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Users  
Conference  
Transitioning  
to autonomous  
operations

# AGENDA | 23 JUNE 2022

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09:20 a.m. Breakfast & Registration

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09:50 a.m. Welcome Speech

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## USVS FOR HYDROGRAPHY & OCEANOGRAPHY SESSION

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10:00 a.m. **How autonomous operations affect the IHO agenda** | Dr. Mathias Jonas | IHO

10:20 a.m. **Tests cruise of a DriX USV with a fishery sensors package** | Marc Nokin | Ifremer

10:40 a.m. **The renewal of the French hydrographic and oceanographic fleet (CHOF)** | CAPT. Laurent Louvart | SHOM

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11:00 a.m. DriX Uncrewed Surface Vehicle Over The Horizon demonstration

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11:30 a.m. Coffee Break

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11:45 a.m. **Searching for the lost wreck of the Ravenel fishing trawler using DriX USV** | Olivier Moisan | iXblue

12:05 p.m. **The Mayflower Autonomous Ship** | Brett Phaneuf | Promare

12:25 p.m. **Trends in Autonomy and Artificial Intelligence: example of the U.S. DriX USV** | Rear Admiral(ret) Tim Gallaudet, PhD | Ocean STL Consulting, LLC

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12:45 p.m. Lunch & visit of iXblue manufacturing facilities

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## SUBSEA IMAGERY AND SITUATIONAL AWARENESS SESSION

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02:30 p.m. **The importance of a continuum between high quality surveying and the management of authoritative bathymetric/ oceanographic data to ensure the safeguarding of national rights on seabed and naval resources** | Guilhem Soulie | Esri

02:50 p.m. TBC | Julien Guichard | iXblue

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03:10 p.m. **Enhancing autonomous survey capabilities with FlipiX new ROTV** | Stéphane Vannuffelen | iXblue

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## SUBSEA OPERATIONS SESSION

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03:30 p.m. TBC | Alain Biston | ASN

03:50 p.m. **Autonomous multi-vehicle operations in ultra-deep environment** | Anna Lim | Argeo

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04:10 p.m. Coffee Break

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04:30 p.m. **From de-risking to value creation: First Canopus/Ramses LBL solutions deployment on an O&G project** | Trevor Pugh | UTEC

04:50 p.m. **USV+AUV collaboration: opportunities and way forward** | Mathieu Lardeux | Total Energies

05:10 p.m. **The challenges of positioning a deep-sea harvesting vehicle on the abyssal plain** | Hendrik de Beuf | DEME

05:30 p.m. **Subsea autonomous inspection of offshore wind assets** | Gautier Dreyfus | Forsea Robotics

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05:50 p.m. Closing remarks

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06:00 p.m. Networking dinner

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# PRESENTATIONS | USVS FOR HYDROGRAPHY & OCEANOGRAPHY SESSION

**IHO**  
Dr. Mathias Jonas  
10:00 a.m.

**How autonomous operations affect the IHO agenda**  
Sea surveys and the search for wrecks can be costly, time consuming and laborious. Full surveys to get up-to-date coverage and accuracy can be dangerous, dull and dirty in certain sea areas. Autonomous vehicles like underwater, floating or flying drones can now do the job far more effectively than boats with crews, airplanes, or divers. Autonomous technologies are helping make great advances in hydrography, but hydrography is also helping make progress in autonomous transportation technologies. Up-to-date and comprehensive hydrographic information is essential to develop autonomous shipping which is safe, efficient and sustainable. The IHO is called up to reflect the impact of its work program in the field of technical standardization and provision of data services.

**Ifremer**  
Marc Nokin  
10:20 a.m.

**Tests cruise of a DriX USV with a fishery sensors package**  
USVs were originally developed by industry mainly for the defence market, but scientific applications have now become a reality. These USV's can be used during scientific campaigns alongside research vessels to optimise time spent at sea, or even to replace vessels altogether for some highly specific missions. Ifremer studies the potentialities offered by this kind of platforms. In this context, Ifremer conducted a demonstration of a conventional DriX with a fishery sensors package in autumn 2021. This talk gives a general presentation of the cruise.

**SHOM**  
CAPT. Laurent Louvart  
10:40 a.m.

**The renewal of the French hydrographic and oceanographic fleet (CHOF)**  
Since its creation and until today, the information collected on all the oceans by the Shom accompanies the sailors, supports the actors of the blue economy, contributes to the protection and the preservation of the interests of the Nation. In a rapidly changing maritime world, within Seabed 2030 initiatives, the Shom must accelerate its knowledge of the oceans, through more extensive, deeper, more resolute, and more regularly updated measurements. Emblematic of a world in complete evolution, the CHOF project led by the General Delegation for Armament, the Defence General Staff, the Navy Staff and the Shom, must not only renew old ships, but also transform the Shom, its resources and its know-how. It is a question of being visionary and structuring a sovereign fleet, which will be scalable and sustainable for nearly half a century. By renewing the Navy ships used by the Shom with state-of-the-art assets: joint use of drones, use of artificial intelligence to process data rapidly, etc., the CHOF project is also dragging together a leading-edge industry and a scientific community invited to cooperate. Numerous experiments are being carried out as part of the CHOF's preparation stage. The DriX trials conducted by the Shom in September 2020 near Brest revealed its excellent aptitude for hydrographic work.

**iXblue**  
Olivier Moisan  
11:45 a.m.

**Searching for the lost wreck of the Ravenel fishing trawler using DriX USV**  
Almost 60 years after the disappearance of the fishing trawler Ravenel in Saint-Pierre-and-Miquelon, the French Minister for the Sea announced, in April 2021, that the search would resume using the DriX USV. With over 5800km of navigation lines conducted in challenging weather conditions trying to locate the wreck within unmapped areas, DriX was operated 24hours a day and supervised both within visual range and Over The Horizon from La Ciotat (France). This presentation will present the challenges encountered during the mission as well as the high-quality bathymetric data collected despite the challenging environment.

**Promare**  
Brett Phaneuf  
12:05 p.m.

**The Mayflower Autonomous Ship**  
The Mayflower Autonomous Ship (MAS400) is a grass roots initiative led by marine research non-profit ProMare with support from IBM and a global consortium of partners, initially launched to commemorate the 400th anniversary of her namesake crossing the Atlantic in 1620. Working in tandem with oceanographers and other vessels, MAS400 provides a flexible, cost-effective and safe option for gathering critical data about the ocean. It can spend long durations at sea deploying a vast array of scientific equipment while making its own decisions about route and mission optimization. iXblue provided the critical component to navigation that aids in our work at sea, an Octans Surface, without which the ship would literally be lost. This talk will provide an overview of the project to date, the technology deployed and the successes and failures to date, along with a preview of what comes next.

**Ocean STL Consulting, LLC**  
Rear Admiral(ret)  
Tim Gallaudet,  
PhD  
12:25 p.m.

**Trends in Autonomy and Artificial Intelligence: example of the U.S. DriX USV**  
Autonomous systems and artificial intelligence are transforming every aspect of industry, defense, and society. This presentation will describe this trend and iXblue's DriX as one example. With unmatched endurance, speed, and stability, DriX has the potential to become the market-leading USV in the U.S. The goals and objectives of the U.S. DriX Strategy and actions in the DriX Development Plan will be outlined as the path to realizing this potential.

# PRESENTATIONS | SUBSEA IMAGERY AND SITUATIONAL AWARENESS SESSION

**Esri**  
Guilhem Soulie  
02:30 p.m.

**The importance of a continuum between high quality surveying and the management of authoritative bathymetric/oceanographic data to ensure the safeguarding of national rights on seabed and naval resources**

With the increased emphasis placed by major geopolitical actors on ownership of sea lanes, fishing resources, and seabed resources (e.g. rare earth metals), an ongoing race has developed and will intensify in the short future to ensure credible claims to such critical assets. Traditional surveying of large bodies of water has remained impaired for decades by lack of high-quality data, time taken to survey relatively small areas, and inability to perform adequate deep see mapping of entire oceanic regions. With the recent advent of surveying technologies such as those developed by iXblue, it is now possible to envision a future where digital twins of seabeds and large water bodies could be managed in the same authoritative manner as their terrestrial counterparts within Geospatial Information Systems.

**iXblue**  
Stéphane Vannuffelen  
03:10 p.m.

**Enhancing autonomous survey capabilities with FlipiX new ROTV**

This presentation will introduce FlipiX, iXblue new Remotely Operated Towed Vehicle (ROTV), designed to operate in combination with a USV (Uncrewed Surface Vessel). It will detail FlipiX latest developments and test results. The overall concept of operation will be presented as well as the most recent Field Test results. FlipiX currently provides interfaces with Side Scan Sonar (EdgeTech 4200 or 4205) and Magnetometers. The Field Test results will highlight FlipiX unique capabilities in terms of its stability and will demonstrate how active attitude control enhances SSS measurement quality. The presentation will also show FlipiX remarkable turning capabilities that enable fast turns in between survey lines.

The demonstration of the simultaneous operation of iXblue DriX USV and FlipiX ROTV is a step change in running survey operation in autonomous mode. It allows to conduct hydrographic, geophysics and UXO operations in a single run. It also highlights iXblue long-term vision and commitment to develop a comprehensive ecosystem of maritime autonomous solutions.

**Total Energies**  
Mathieu Lardeux  
04:50 p.m.

**USV + AUV collaboration opportunities and way forward**

Early 2018 TotalEnergies E&P pioneered using an Unmanned Surface Vessel with a successful demonstration of the application of a Box-In operation in shallow water, using the DriX version 1. This first application opened the door to further explore other unmanned solutions for offshore activities. Facing the challenges raised by the conventional IMR or Survey solutions for conventional offshore or Deep-offshore, TotalEnergies R&D Upstream has tested in December 2021 at La Ciotat the association of two light drones: a USV and an AUV.

The test objectives intended to demonstrate that a USV, like DriX, can support an AUV mission. This addressed the challenges of both subsea and aerial communications, with the DriX employing autonomous behaviours to support tracking of the AUV while being remotely supervised.

**DEME**  
Hendrik de Beuf  
05:10 p.m.

**The challenges of positioning a deep-sea harvesting vehicle on the abyssal plain**

In DEME's efforts to provide an answer for the growing demand of metals used in the global transition to a greener economy, GSR is researching the feasibility of harvesting polymetallic nodules on the abyssal plain of the Pacific Ocean. As part of this research, prototype harvesting vehicles are being tested in situ at depths of around 5000m. Positioning these vehicles and all monitoring equipment around it comes with its own set of unique challenges. A wide range of iXblue products have been used to make this possible.

**Forssea Robotics**  
Gautier Dreyfus  
05:30 p.m.

**Subsea autonomous inspection of offshore wind assets**

The repeatability of offshore renewable inspection tasks opens the door to robotization. Forssea have developed Argos, the world most compact smart ROV (Remotely Operated Vehicle) dedicated to underwater inspections. Forssea will present its recent offshore deployment on both renewable and oil sites, highlight its key technological features. As a long term partner of iXblue, Forssea will present key collaboration milestones with iXblue products and R&D teams.

# PRESENTATIONS | SUBSEA OPERATIONS SESSION

## ASN

Alain Biston

03:30 p.m.

## TBC

TBC

## Argeo

Anna Lim

03:50 p.m.

### **Autonomous multi-vehicle operations in ultra-deep environment**

Transition to deep- and ultradeep-sea autonomous operations not only improve the HSE factors and overall performance but become the only practical and cost-effective way to access seabed providing sufficient coverage, resolution, and high data quality. This is important for both research and economic activities like deep-sea mining, where features of interest cannot be resolved by sea surface surveying. Data quality, in this case, depends on both remote sensing technologies but also navigational/positioning solutions that define the overall accuracy of the multitude of geospatial data. Being focused on data quality of multiphysics payload sensors, and dedicated to maximum efficiency of our operations, Argeo naturally pays equal attention to the choice of state-of-the-art inertial navigation system (INS), USBL and sparse LBL navigation for our AUVs that would provide reliable positioning and allow extended durations of surveying in high proximity to the seabed. In the presentation, we will share our experience and vision on AUV exploration for deep-sea minerals and particularly discuss multi-platform acquisition related challenges.

## UTEC

Trevor Pugh

04:30 p.m.

### **Managing the Risk of Being the First-User of Canopus/Ramses LBL systems**

UTEC selected Canopus/Ramses as the sparse LBL positioning system for a deepwater subsea construction project offshore Africa. The system was selected for its technical advantages over competitors' systems, proactive support from iXblue and to prove that it could give significant vessel time savings on future larger projects. UTEC would be first-users of the system. First-use meant significant risk of costs and loss of reputation for UTEC and iXblue if the system did not work. This talk covers the process followed by UTEC and iXblue to ensure the system worked.



**IHO**

Dr Mathias Jonas  
Secretary-General



**The International Hydrographic Organization** is an intergovernmental organization that works to ensure all the world's seas, oceans and navigable waters are surveyed and charted. Established in 1921, it coordinates the activities of national hydrographic offices and promotes uniformity in nautical charts and documents. It issues survey best practices, provides guidelines to maximize the use of hydrographic survey data and develops hydrographic capabilities in 95 Member States.

**Dr Mathias Jonas** is the Secretary-General of the International Hydrographic Organization (IHO) since 2017. Prior to this appointment he held the posts of Vice President of the Federal Maritime and Hydrographic Agency and National Hydrographer of Germany with responsibility for sea survey and sea cartography. As one of the responsibilities of his current post he holds the chair of the Hydrographic Commission on Antarctica.



**Promare**

Brett Phaneuf  
Founder and chief executive of Submergence Group LLC (USA) / M Subs Ltd (UK)



**Brett Phaneuf** is the founder and chief executive of Submergence Group LLC (USA) / M Subs Ltd (UK) and through his office in the United Kingdom overseas the design and production of manned and unmanned, underwater vehicle systems. A serial entrepreneur, Mr. Phaneuf has recently turned his attention to machine learning and artificial intelligence; a new company (Marine Ai) has been spun out from M Subs Ltd with the goal of creating cognitive AI to enhance maritime capabilities by drawing on decades of experience in manned and unmanned marine vehicle design, manufacture and operations, coupled with vast experience in automation and autonomous systems software architecture, and computer vision expertise. Brett is also one of three founding board members of ProMare, a non-profit (501c3) public charity founded in 2001 to promote marine exploration throughout the world.



**Ocean STL Consulting, LLC**

Tim Gallaudet  
PhD, Rear Admiral, U.S. Navy (ret)



**Ocean STL Consulting, LLC** is a marine technology and management consulting agency. We bring a nationally recognized reputation and record of success at the highest levels of government, academia, and industry. Our professional network provides direct access to top executives in the environmental, defense, and technology sectors.

Rear Admiral **Tim Gallaudet**, PhD, US Navy (ret) is the CEO of Ocean STL Consulting, LLC and host of The American Blue Economy Podcast. He is the former Acting Undersecretary of Commerce for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration (NOAA). He served for 32 years in the US Navy, completing his career as the Oceanographer of the Navy, and has a Bachelor's degree from the U.S. Naval Academy and Master's and Doctoral degrees from Scripps Institution of Oceanography.



**Ifremer**

Marc Nokin  
Head of Ships and on-board equipment department



**Ifremer** is the French Institute for research and exploitation of oceans. As an integrated marine sciences research institute, IFREMER contributes to national research and innovation, as well as to the European research landscape.

**Marc Nokin** joined IFREMER in 1985 and started working on the development of the ROV Victor 6000. He then moved to Brest (France) in 2000 for the building of RV Pourquoi pas? (2000-2006). Since 2007, Marc Nokin is the head of "Ships and Onboard Equipment" department in IFREMER. This unit is in charge of new constructions, modernizations and up-grading of the national research vessels, mainly of the scientific equipment and IT aspects.



## Esri

Guilhem Soulie  
Team Lead,  
National  
Government &  
National Security,  
Middle East & Africa



**Esri** is the world leader in Geospatial Information Systems technology. One of the world's largest companies to be entirely owned by its founder, it is dedicated to advancing the understanding of our world through geography and geospatial technologies. Comprised of around 8,000 employees, Esri reinvests more than 25% of its \$2.5bn annual income into R&D.

**Guilhem Soulie** is Esri's Team Lead for National Government & National Security in the Middle East & Africa region. With a dual French and American National Security culture (an alumni of both Paris II and Georgetown University), he has devoted his career to supporting Defense, Intelligence and National Government agencies through the digitization of their processes – whether it be emergency management, command & control, remote sensing, surveying, land administration or nation-wide statistics. An avid motorcyclist, you may find him riding around the world and he will always be ready to discuss geopolitics, good wines and advanced geospatial technology.



## ASN

Alain Biston  
President & CEO



**Alcatel Submarine Networks**, part of Nokia, leads the industry in terms of transmission capacity and installed base with more than 650,000 km of optical submarine systems deployed worldwide, enough to circumnavigate the globe 15 times. From traditional Telecom applications to Content and "Over The Top" Service Provider infrastructures, as well as to offshore Oil and Gas applications, ASN provides all elements of a turnkey global undersea transmission systems, tailored to individual customer's needs. An extensive Services portfolio completes its comprehensive offering for the submarine business, including project management, installation and commissioning, along with marine and maintenance operations performed by ASN's fully owned fleet of cable ships.

**Alain Biston** has been working for more than 25 years in telecoms, with Nortel, then Alcatel-Lucent / Nokia, holding management and leadership positions in R&D, Product Line, Industrial Operations, Sales & Marketing, Business Unit P&L accountability. He brings to ASN his thorough knowledge of the telecoms industry, his extensive international management background with several postings overseas, and his field-proven customer-facing acumen. Since 2016, as a Nokia executive, Alain has been Senior VP Customer Operations End2End and until October 2019 Senior Vice President in charge of Mobile Network business management. Alain holds a degree in Information Technology from INSA, Rennes, France. He was also honored with the National Order of Merit in 2006 from the French Minister of Industry.



## iXblue

Olivier Moisan  
DriX Operations  
Manager at iXblue



**Olivier Moisan** graduated from the National Institute of Marine Science and Technology of Cherbourg (Intechmer). After a few years working as a hydrographic surveyor for Belgium company GEOXYZ, he resumed his studies at the National School of Advanced Engineering Techniques of Brest (ENSTA Bretagne), where he continued his specialization in hydrography and oceanography, while, in parallel, obtaining a Master degree in Marine Geophysics at the European University Institute of the Sea (IUEM). After two years working as a freelance hydrographic surveyor and party chief, for companies like Geoclean, Jan de Nul, Boskalis, GeoXYZ or iXblue Sea operations, he permanently joined iXblue in 2015 as a project engineer and was appointed DriX USV Operations Manager in early 2020.



## Promare

Brett Phaneuf  
Founder and  
chief executive  
of Submergence  
Group LLC (USA) /  
M Subs Ltd (UK)



**Brett Phaneuf** is the founder and chief executive of Submergence Group LLC (USA) / M Subs Ltd (UK) and through his office in the United Kingdom oversees the design and production of manned and unmanned, underwater vehicle systems. A serial entrepreneur, Mr. Phaneuf has recently turned his attention to machine learning and artificial intelligence; a new company (Marine Ai) has been spun out from M Subs Ltd with the goal of creating cognitive AI to enhance maritime capabilities by drawing on decades of experience in manned and unmanned marine vehicle design, manufacture and operations, coupled with vast experience in automation and autonomous systems software architecture, and computer vision expertise. Brett is also one of three founding board members of ProMare, a non-profit (501c3) public charity founded in 2001 to promote marine exploration throughout the world.

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