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Users  
Conference  
Transitioning  
to autonomous  
operations

# AGENDA | 23 JUNE 2022

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09:00 a.m. Breakfast & Registrations

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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. Coffee Break

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11:15 a.m. DriX Uncrewed Surface Vehicle Over The Horizon demonstration

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

12:05 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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12:25 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. Safeguarding national rights on seabed and naval resources  
through the management of authoritative bathymetric/  
oceanographic data | Guilhem Soulie | Esri

02:50 p.m. Autonomous systems for remote MCM and key sensors |  
David Barre | ECA Group & Julien Guichard | iXblue

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03:10 p.m. Ulyx: an AUV for deep sea exploration | Jan Opderbecke |  
Ifremer

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## SUBSEA OPERATIONS SESSION

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03:30 p.m. Developments in the world of submarine cables |  
Alain Biston | ASN

03:50 p.m. Autonomous multi-vehicle operations in ultra-deep  
environment | Dr. 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 | TotalEnergies

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 | Forssea 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 on 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 the industry mainly for the defence market, but scientific applications have now become a reality. These USVs 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.

## PRESENTATIONS | USVS FOR HYDROGRAPHY & OCEANOGRAPHY SESSION

**iXblue**  
Olivier Moisan

11:45 a.m.

### **Searching for the lost wreck of the Ravenel fishing trawler using the DriX USV**

Almost 60 years after the disappearance of the Ravenel fishing trawler 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 paper will present the challenges encountered during the mission as well as the high-quality bathymetric data collected despite the challenging environment.

**Ocean STL Consulting, LLC**  
Rear Admiral(ret)  
Tim Gallaudet,  
PhD

12:05 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.

### **Safeguarding national rights on seabed and naval resources through the management of authoritative bathymetric/oceanographic data**

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.

**ECA Group**  
David Barre

**iXblue**  
Julien Guichard

02:50 p.m.

### **Autonomous systems for remote MCM and key sensors**

ECA Group is providing the most advanced unmanned systems for remote MCM to the Belgium & Royal Dutch Navies, simultaneously addressing Surface, Underwater and Air. This paper will present the program and showcase the importance of high-grade sensors, such as iXblue's, for critical capabilities including underwater communication and positioning, navigation, as well as underwater situational awareness and detection.

**Ifremer**  
Jan Opderbecke

03:10 p.m.

### **Uly<sup>x</sup>: an AUV for deep sea exploration**

Ifremer have developed a deep-sea AUV, Uly<sup>x</sup>, for operations down to 6000m depth. The new system has been designed, manufactured and equipped in partnership with ECA Group and iXblue. Uly<sup>x</sup>'s specific set of features allow to combine long range acoustic survey with close-to-sea-floor hovering for local imaging and inspection. iXblue products for subsea navigation, acoustic positioning, sonar acoustic imaging and sediment profiling equip the AUV. Trials at sea have allowed in 2021 to validate the system functionalities, vehicle security management, and payload data production. Two blue-water cruises on R/V *Pourquoi Pas?* Have been run in 2022 are programmed in order to qualify Uly<sup>x</sup> for missions down to the full operation depth.

# PRESENTATIONS | SUBSEA OPERATIONS SESSION

**ASN**  
Alain Biston  
03:30 p.m.

**Developments in the world of submarine cables**  
In order to meet our customers' ever-increasing requirements in terms of capacity and performance, ASN must always be at the cutting edge of technology and make its products and services evolve. The DriX is a perfect example of our desire to innovate and meet the new requirements of our maritime activities. It is also part of ASN's global approach to the fight against climate change, with the Smart Repeater as an example.

**Argeo**  
Dr. 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.

**From de-risking to value creation: First Canopus/Ramses LBL solutions deployment on an O&G project**  
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.

**TotalEnergies**  
Mathieu Lardeux  
04:50 p.m.

**USV + AUV collaboration: opportunities and way forward**  
Early 2018 TotalEnergies E&P pioneered using an Uncrewed Surface Vessel with a successful demonstration of the application of a Box-In operation in shallow water, using the DriX. This first application opened the door to further explore other uncrewed 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 in 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, and 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.



Dr Anna Lim  
Secretary-General



**Argeo** is a company with a mission to transform ocean industries by utilizing autonomous underwater/surface vehicles and deliver highly accurate digital models of the ocean space and AI-powered digital twin solutions. Equipped with unique geophysical and oceanographic sensors, Argeo's autonomous fleet significantly increases efficiency and data quality while substantially reducing CO<sub>2</sub> emissions from operations for Infrastructure, Offshore Wind, Oil & Gas, and Deep-sea Minerals markets.

**Dr Anna Lim** is a Principal Geophysicist and Discipline Leader for Deep-Ocean Space Exploration at Argeo. She focuses on deep-ocean space mapping, characterization and sub-seafloor imaging through the use and development of advanced sensors, robotic solutions and AI-powered data management/analysis, and leads deep-sea mineral activities in the company.



Alain Biston  
President & CEO



**Alcatel Submarine Networks** is the industry leader with 700,000 km of submarine optical cable deployed. It provides all elements of turnkey global submarine transmission systems, a strong portfolio of services, as well as innovative products for the oil and gas industry. It is involved in solutions to address climate change and has a fleet of 7 vessels. Part of @nokiam.

**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.



Hendrik de Beuf  
Chief surveyor



**DEME** is a world leader in the fields of dredging, marine engineering and environmental remediation. DEME's vision is to work towards a sustainable future by offering solutions for global challenges: a rising sea level, a growing population, reduction of CO<sub>2</sub> emissions and the scarcity of natural resources.

**Hendrik de Beuf** has been working in DEME's survey department since 2014 and got involved with GSR in 2017 for the development of their prototype deep-sea harvesting vehicles. Since then he has been responsible for the development and commissioning of the monitoring and positioning systems used during the offshore campaigns.



David Barre  
Program Design  
Authority



**ECA Group** is recognized for its expertise in robotics, automation systems, simulation and industrial processes. The company has been developing complete, innovative technological solutions for complex missions in hostile and confined environments since 1936. Its product offering is designed for an international client base that is demanding, both in terms of safety and effectiveness. The Group's main markets are in the defense, maritime, aeronautics, simulation, industrial and energy sectors. ECA Group is a Groupe Gorgé company.

**David Barre** has been ECA Group Design Authority for the BE&NL Navies' rMCM program since its award in 2019. Prior to that, David held various positions at ECA Group, including that of System Engineering Manager, as well as Project Manager for the Lightweight A9 AUV dedicated to French Clearance Divers, and Project Manager for the Lithuanian Navy's Expandable Mine Disposal System.



**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.



**Gautier Dreyfus**  
Co-founder & CEO



**Forssea** provides subsea Robotics As A Service (SaaS) solutions to offshore energy O&M contractors. Through its specialized team currently comprising 20 professionals, Forssea develops smart underwater vehicles with remote supervision capability as well as real-time vision systems. Founded in 2016, Forssea started to qualify its product in 2020 and recently entered commercial ramp-up phase with various North Sea and French clients.

**Gautier Dreyfus** started his career as a petroleum engineer on West Africa and North Sea projects. Since 2016, he has been leading Forssea to develop autonomous robotics systems for offshore energy operators. He graduated from Ecole Polytechnique (France), IFP School (France) and Texas A&M University (USA).



**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 Victor 6000 ROV. 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 at Ifremer. This unit is in charge of new constructions, modernizations and upgrading of the national research vessels, mainly of the scientific equipment and IT aspects.

**Jan Opderbecke**  
Head of Unit  
for Underwater  
Systems



**Jan Opderbecke** has been working for many years on subsea vehicles for the exploration of the deep sea. Electrical engineer and PhD in physics, his career interest lies in the field of underwater navigation and acoustic/optic mapping of the sea floor. He is head of Ifremer's Unit for Underwater Systems, which designs, develops and operates underwater vehicles within the French Oceanographic Fleet. The unit is furthermore involved in numerous research projects in underwater technology with academic or industrial partners.



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.



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.



Capt. Laurent Louvart  
Chief surveyor



**Shom's** mission is to know and describe the physical marine environment in its interactions with the atmosphere, the seabed and coastal areas, to forecast its evolution and to ensure the dissemination of corresponding information. Shom is a global player, operating on most of the world's oceans to provide services for a wide range of civilian and military clients.

After majoring in math and graduating from the École Supérieure d'Électricité, **Capt. Laurent Louvart** undertook postgraduate studies in Computer Sciences and Hydrography. He has been serving in Shom since 1992 and currently manages the HO survey fleet renewal project (CHOF) in cooperation with the Defense Procurement Agency, the French Navy and the Armies.



Mathieu Lardeux  
Asset Integrity  
Theme Manager



**TotalEnergies** is a global multi-energy company that produces and markets energies: oil and biofuels, natural gas and green gases, renewables and electricity. Our 105,000 employees are committed to energy that is ever more affordable, cleaner, more reliable and accessible to as many people as possible. Active in more than 130 countries, TotalEnergies puts sustainable development in all its dimensions at the heart of its projects and operations to contribute to the well-being of people.

**Mathieu Lardeux**, MSc. of Engineering from the Ecole Centrale Marseille France with 14 Years of experience both operational/project and R&D activities within TotalEnergies E&P. Mathieu started his career back in 2002 with TotalEnergies as process surface engineer in R&D, then he attained different roles as operation engineer and project package management in Deep water. Mathieu has joined the TotalEnergies subsea technology group in 2013 before joining the Deep-offshore R&D Program late 2016 in charge of the Asset Integrity theme including the Subsea Robotics project.



**Trevor Pugh**  
Technical  
Authority - Survey



**UTEC**, the lead brand for the geo-services business segment within Acteon, provides a wide range of survey services, includes offshore positioning and construction support, dimensional control surveys, metocean, geophysical and AUV surveys, geotechnical sampling and consulting services, laser scanning, 3D modelling and iSITE asset management portal, offering differing levels of data interaction.

**Trevor Pugh** is Survey Technical Authority for UTEC. His focus is implementation of remote services. Based in Aberdeen, Trevor also leads UTEC's Knowledge Transfer amongst personnel in UTEC's Houston, Perth, Abu Dhabi and Singapore offices. He joined UTEC in 2017 after working at Fugro and Technip since the early '80's in offshore survey and subsea construction.



**Olivier Moisan**  
DriX Operations  
Manager



**iXblue** is a global high-tech company recognized worldwide for delivering advanced navigation, photonics as well as maritime and autonomy solutions. From components to systems and comprehensive solutions, iXblue critical technologies are at work in both the civil and defense markets. They meet customers demanding requirements for successful missions in the most challenging environments, from the deep sea to outer space.

**Olivier Moisan** joined iXblue in 2015 as a project engineer for the Sea Operations division. With a hydrographic and geophysical engineering background, Olivier took part in diverse survey projects, including windfarm, dredging, nautical charting and oil/gas. In 2020, after being involved in the survey development of DriX, he was appointed DriX Ops Manager, supervising iXblue DriX Operations.

**Julien Guichard**  
Bid & Naval  
Program Manager



**Julien Guichard** has joined iXblue Navigation division in 2013 as Project Manager, mainly taking care of Inertial projects in the defense domain. In 2015, he became System Project Manager, involved in the first deliveries of iXblue Data Distribution Units (NETANS). Since 2018, Julien has been part of iXblue Sonar Systems division as Bids and Programs Manager.

## SPONSORS | PROFILE



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Nortek's product portfolio covers four themes: ocean waves, ocean currents, turbulent flow and subsea navigation. Our instruments are used by scientists, researchers and engineers at renowned institutions and government agencies worldwide. They are employed in demanding environments that require state-of-the-art instrumentation that is reliable and easy to use.



[www.oceanscan.co.uk](http://www.oceanscan.co.uk)

Formed in 1989, the privately owned Oceanscan Group has become a leading international equipment rental and personnel supply company. Oceanscan specialises in providing the very latest and most advanced subsea and inspection technology to the oil and gas, petrochemical, renewables, defence and nuclear industries.

Our continued investment in new and advanced equipment allows you access to the latest technologies at a fraction of the purchase cost; renting or hiring your subsea and inspection solutions and personnel directly from us dramatically reduces your financial outlay...let us make the investment for you.



[www.rts.as](http://www.rts.as)

RTS is an international provider of electronic engineering solutions for the subsea industry. We supply equipment and technical solutions to companies involved in the world's major offshore inspection, seabed mapping- and subsea construction projects. RTS was established in 2002, and has since then designed and manufactured industry-leading solutions, recognised as best-in-class by the ROV and subsea survey communities around the world.



[www.teledynemarine.com](http://www.teledynemarine.com)

Teledyne Marine is an organization comprised of 23 leading-edge undersea technology brands that have been assembled by Teledyne Technologies Inc. Through acquisitions and collaboration, Teledyne Marine has evolved into an industry powerhouse, providing the widest breadth of marine technology in the industry, now available through a single supplier. Each Teledyne Marine brand is a leader in its respective field, with a shared commitment to providing premium products backed by unparalleled service and support.

The Teledyne Marine companies now include: Teledyne AG Geophysical, Benthos, BlueView, Bolt, Bowtech, CDL, DGO, Gavia, Geophysical Instruments, Impulse, ODI, Odom Hydrographic, RD Instruments, Real Time Systems, RESON, SeaBotix, Storm Cable, TSS, VariSystems, and Webb Research

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