



Aerial & Subsea Drones in O&G Operations: Service Providers Experiences and Emerging Application Scenarios

Saipem Experience

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The image shows a yellow and black underwater drone from a top-down perspective. It is emitting a powerful, wide beam of green light that illuminates the dark seabed below. The seabed appears to have some vegetation or structures. In the bottom left corner, there is a decorative graphic of binary code (0s and 1s) in green and white.

1 | **Underwater Drone**
Short description of an underwater drone

2 | **Zoom on Technology**
Challenges related to technology development & deployment



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1 | **What is an Underwater Drone?**



The image shows a yellow and black underwater drone, similar to the one in the first slide, but from a side profile. It is positioned above a dark seabed. In the background, there are several industrial structures on the seabed, possibly part of an offshore oil or gas platform, with some lights visible. The drone has a blue light on its front and some equipment on its side.



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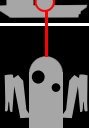


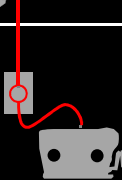
SUBSEA ROBOTICS EVOLUTION

from manned to autonomous









Subsea Drones:
a new generation of
subsea robotics

Enabled by the
emerging technologies

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UNDERWATER DRONE

BENEFITS

- SAFETY
- CO2
- DIGITAL
- DE-RISK
- OPEX





Intelligent Hybrid (AUV / ROV) Subsea Robots



REMOTE CONTROL ROOM



SUBSEA DRONE (FlatFish)



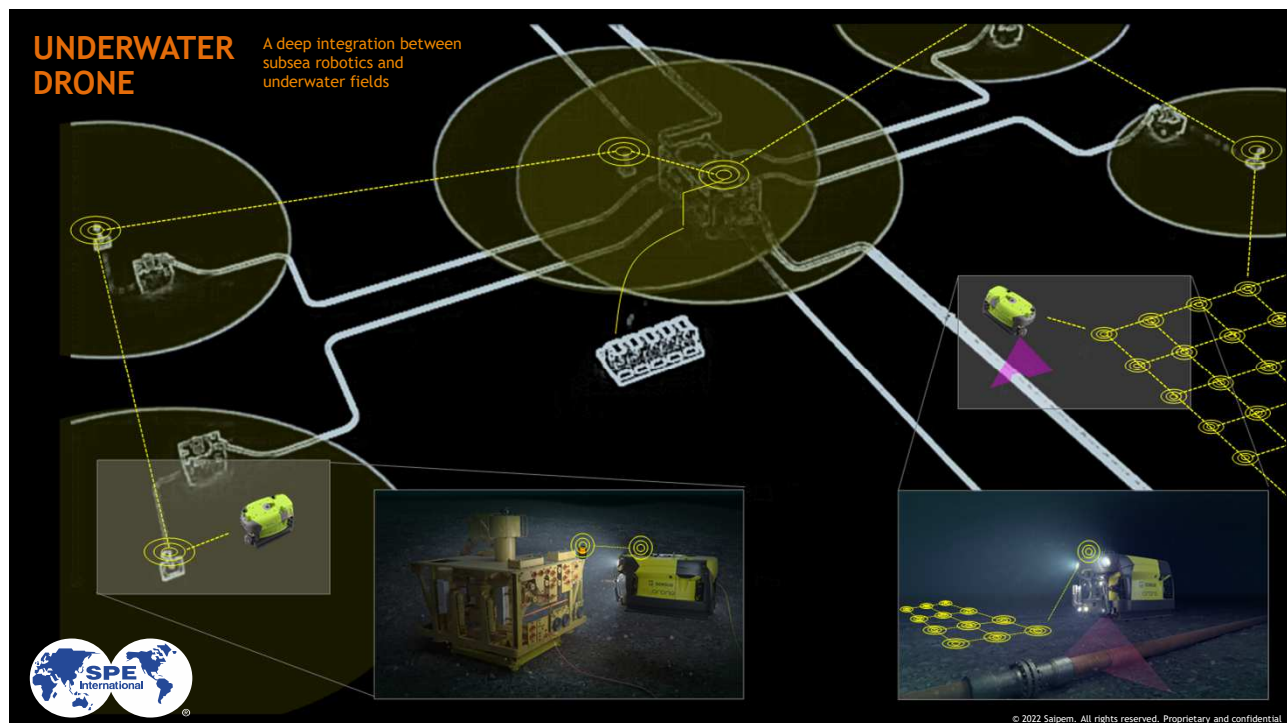
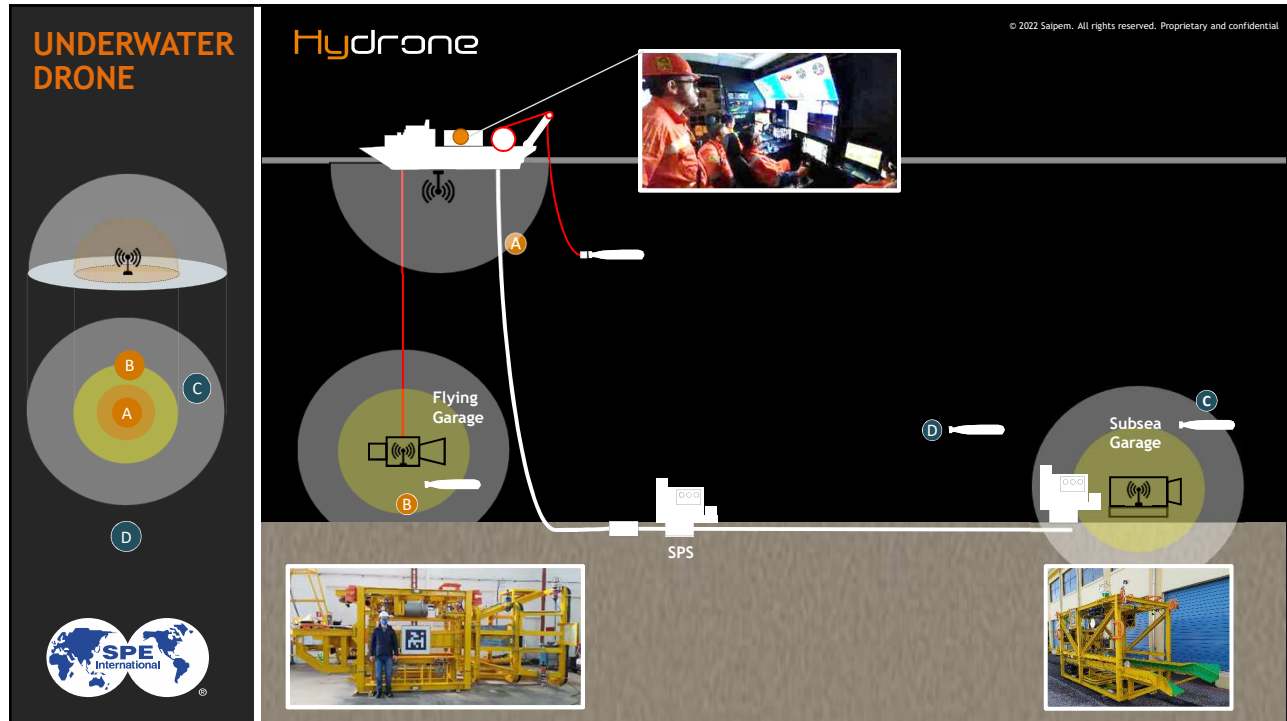
SUBSEA DRONE (Hydrone-R)



SUBSEA BASES



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2 Zoom on Technologies



Development
how to qualify this new technology



Deployment
how to introduce this technology in the O&G fields



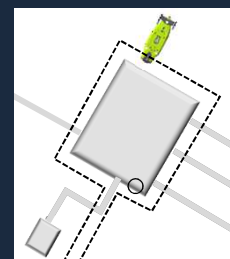
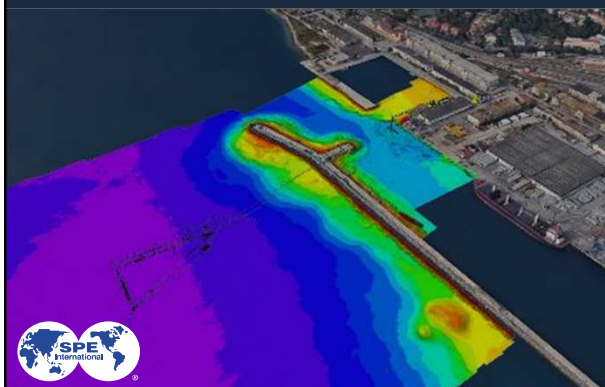
Hydrone



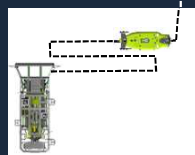
DEVELOPMENT CHALLENGE

Qualification of new Technologies is challenging:

- Specific technologies shall be developed (e.g. deep water AI)
- Long and exhaustive testing is mandatory (using simulators and testing facility)



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Challenging Operations:

- No External positioning system (GPS)
- Poor / No Communications
- Long Distances / High Depth

DEVELOPMENT CHALLENGE

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DEVELOPMENT CHALLENGE
HYDRONE-R

- 4,700h
total testing at sea
- 2,000h
record continuous dive so far
- 100+
garage in/out maneuvers
- 1,000+h
in ROV mode (wired/optical)
- 100+
missions in AUV mode

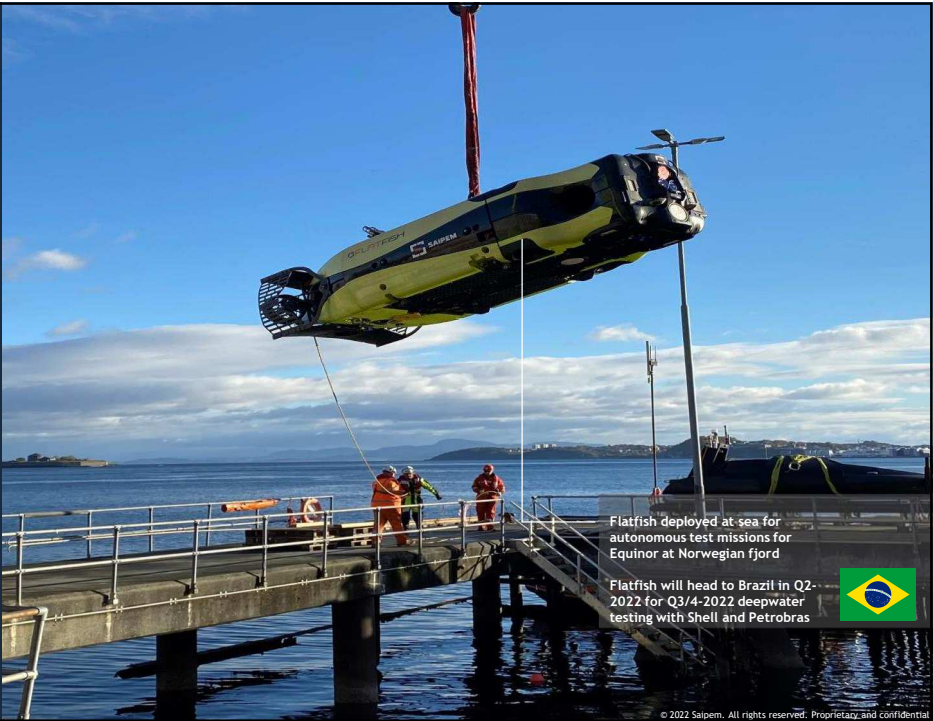
Hydrone-R integration tests with Equinor/BlueLogic SDS subsea docking base, in preparation for first commercial contract, with deployment planned for Q3-2022 @ Equinor Njord field

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DEVELOPMENT CHALLENGE FLATFISH

- **1,900h**
total testing at sea
- **100h**
pipeline tracking and following
- **60+**
garage in/out maneuvers
- **500+**
tag recognition for flying
garage rendez-vous
- **160+**
total number of dives





Flatfish deployed at sea for autonomous test missions for Equinor at Norwegian fjord

Flatfish will head to Brazil in Q2-2022 for Q3/4-2022 deepwater testing with Shell and Petrobras 

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