

# ORGANISATIONS INVOLVED IN THE CONFERENCE PROGRAMME

**(91)** Université Gustave Eiffel, Département MAST, Laboratoire SMC, France
**(92)** APRR AREA, Dir. Infrastructure Patrimoine et Environnement, France
**(93)** ARTLIA, BU Mobilités & Infrastructures, France
**(94)** CINav, France
**(95)** SECCO Corrosion Consulting, France
**(96)** RISE Research Institutes of Sweden, Sweden
**(97)** Blue Observer, France
**(98)** Univ. Bretagne Sud UMR6074 IRISA, France
**(99)** WIPSEA, France
**(100)** Office Français de la Biodiversité, France
**(101)** Sistematica S.p.A., Italy
**(102)** Cerema, France
**(103)** National Data Buoy Center, USA
**(104)** Bureau of Meteorology, Australia
**(105)** OceanOPS, France
**(106)** LEGOS-IRD, France
**(107)** KKP BRIN, Indonesia
**(108)** MIO-IRD, France
**(109)** Sorbonne University, France
**(110)** IRD, France
**(111)** ARGANS Ltd, United Kingdom
**(112)** Department of professional studies/University of Split, Croatia
**(113)** ENSTA Bretagne filière Hydrographie-Océanographie, France
**(117)** School of Mathematics and Computer Science, Indian Institute of Technology Goa, India
**(118)** School of Mechanical Sciences, Indian Institute of Technology Goa, India
**(119)** The Centre for Future Clean Mobility, University of Exeter Engineering Research Centre, United Kingdom
**(120)** Ecomar Propulsion, United Kingdom
**(121)** Aix-Marseille University, LEST, France
**(122)** UTM.CSIC, Spain
**(123)** Ifremer, BEEP UMR6197 Ifremer, Univ Brest, CNRS, France
**(124)** AMURE Joint Research Unit, France
**(125)** eOdyn, France
**(126)** Doris Engineering, United Kingdom
**(127)** We positive Invest, Arkea Capital, France
**(128)** Big Bang Project Agency, France
**(129)** Futurs souhaitables Institute, France
**(130)** MNHN Concarneau, France
**(131)** BLUEFINS, France
**(132)** Institut Universitaire des systèmes thermiques industriels (IUSTI), UMR 7343, France
**(133)** SEACLEANERS, France
**(134)** FinX, France
**(135)** Dotation Funds Pure Ocean, France
**(136)** CEEBIOS, France
**(137)** FRAUNHOFER CML, Germany
**(138)** ELWAVE, France
**(139)** ALPHANOV, France
**(140)** NewCorp Conseil, France
**(141)** Dotation Funds Explore, France
**(142)** City of Lorient, France
**(143)** Université de Pau et des Pays de l'Adour
**(144)** Finsulate France by Blue Innov, France
**(145)** Université de Bretagne Occidentale, France
**(146)** Université de Mons, Belgium
**(147)** Algamafoods, France
**(148)** Crédit Agricole Corporate and Investment Bank (CACIB)
**(149)** Institut des Matériaux de Nantes
**(150)** Station Biologique de Roscoff, France
**(151)** Port de Bordeaux, France
**(152)** CITEPA, France
**(153)** Conseil général de l'environnement et du développement (CGEDD), Ministère de la Transition écologique & AIPCN, France
**(154)** Instituto Superior Técnico (IST), University of Lisbon, Portugal
**(155)** UBS, IRDL, France
**(156)** CentexBel, Belgium
**(157)** Mer Concept, France
**(158)** UBS, France
**(159)** Union Nationale des Producteurs de Granulats (UNPG), France
**(160)** Direction Régionale de l'Environnement, l'Aménagement et le Logement de Bretagne (DREAL Bretagne) - Ministère de la Transition écologique et de la Cohésion des territoires, France
**(161)** Bureau de Recherches Géologiques et Minières (BRGM) - Ministère de l'écologie de l'Energie, du Développement durable et de l'Aménagement du territoire, Ministère de l'Enseignement Supérieur et de la Recherche Scientifique, France
**(162)** Service Hydrographique et Océanographique de la Marine (Shom), France
**(163)** Laboratoire d'Océanologie et Géosciences (LOG), UMR8187, Univ-Lille/CNRS/ULCO, France
**(164)** Territoires, Villes, Environnement Société - EA 4477 - Université du Littoral Côte d'Opale, Université de Lille : EA4477, France
**(165)** Morphodynamique Continentale et Côtière - Centre National de la Recherche Scientifique : UMR6143, Université de Rouen Normandie, Institut national des sciences de l'Univers, Université de Caen Normandie, Institut National des Sciences de l'Univers, Institut national des sciences de l'Univers, France
**(166)** Center for Marine Environmental Sciences (MARUM), Germany
**(167)** Geo-Ocean, Univ Brest, CNRS, Ifremer, UMR6538, France
**(168)** Laboratoire des Sciences Appliquées de Cherbourg - Normandie Univ., UNICAEN, EA 4253, France
**(169)** Cnam/Intechmer - Conservatoire National des Arts et Métiers, France
**(170)** Morphodynamique Continentale et Côtière (M2C) - Normandie Univ, UNICAEN, UNIROUEN, UMR CNRS 6143, France

# ORGANISATIONS INVOLVED IN THE CONFERENCE PROGRAMME

**(171)** IC-ENC, United Kingdom
**(172)** Geomod, France
**(173)** Marine Nationale, France
**(174)** Station de Pilotage Le Havre Fécamp, France
**(175)** CBS, France
**(176)** Alca Torda, France
**(177)** Bretagne Developpement Innovation, France
**(178)** IMAR, Canada
**(179)** ISMER-UQAR, Canada
**(180)** RWE, Germany
**(181)** Genavir, France
**(182)** Ship ST, France
**(183)** Wind Ship Association, France
**(184)** IRD, URMIS-Paris Diderot, France
**(185)** Navgathi, India
**(186)** Centre de Recherche pour l'Architecture et l'Industrie Nautiques (CRAIN), France
**(187)** WindCoop, France
**(188)** D-ICE Engineering, France
**(189)** ENSM, France
**(190)** International Wind Ship Association (IWSA)
**(191)** AYRO, France
**(192)** VPLP design, France
**(193)** CT Mer Forte, France
**(194)** TOWT, France
**(195)** GloBallast, UK
**(196)** National School of Chemistry, Biology and Physics (ENSCBP-Bordeaux INP), France
**(197)** Airseas, France
**(198)** Brittany Region, France
**(199)** Cedre, France
**(200)** Institut national de l'environnement industriel et des risques (Ineris), France
**(201)** Royal Belgian Institute of Natural Sciences, Belgium
**(202)** Direction Générale Des Affaires Maritimes, De La Pêche Et De L'Aquaculture (DGAMPA), France
**(204)** Laval University, Canada
**(207)** IUEM, Brest University, France
**(208)** Pôle Mer Bretagne Atlantique, France
**(209)** Reeferpulse, France
**(210)** Marinelec, France
**(211)** SNEF, France
**(212)** iFADO project and Instituto Superior Técnico (IST), Portugal
**(213)** Cluster Maritime Français, France
**(214)** Energy Observer, France
**(216)** Esprit de Velox, France
**(217)** ABB Group, France
**(218)** Maersk-McKinney Moller Center for Zero Carbon Shipping, Denmark
**(219)** Alfa-Laval, France
**(220)** CNRS, BeBest, France
**(221)** Excelia, France
**(222)** ATKA non-profit organisation, France
**(223)** Pelagis observaroty, France
**(224)** OceanCare, Switzerland
**(225)** Institut Océanographique Paul Ricard / Ocean Climate Platform, France
**(226)** Promare, USA
**(227)** French Embassy in India, France
**(228)** Centre National de la Recherche Scientifique Office in India, (CNRS), France
**(229)** CNRS Sorbonne Université, Laboratoire d'Ecogéochimie des Environnements Benthiques, LECOB, Observatoire Océanologique de Banyuls Sur Mer, France
**(230)** Centre for Ecological Sciences, Indian Institute of Science, India
**(231)** IRD, Marine Biodiversity, Exploitation and Conservation (MARBEC), France
**(232)** IRD, Laboratoire d'Océanographie - Expérimentation et Approches Numériques (LOCEAN), France
**(233)** JET Engineering System Solutions, UK
**(234)** Simec Atlantis, UK
**(235)** Grain de Sail, France
**(236)** IFPEN, France
**(237)** Hyke, Norway
**(238)** French Embassy for the Poles and Maritime Issues, France
**(239)** Ponant, France
**(240)** Arctic Economic Council, Norway
**(241)** Maritime Prefect, France
**(242)** French National Assembly, France
**(243)** Le Cercle Polaire, France
**(244)** French polar institute Paul-Emile Victor (IPEV), France
**(245)** Le Vagabond, France
**(246)** French National Maritime College, France
**(247)** L'Astrolabe, French Navy, France
**(248)** PGPE, France
**(249)** Sedna, France
**(250)** Geogas Maritime, France
**(251)** France LNG, France
**(252)** Bretagne Développement Innovation, France
**(253)** IEEE OES France Chapter, France
**(254)** Institut France-Québec Maritime, France-Canada
**(255)** Technopole Maritime du Québec, Canada
**(256)** IEEE-OES
**(257)** Office Français de la Biodiversité, France
**(258)** France Cyber Maritime, France
**(259)** Institut de la corrosion, France
**(260)** Brittany Ferries, France
**(261)** Inyanga Maritime, UK
**(262)** Opsealog
**(264)** PML Applications Ltd, UK
**(265)** Maritime UK South West, UK
**(266)** Seaowl, France
**(267)** IoT.bzh, France
**(268)** Semsoft, France
**(269)** Schneider Electric
**(270)** SINAY, France

# HIGHLIGHTS

## SOCIAL EVENTS

### EXHIBITOR'S DRINK RECEPTION

**TUESDAY 27TH SEPTEMBER 7PM, EXHIBITION HALL.**

Network with the other exhibitors; Invite your current and upcoming clients or partners. An event by invitation only dedicated to the exhibitors and their prospects.

**The cocktail will be introduced by our partner for the event Crédit Mutuel Arkéa.**

The drink reception will also include the networking cocktail of the Norwegian delegation as well as the ice breaker of the French Congress of sedimentology.

### GALA EVENING

**WEDNESDAY 28TH SEPTEMBER 7.30PM, LES CAPUCINS.**

The gala evening will be organised in the incredible setting of the Ateliers des Capucins (Brest), the largest covered public square in Europe. This astonishing industrial cathedral with its majestic naves offers a breathtaking view over the harbour of Brest.

> Come and network around the Emperor's canoe, a symbol of maritime history.
> Visit the 70.8, a new place where the sea is told through the prism of innovation and technology.
> Taste French and Breton specialities while discovering the music of the region.

## OPENING

### INAUGURATION OF THE EXHIBITION

**TUESDAY 27TH SEPTEMBER 11.30AM, EXHIBITION HALL.**

### SEA TECH WEEK® OFFICIAL OPENING

**TUESDAY 27TH SEPTEMBER 1.45PM, AUDITORIUM.**

Welcome speeches from the President of Brest métropole, the President of the Brittany region, the French State, the European parliament, the European Commission and the Indian Minister of Ports, Shipping and Waterways

# FOCUSES

## WOMEN IN MARINE SCIENCE AND TECHNOLOGY

Testimony of Marie-Noëlle Tiné-Dyèvre,
President of **WISTA France**

"On the occasion of the **One Ocean Summit** held at the beginning of February 2022 in Brest, during the **Women Voices** for **Ocean workshop**, organised by **WISTA France**, I asked in conclusion, and I renew on the occasion of **Sea Tech Week®**, whose focus on women in marine sciences and technologies I welcome here, the following message:
We ask the international public and private maritime actors to commit themselves to respecting the United Nations Sustainable Development Goals 14 and 5, to eliminate the pay gap, to recruit more women and to retain them in order to bring more mixity at all levels in companies and public establishments, which is a guarantee of performance, balance and a sustainable and responsible development of the oceans.
We hope that within the governance bodies and at the negotiating table on the future of the oceans, there will be a permanent search for gender diversity so that men and women can contribute together to the protection of the Ocean, our common good".

**BEFORE AND DURING THE EVENT, WOMEN IN MARINE SCIENCE ARE IN THE SPOTLIGHT:**

**> Portraits of engaging women who work in specific maritime fields**

**> Verbatims to encourage young recruits to get involved in the stimulating maritime field**

**> Discover on site an exhibition of women portraits involved in marine science**

## TRAINING AND CAREERS IN MARINE SCIENCE AND TECHNOLOGY

**Campus mondial de la mer** includes 28 training related institutions which train 8,500* people per year. Initial or continuing education, short or long courses, every level and professional projects are under concern. In 2022, **Campus mondial de la mer** launched its portal highlighting the training offer and institutions. Regular news are also published. Please visit **www.training-campus.fr**.
To echo this action, **Sea Tech Week®** this year offers the opportunity for small groups of schoolchildren and students (with an access for free) to meet experts attending at the event and who are volunteer to talk about their career path.

**AND ALSO:**

**> Come and discover the maritime industry sector with the «ship of trades» operated by CINav**
(Ground floor, beside the auditorium Anita Conti)
**www.cinav.fr**

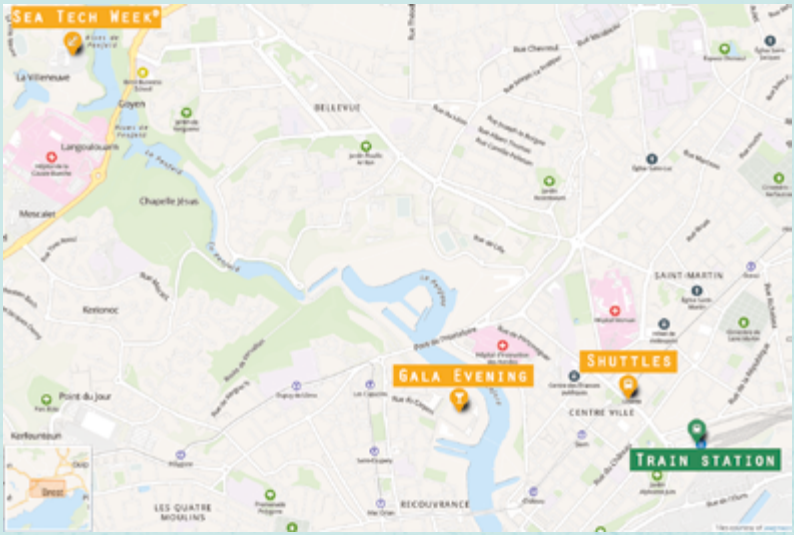
**> Attend the 3rd plenary session dedicated to the evolution of training and jobs in maritime transport (Thursday 29th September 2pm,**
(Auditorium Anita Conti)

**> In the framework of the French Congress of Sedimentology, a round-table dedicated to career in geosciences is organised on Thursday 29th September 10.30am-12.20am**
(Auditorium Anita Conti)

**Excluding more generalist training that may lead to a job related to the sea.*

# PRACTICAL INFORMATION

**BREST EXPO** Rond-point Guerven – 29820 Guilers
**48°24.5952'N | 04°31.9192'O**




**A SHUTTLE SERVICE IS AVAILABLE FROM MONDAY TO FRIDAY**
**LOCATION IN THE CITY : PLACE DE LA LIBERTÉ – BREST.**

| | MORNING (CITY TO BREST EXPO) | EVENING (BREST EXPO TO CITY) |
|---|---|---|
| MONDAY | 1PM (X2) | 6PM<br>6:30PM |
| TUESDAY | 8AM<br>8:30AM | 7PM (X2)<br>8:30PM |
| WEDNESDAY | 7:30AM<br>8AM | 6PM<br>6:30PM<br>8:40PM |
| THURSDAY | 8AM (X2) | 6PM<br>6:30PM |
| FRIDAY | 8AM | 4PM |

## TAXIS

**AAA TAXIS BRESTOIS**
+33 (0)2 98 806 806
www.taxi806.com

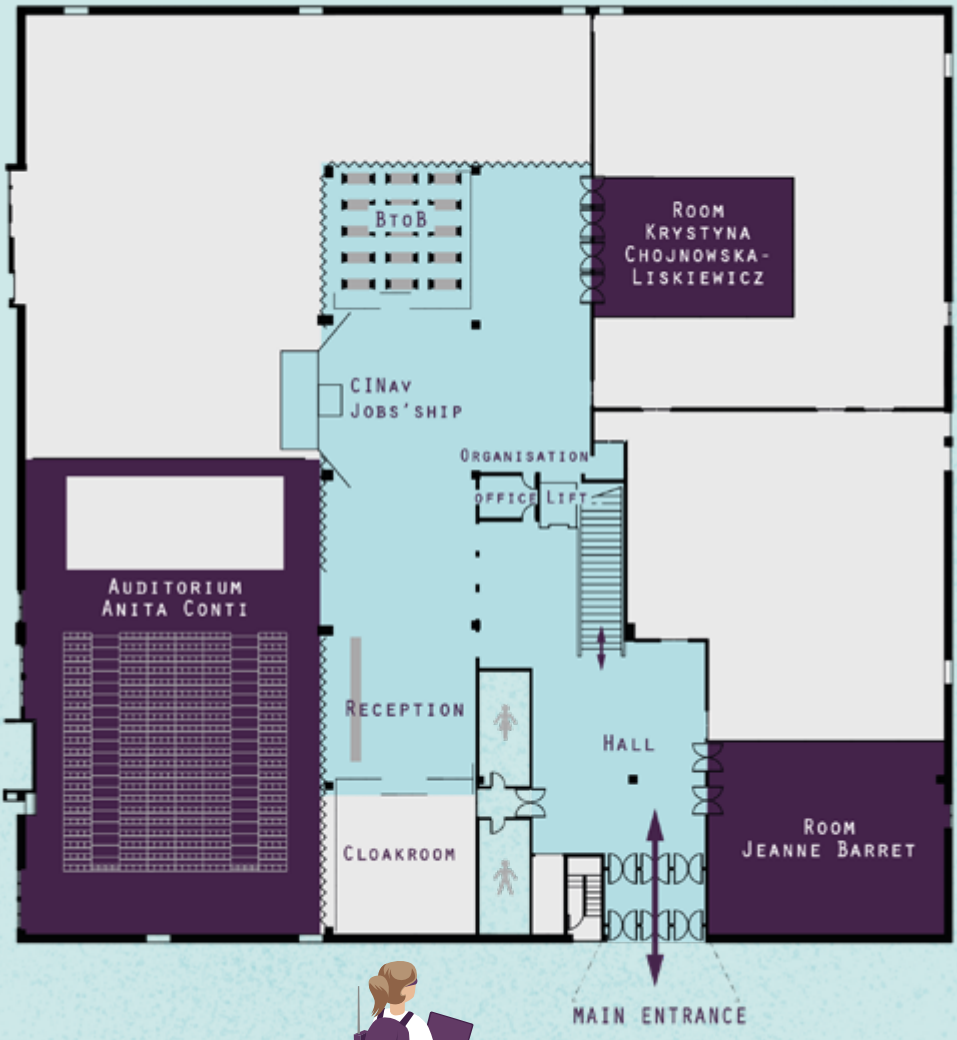
**TAXIS BRESTOIS**
+33 (0)2 98 801 801
www.taxisbrestois801.com

## TO IMPROVE YOUR STAY:

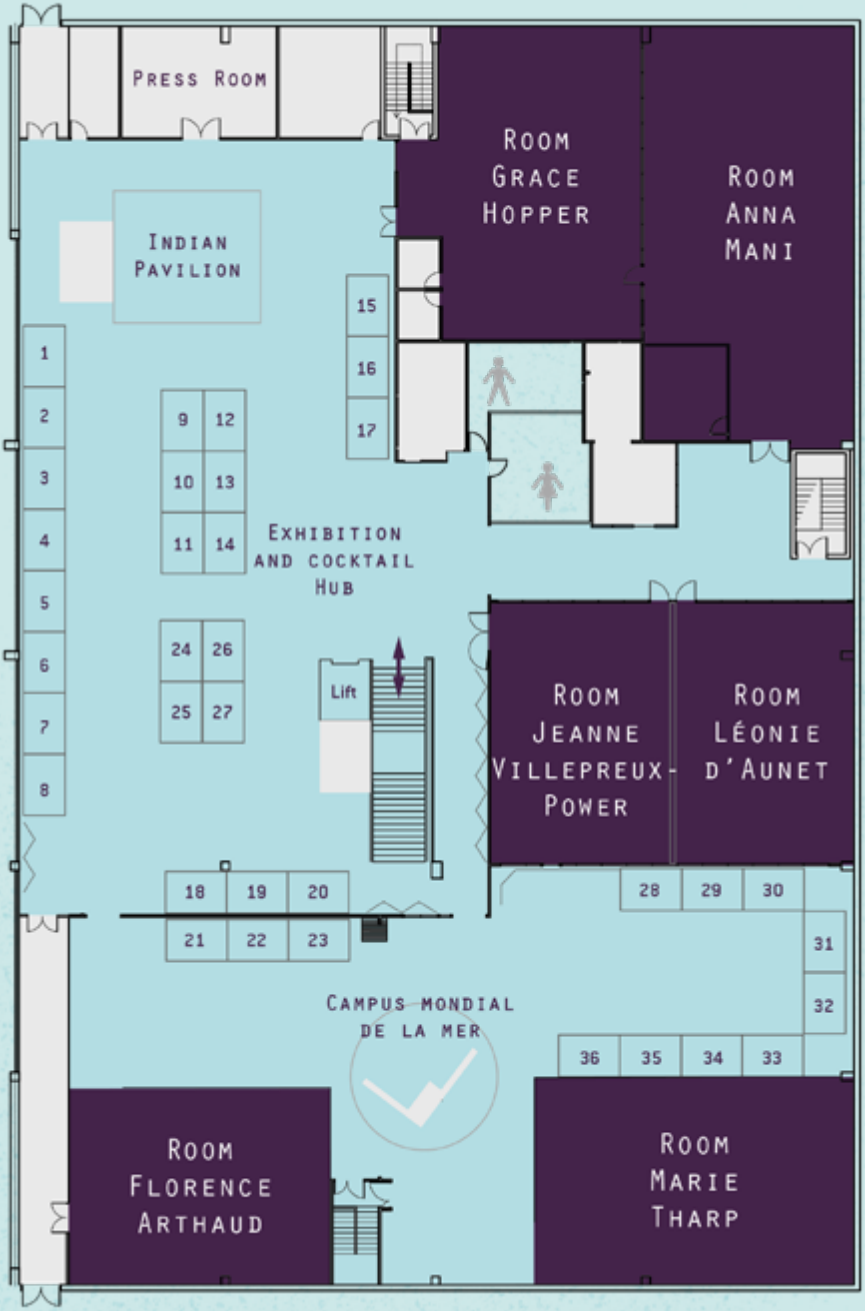
**BREST METROPOLE TOURISME**
8 avenue Georges Clémenceau
29 200 Brest
+33 2 98 44 24 96

Monday to Saturday: from 9:30am to 6pm
Closed on Sunday

# GROUND FLOOR



# 1ST FLOOR


Press Room
Room Grace Hopper
Room Anna Mani
Indian Pavilion
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Exhibition and cocktail Hub
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Lift
Room Jeanne Villepreux-Power
Room Léonie d'Aunet
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Campus mondial de la mer
Room Florence Arthaud
Room Marie Tharp

# LIST OF EXHIBITORS

01 > PrimeGPS
02 > Smart Shipping
03 > Maritime UK South West
04 > France Cyber Maritime
05 > Novacavi
06 > Deep Blue Technology
07 > Pôle Mer Bretagne Atlantique + Ifado
08 > RBR
09 > Thalos
10 > Sercel
11 > MacArtney
12 > EuroSWAC
13 > Geomod
14 > Cadden
15 > Ecole Navale
16 > Bretagne Développement Innovation
17 > Crédit Mutuel Arkéa
18 > Shom
19 > Maritech
20 > Celadon
21 > ECA Group
22 > iXblue
23 > Ad Terra Energy
24 > Thales
25 > Ouest Valorisation
26 > NKE Instrumentation
27 > Maint&Sea
28 > IEEE OES
29 > Neotek
30 > IM Solutions
31 > Thin Section Lab + New Tec Scientific + Brot Lab
32 > French Sedimentologists Association and UMR Geo-Ocean
33 > NortekMed
34 > Cerema
35 > Thermo Fischer Scientific
36 > IODP - France

# PARTICIPATE TO THE BTOB MEETINGS

## FROM YOUR PROFILE ON THE B2MATCH PLATFORM, SCHEDULE YOUR ONE-TO-ONE MEETINGS.

**BtoB meetings are managed by our partners Bretagne Developpement Innovation (BDI) and Enterprise Europe Network (EEN).**

### BRETAGNE DEVELOPPEMENT INNOVATION (BDI)

**Bretagne Développement Innovation** is Brittany's regional innovation and economic development agency, composed of 50 collaborators. Its mission is to participate in the transformation of the economy accelerating the implementation of the RIS. On regional priorities, BDI brings together multidisciplinary skills at the crossroads of the knowledge of local stakeholders, a vision of market and technology trends, as well as operational innovation practices in companies. BDI has a 20 years expertise in European Projects and is well integrated in a rich regional innovation ecosystem making it your privileged contact for European cooperation with Breton partners.

Following Brittany's strategic sectors (S3), our team of sectoral experts and European counsellors offers intelligence on large call for project tenders and partners' search on 5 European strategic sectors: Smart Energies, Cybersecurity, Digital Agri-Food, Marine Energy, Competitive sailing and Renewable hydrogen

### ENTERPRISE EUROPE NETWORK (EEN)

The **Enterprise Europe Network** helps small and medium-sized enterprises (SMEs) make the most of business opportunities in the EU and beyond. Bringing together around 600 business support organisations from more than 60 countries our experts can help you to find international business partners, source new technologies and receive EU funding or finance. And they can advise you on issues so diverse as intellectual property, going international, or EU law and standards.

The Network is active worldwide. It brings together experts from member organisations that are renowned for their excellence in business support.

*International partnerships*
Expertise, contacts and events to connect you with the right international partners to grow your business.

*Advice for international growth*
Expert advice for growth and expansion into international markets.

*Support for business innovation*
Solution-driven services to help you turn your innovative ideas into international commercial successes.

www.campusmer.fr

## IDENTIFY THE EXPERTS IN OUR COMMUNITY

Expertise desk

www.infras-campusmer.fr

## ACCESS TO THE MARINE TOOLS AND EXPERTISE TO INNOVATE!

Marine research infrastructures and facilities portal

www.training-campusmer.fr

## A TRAINING OFFER FOR ALL

Train for jobs in the sea sector!

CAMPUS MONDIAL DE LA MER

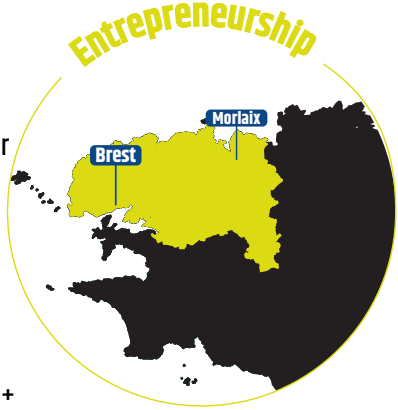
Brest MÉTROPOLE

Région BRETAGNE

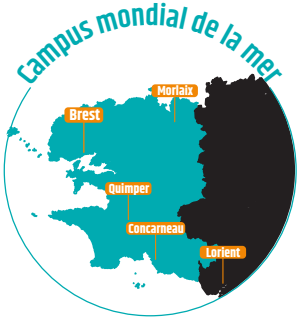
TECHNOPÔLE BREST - IROISE

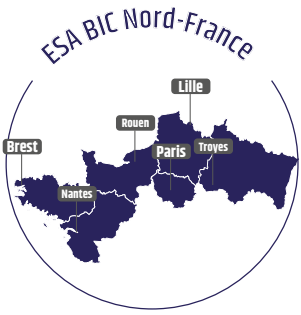
TECHNOPÔLE
BREST - IROISE

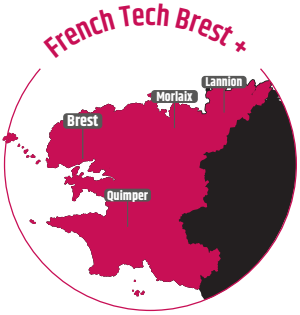
Technopôle Brest-Iroise is an EU Business Innovation Center (BIC) located in Brest, France. It supports the creation of startups and the development of more mature companies which want to innovate. Every year it supports the creation of 10 to 20 startups, mainly in the maritime, digital, health and spatial sectors.




Technopôle manages thematic programmes such as the Campus mondial de la mer (to create connections between research and industry in the maritime field and ensure the visibility of Brest and Brittany at international level), the French Tech Brest + (to create connections between research and industry in the digital field) but also the ESA BIC Nord France (to foster the creation and development of companies based on the transfer of technologies from the space sector to other economic sectors, and on the development of services and applications based on space technologies).




Contact :
contact@tech-brest-iroise.fr
+33(0)2 98 05 44 51

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# Le Crédit Mutuel Arkéa accompagne tous les acteurs de la filière mer

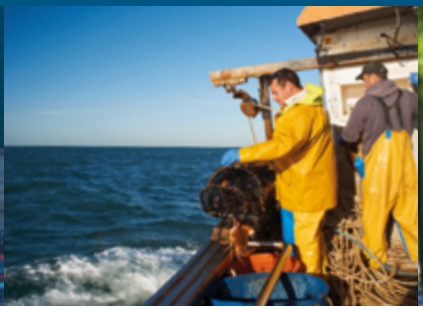
« L'économie maritime et ses innovations sont au cœur des transitions d'avenir que le Crédit Mutuel Arkéa entend accompagner. En soutenant l'innovation et la R&D des sea-tech, le Crédit Mutuel Arkéa est aux côtés de ceux qui contribueront à relever les défis de la transition maritime : décarbonation des flottes, verdissement et électrification des ports, préservation des ressources ou encore développement des énergies marines renouvelables ...

Parce que toute transformation d'ampleur nécessite à la fois d'être financée et exige une approche collaborative, nous agissons naturellement, pour relever cette ambition, de concert avec les acteurs institutionnels, privés et la société civile : notre présence à la 13ème édition de Sea Tech Week® organisée, par le campus mondial de la mer, est le reflet de notre engagement. »

**Julien Carmona**
Président du Crédit Mutuel ARKEA

- Pêche, algues, conchyliculture et aquaculture durables
- Transport et fret
- Construction, réparations navales et infrastructures
- Défense, sécurité et sûreté maritimes
- Négoce et transformation des produits de la mer
- Nautisme, plaisance et course au large
- Energies marines et renouvelables
- Sea-Tech

Crédit photo : GettyImages



Crédit Mutuel ARKEA

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