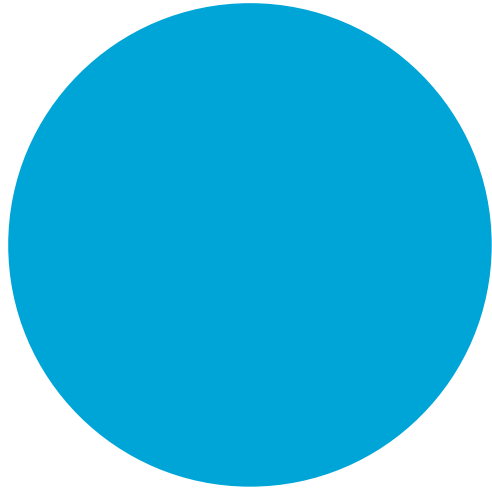




[David.vincentelli@ixblue.com](mailto:David.vincentelli@ixblue.com)



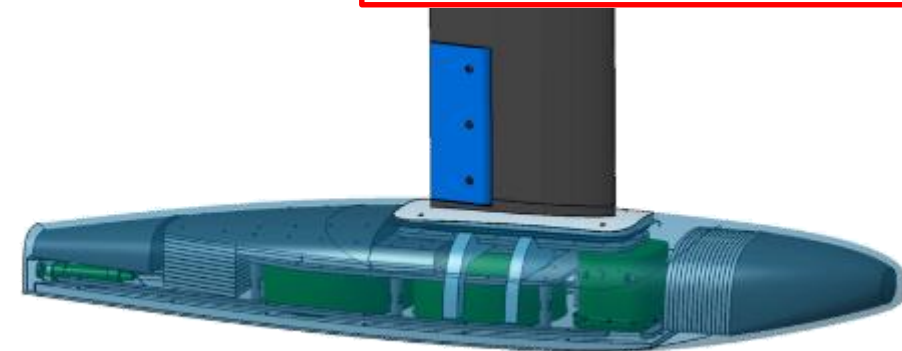
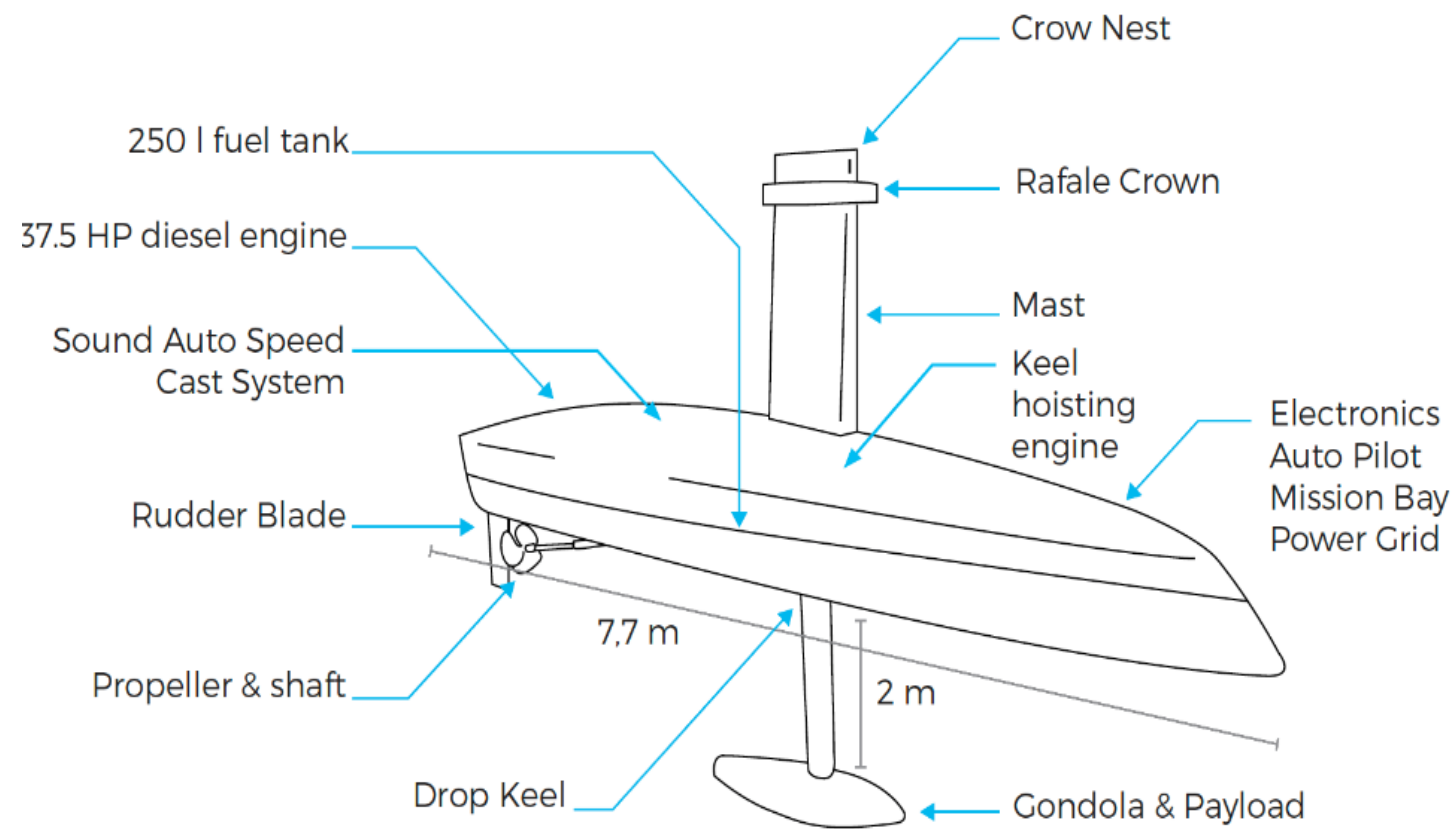
**9<sup>th</sup> ROPME SAHC**

# **REMOTE HYDROGRAPHY CONCEPT**

**Muscat, 15<sup>th</sup> November 2022**

# DriX USV in a Nutshell

PROPERTY OF IXBLUE



# Autonomy allows innovations in the design of the platform: Example of DriX

## **Main Dimensions**

Length Overall (LOA)	7,7 m
Beam:	0,82 m
Draft :	2,0 m
Light Weight :	1,4 Tons

## **Construction materials**

Hull & Deck & superstructure	composite material
------------------------------	--------------------

## **Performance**

Maximum Speed :	14 kt
Survey Speed :	8+ kt
Fuel capacity :	250 liters
Fuel Consumption (Survey):	2-3 L/h
Range :	650 nm@ 8kt

## **Machinery**

STD propulsion:	1 x 38HP diesel engine
Power Generation:	Up to 3 kW

DriX



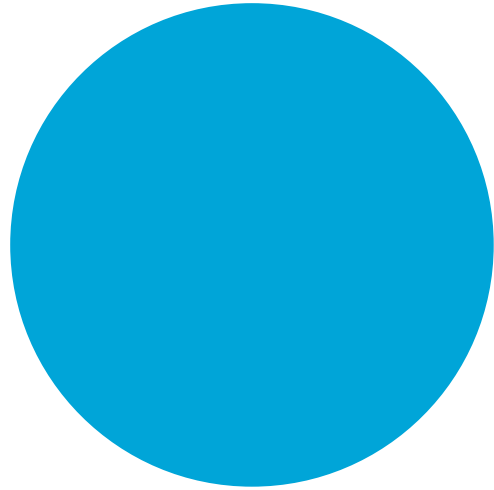
MISSION EQUIPMENT :	Mission software, LIDAR, Video Camera, IR camera
MISSION PAYLOAD:	Sensors antennas Inside the gondola
MISSION PAYLOAD:	
COMMUNICATION:	WiFi, Maritime Broadband Radio (MBR) , SATCOM, IRRIDIUM
AUTONOMY:	Up to 1500 Nm



iXblue





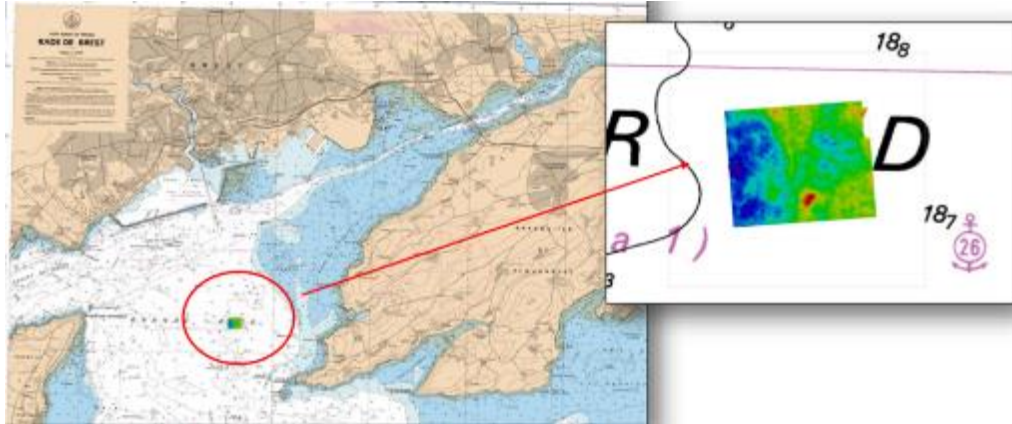


# **DriX Return of Experience**



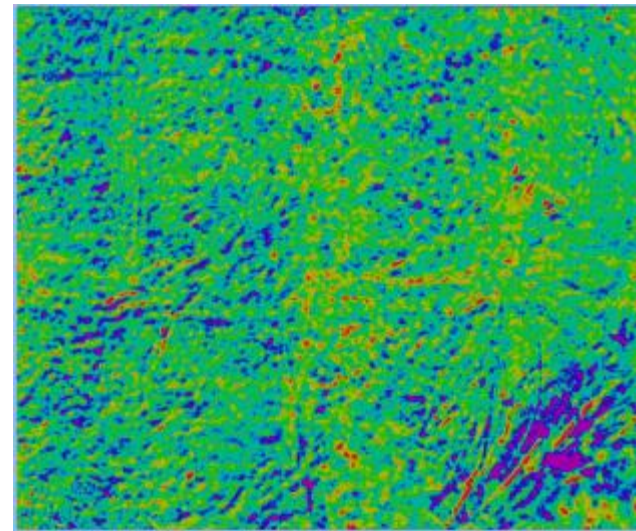
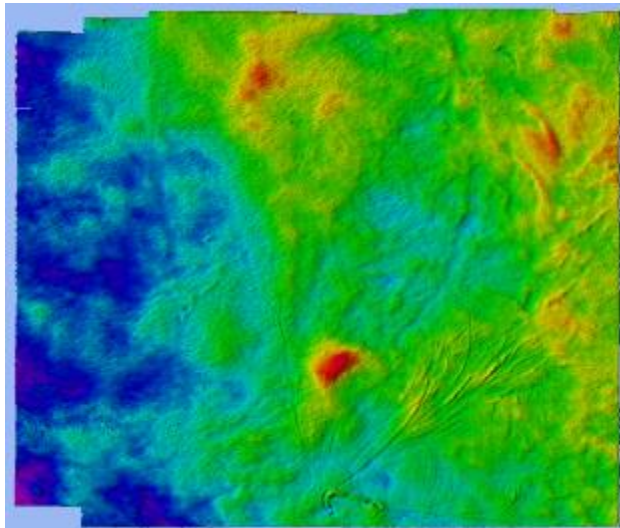
# Data Quality

## Qualification on SHOM - Reference area survey

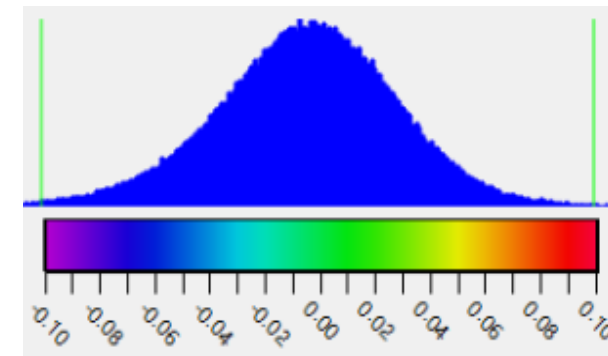


Outstanding achievements on meeting IHO exclusive order requirements in Uncertainty and data density @20m

<b>Mean difference respect to reference</b>	1cm
<b>Mean standard deviation</b>	3cm
<b>Result repeated and valid at speed</b>	4, 6, 8, 10 & 14kts



**Differential map**  
**DriX vs SHOM ref data set**

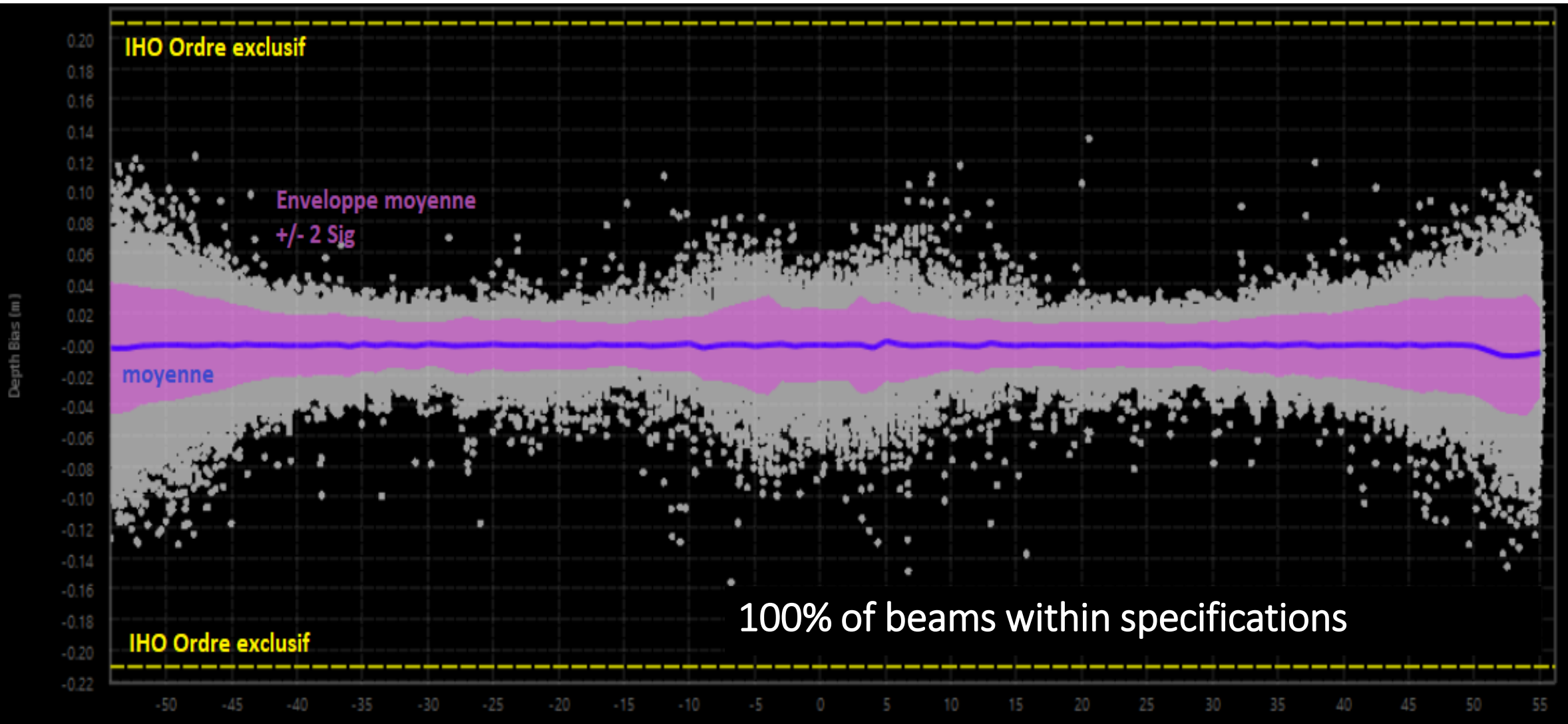


**Differential statistic**  
**distribution**



# Case Study: Hydrographic Reference Site

Qualification on reference area



100% of beams within specifications

# Hydrographic Survey Canada/France

## DriX Return of Experience

Manning: **1 engineer, 2 surveyors**

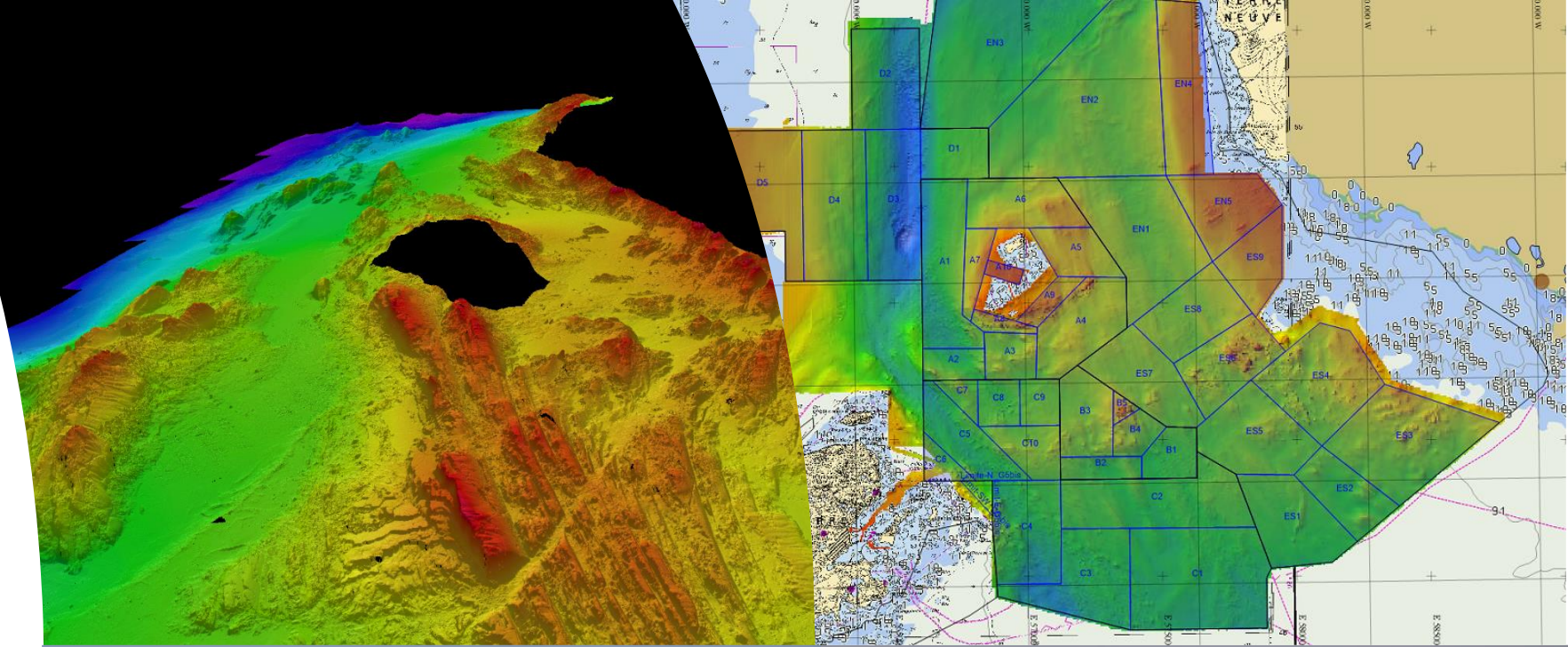
### Operational observations:

- Av. SeaState 4
- Wind up to 45kts
- Current up to 2.5 kts
- Overall 10% of weather standby
- Extremely Bad visibility
- Survey depth : 8 to 270m
- Satellite Derived Bathymetry: 0 to 15m

Data: > **6.0 Terabit**

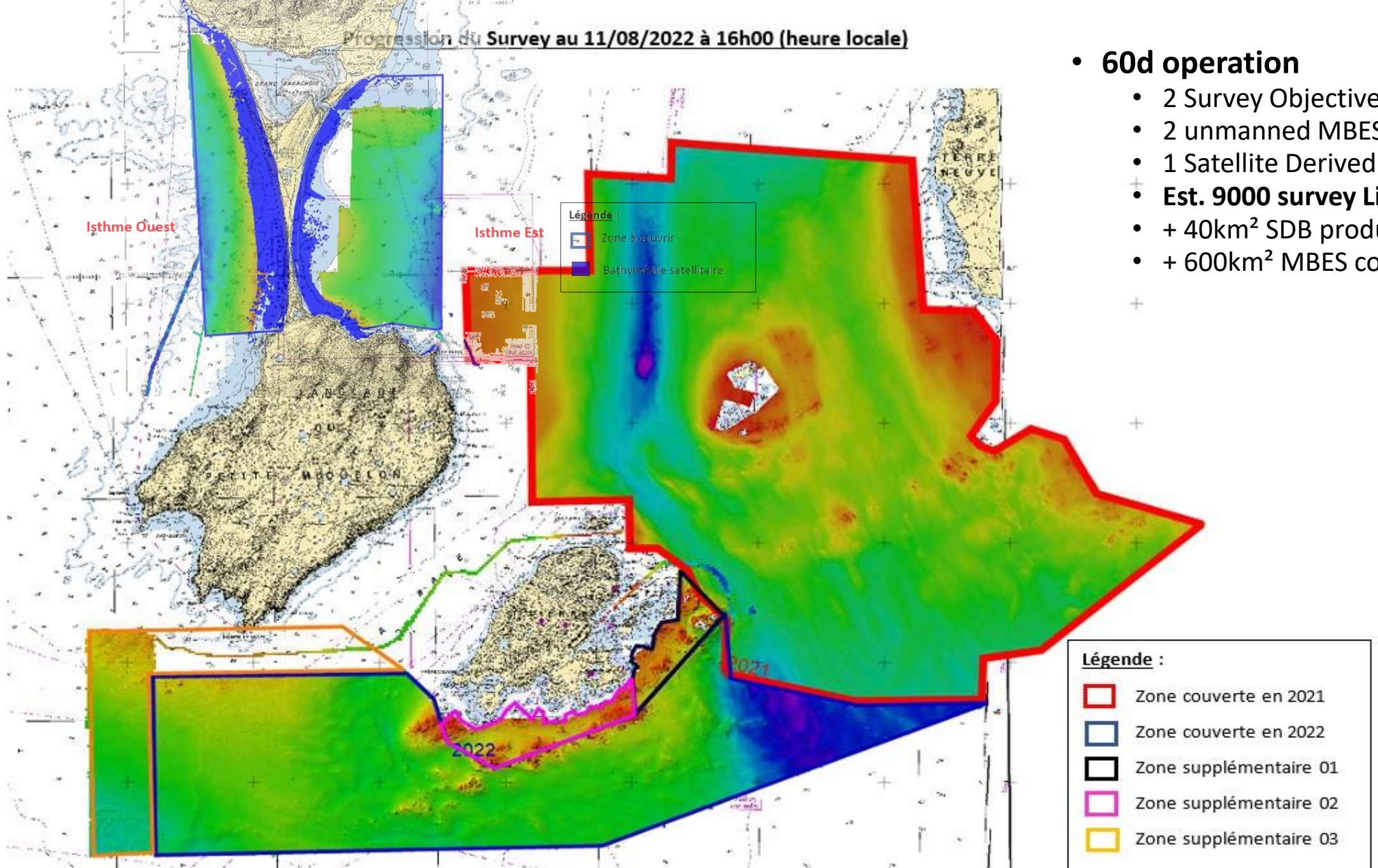
### Benefits:

- 2.5Tons Total fuel consumption in 60 days
- Results 5 times better than previous seabed mappings of the area
- 0 manual cleaning
- Field proven ColReg equipment
- 200m swath @WD 270m with the 400kHz – KM EM2040





Progression du Survey au 11/08/2022 à 16h00 (heure locale)

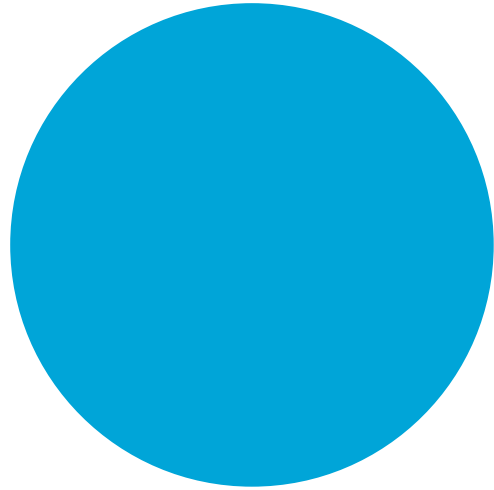


## • 60d operation

- 2 Survey Objectives, 2 Clients
- 2 unmanned MBES-SBP campaigns
- 1 Satellite Derived Bathymetry order
- **Est. 9000 survey Line KM**
- + 40km<sup>2</sup> SDB product
- + 600km<sup>2</sup> MBES coverage







**Enhancing the hydrospatial data  
gathering**

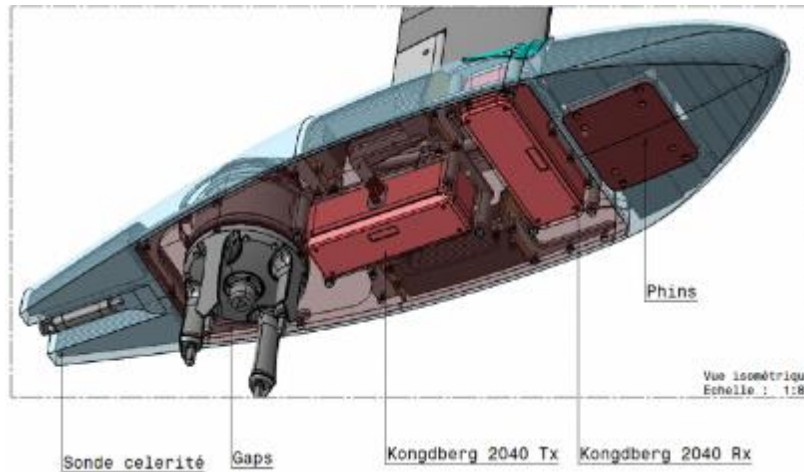
# A universal platform

A gondola to house any type of relevant sensor – a serious track record

Example of standard combination



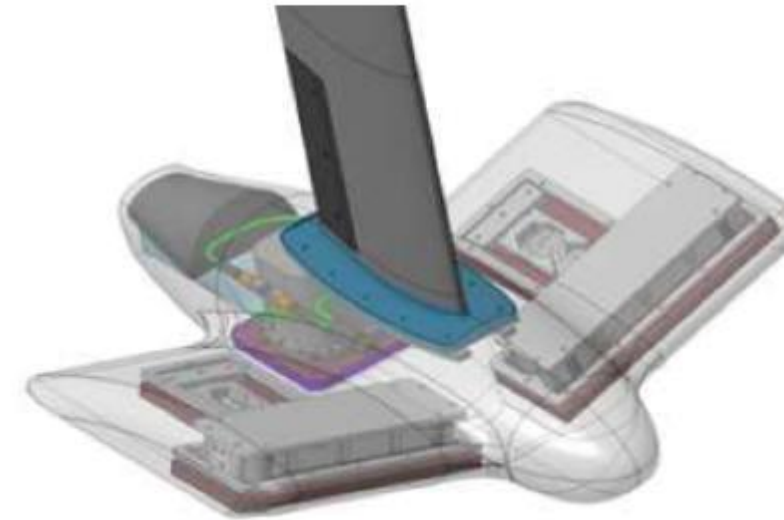
A GAPS USBL and a MBES



Integration track record:

- Multiple brands of MBES
- Side Scan Sonar
- Sub bottom profiler

Various sizes and shapes



- USBL
  - Acoustic modem
- All customers requirement within

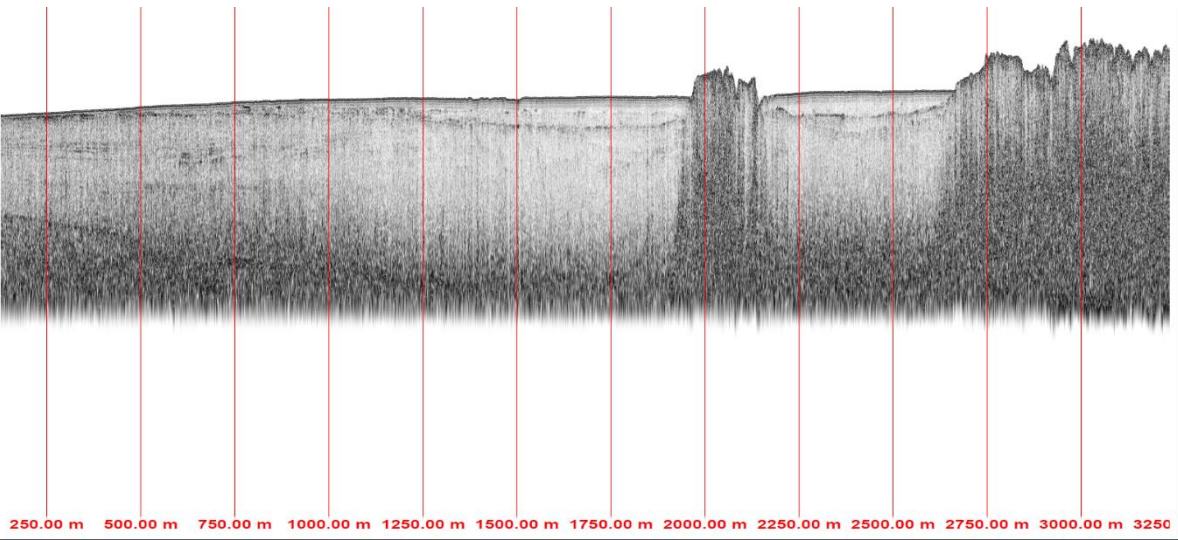


# Geophysical survey MBES & SBP simultaneous acquisition

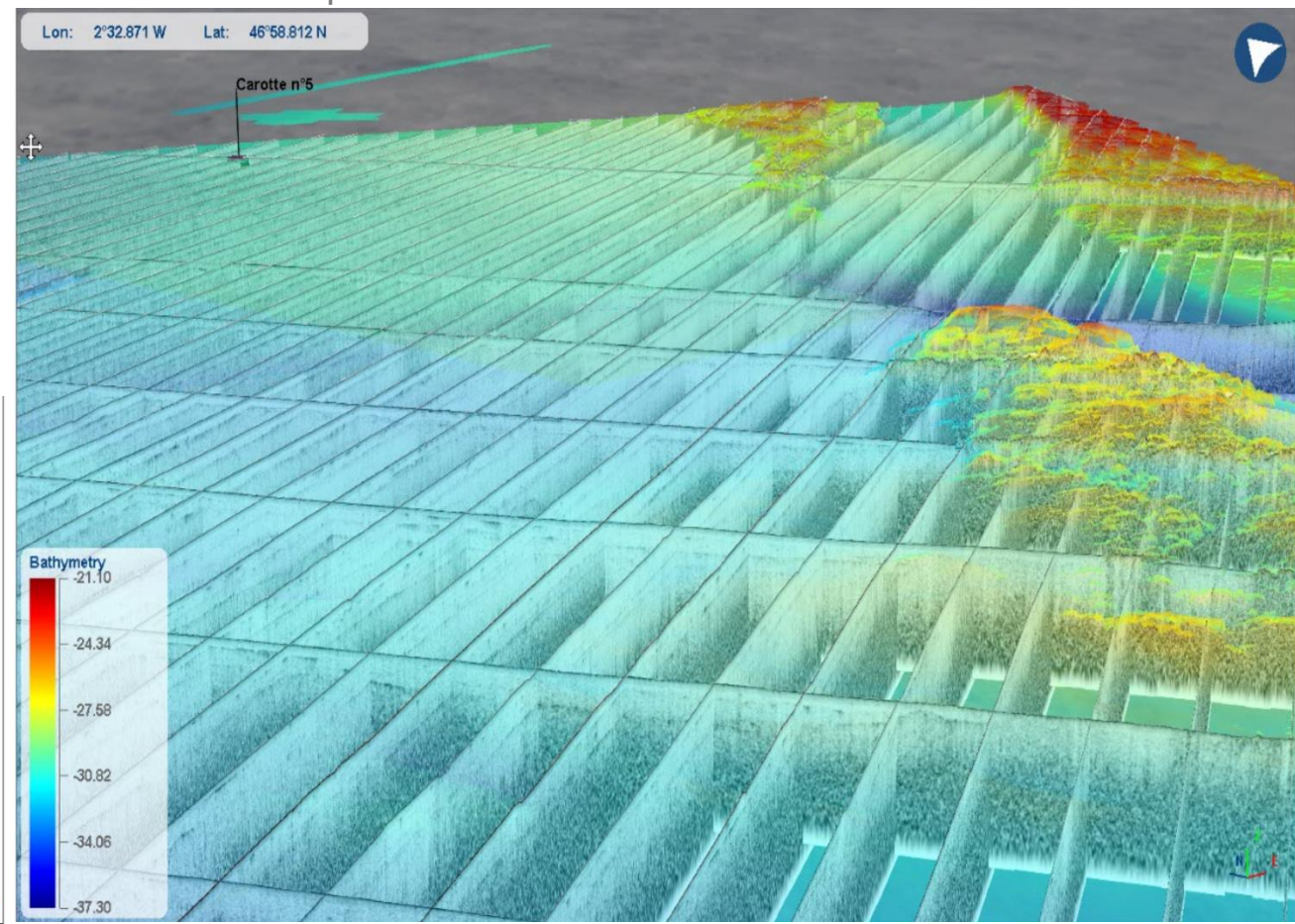
Large, high resolution sub-bottom survey to assess aggregate extraction / dredging activities

Reduce cost and impact of routine survey assessment

Increase data quality : line keeping, low noise environment, well known motion compensation.



SBP profil



Merged SBP / MBES top of the rocky layer

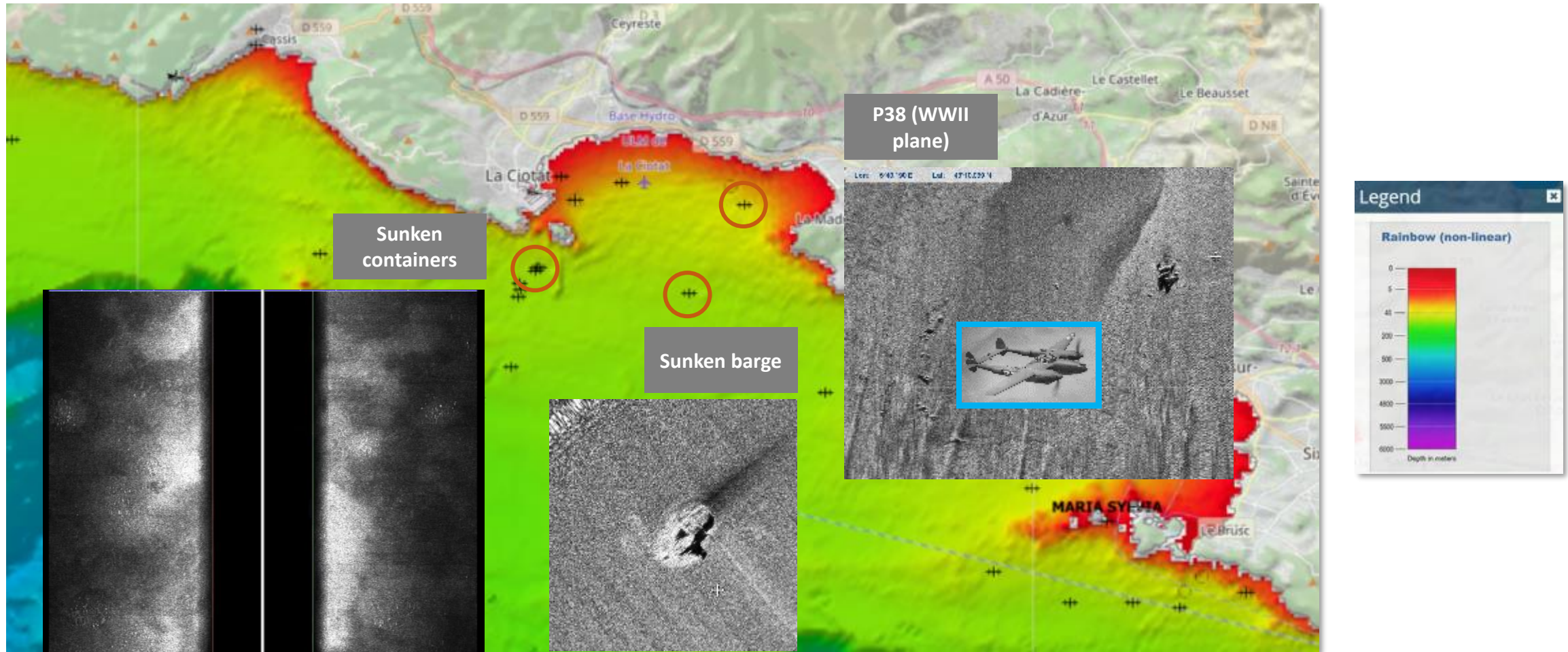
FLIPIX INNOVATIVE TOW WING

*Patent Pending –Confidential Industry*

**iXblue**



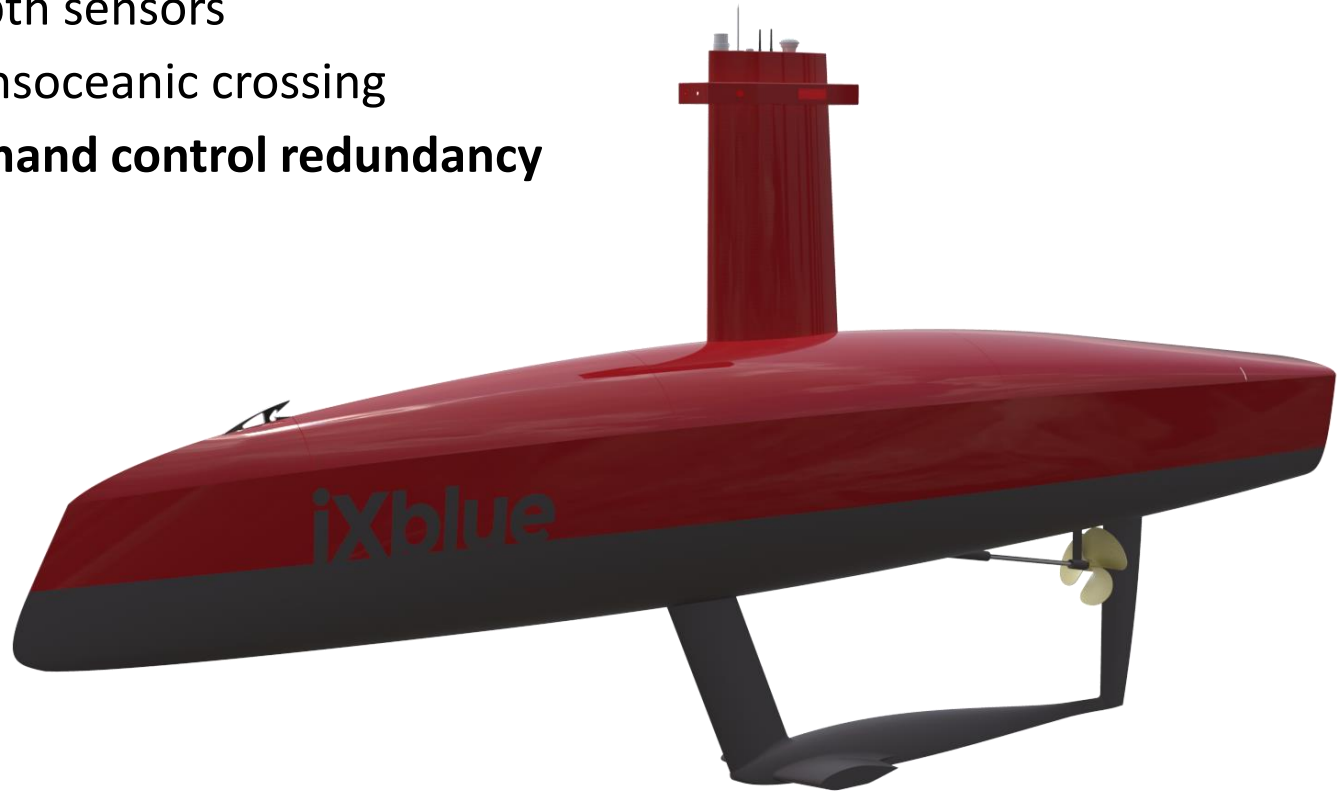
# DRIX – FLIPIX ROTV FOR SIDESCAN SONAR AND MAGNETOMETER

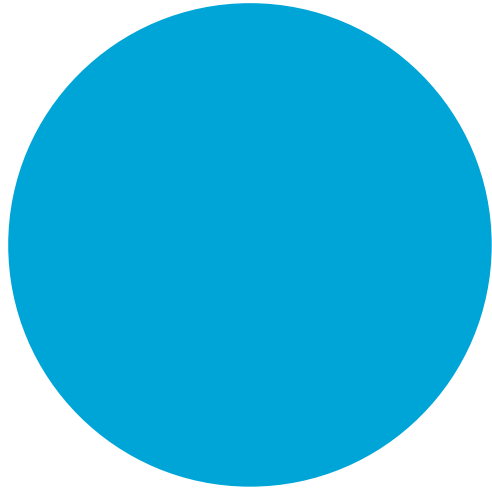




Moving towards long range (>20 days) capabilities

- To keep the dynamic and the key differentiators observed on DriX
- To keep **low manning**
- To enhance the sub-system capabilities (higher power, heavier and larger payload)
- Be capable to carry full ocean depth sensors
- To offer **longer endurance** for transoceanic crossing
- To offer **full propulsion and command control redundancy**





**CONCLUSION**

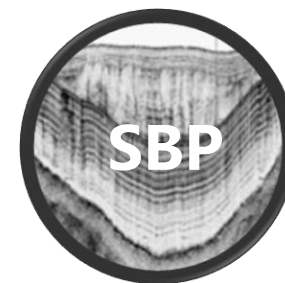
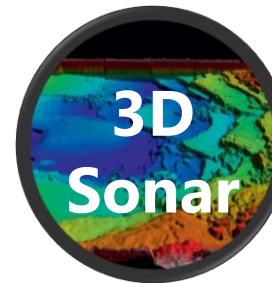
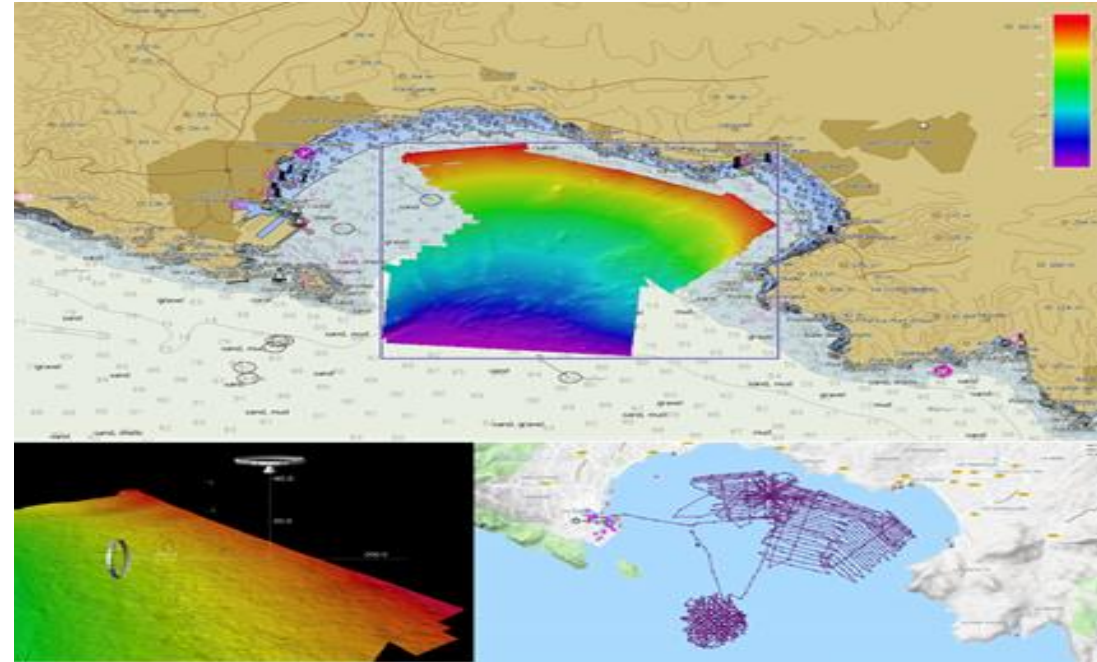
# DriX USV Return of Experience

## *Massive reduction of survey costs*

- **Drastic reduction of fuel consumption (- 90%)**

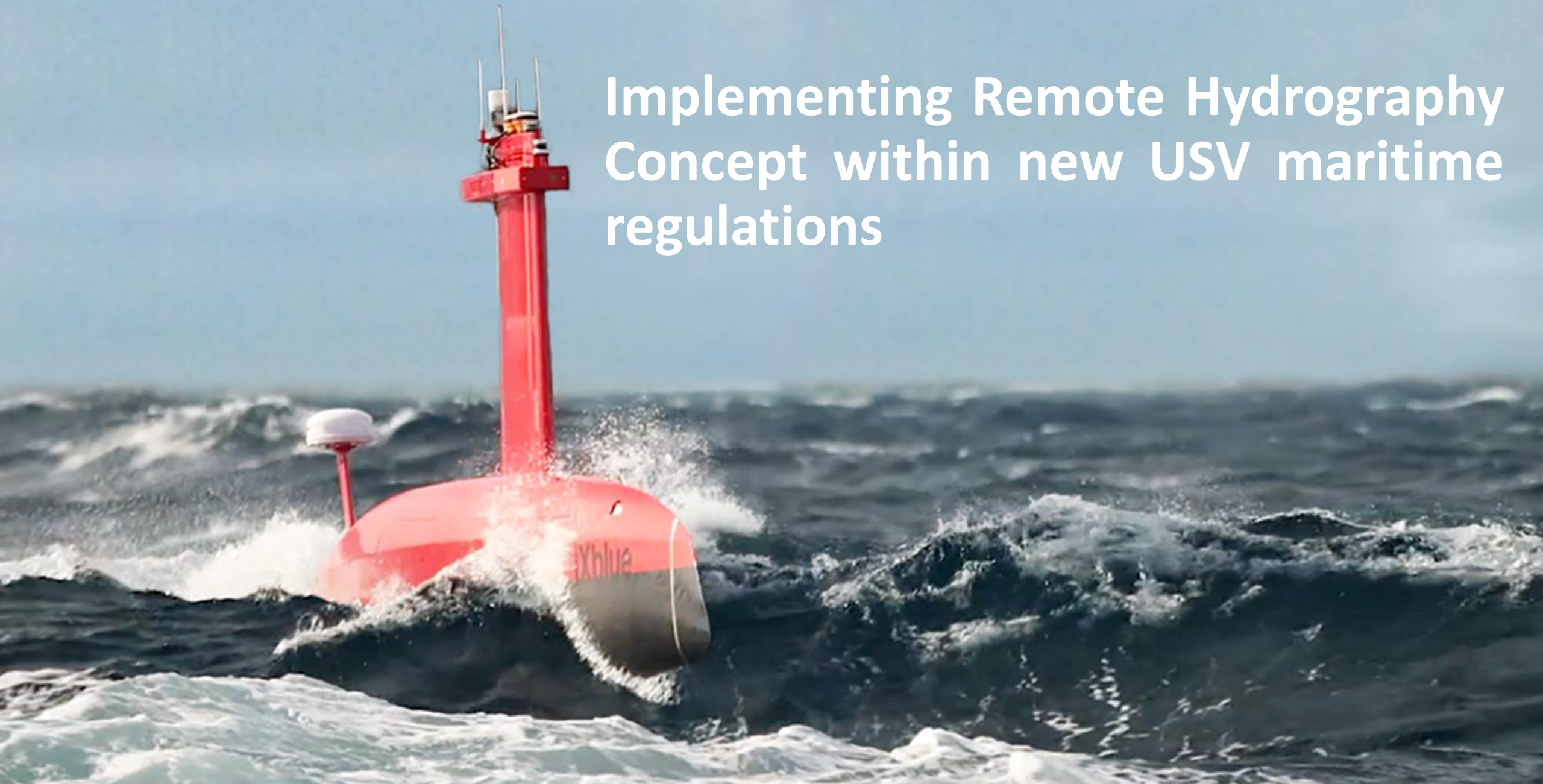
*(fuel consumption: 2.5L/h at 10kts speed)*

- **Sea proven in Sea state 5**
- **Reduced vessel downtime**
- **High speed surveys up 8 to 12 knots**
- **Line change : less than 1 minute**
- **Endurance 8 days @ 4kts / 3 days @ 8kts**





# Implementing Remote Hydrography Concept within new USV maritime regulations



# Emergence of new USV regulations

- Today, USV can freely operate in many parts of the world.
- **No international regulation in place.** IMO not expected to address to the topic before 2028
- States to begin to draft national regulations on USV
  - **France and UK are the world frontrunners**
- **France:**
  - Since 2020, prior authorization required to perform tests and trials at sea in an authorized area
  - Since 2021, issuance of legal definition of USV, USV matriculation, insurance requirements and of the legal responsibility scheme for USV operators
  - Expected in 2023: registration process and flagging of USV to operate in French waters and requirement for specific permits for USV operators
- **UK**
  - MCA in charge of delivering certifications for USV to operate into the UK waters
  - Great importance granted to safety assessment of the USV and of the operational concept prior to grant certificate to operate.

# USV regulations to be addressed in coordination between industrials and maritime administrations

- To allow a close cooperation between USV manufacturers and operators with the administration to draft any new USV regulations.
- USV regulation must rely on:
  - **Efficiency and Trust**
  - It must be drafted in full cooperation and transparency in working groups between government and industrial players
- To avoid contradictions and/or of discrepancies between the requirements of the different foreign administrations (USV acceptance criteria, registration process, operators permits, etc...) :
  - to ensure good coordination between foreign maritime administrations to facilitate USV operations across waters of various countries.
  - Lack of coordination may affect ability to operate and finally, the performance of survey operations

*Thank you for your attention!*

*David Vincentelli: [david.Vincentelli@ixblue.com](mailto:david.Vincentelli@ixblue.com)*

*<https://www.ixblue.com/products/drix>*





# HYDRO22

5 – 8 December 2022

MONACO – Grimaldi Forum



Organized by the Francophone Hydrographic society under the patronage of the IFHS