

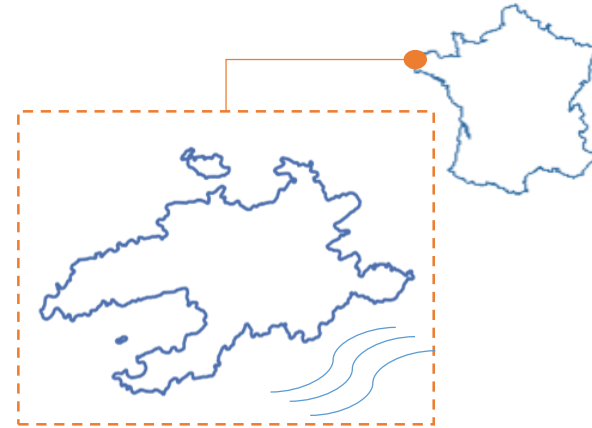
Monitoring around tidal turbines Sabella D10 example

International Forum on MRE Environmental R&D



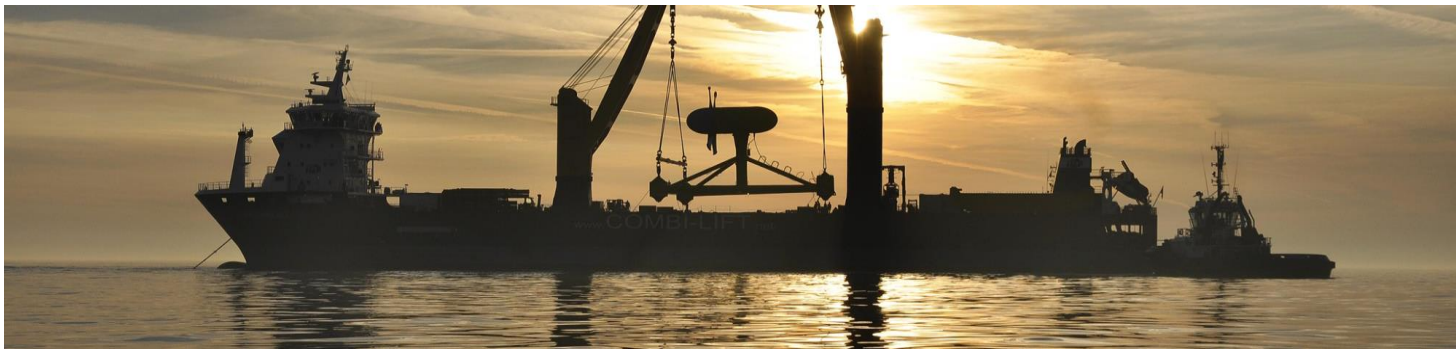
Sabella D10: flagship project

- Ushant island:
 - 900 inhabitants
 - Off-grid island
 - 4 Diesel power gensets
 - Peak consumption 2 MW
 - 7,000 MWh/year
 - 2 millions litres of fuel per year

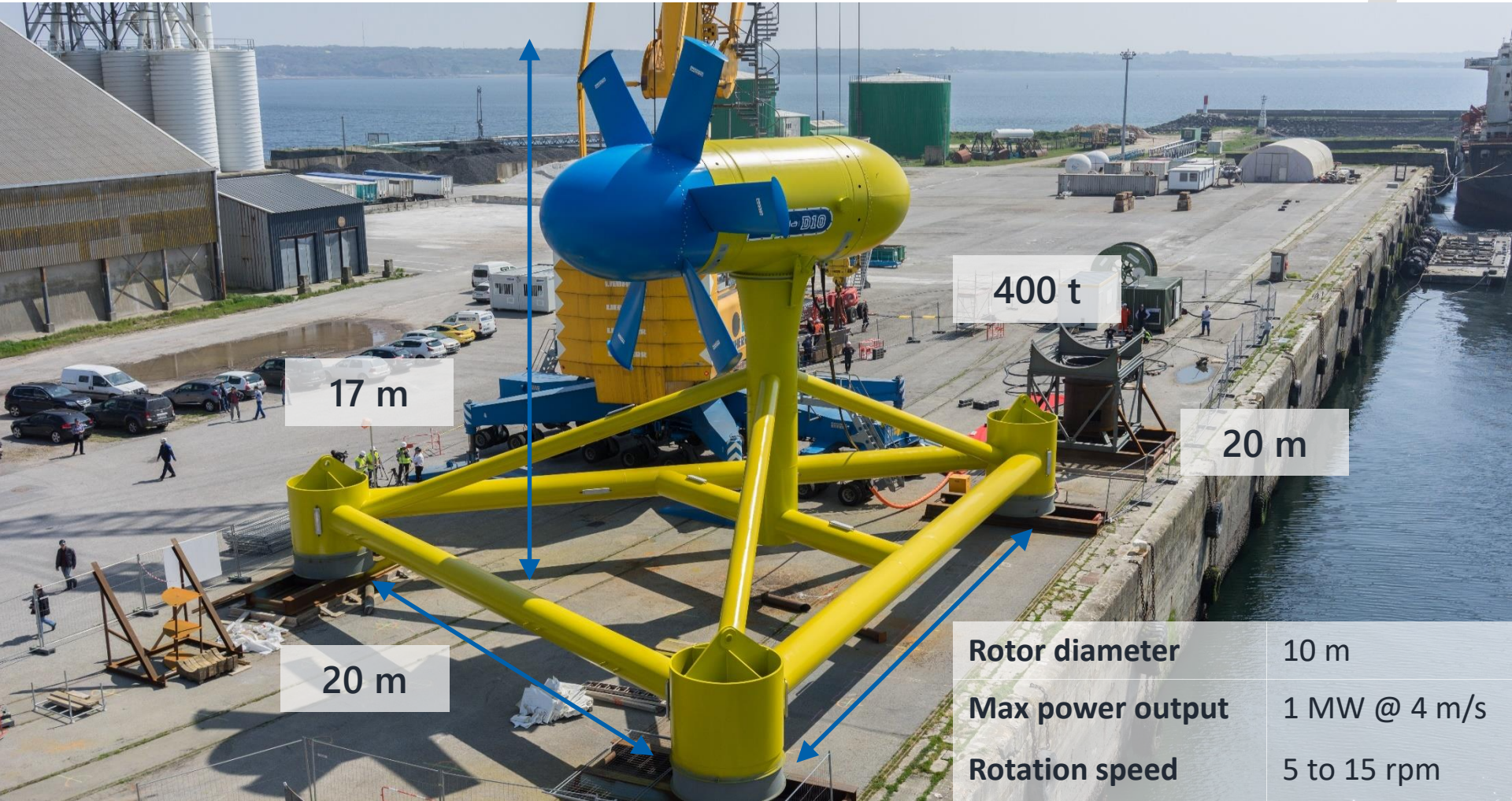


Sabella D10: flagship project

- Sabella D10 project:
 - Install and connect a **first full scale tidal turbine** in France
 - **1 MW** device – **10 meter** diameter
 - Three operation periods:
 - 2015-2016 – initial 12-month authorized period
 - 2018-2019 – 6-month operation
 - 2020-2022 – final campaign before a pilot plant
 - Installation in the **Fromveur passage** and connection to the electrical network of **Ushant island**



Sabella D10: flagship project



The Fromveur Passage

- 55 meters deep
- 2 km off the shore
- Up to 4.5 m/s current velocity
- **Highly environmentally protected area:** IBA, ZNIEFF, UNESCO biosphere reserve, Marine Nature Park, Natura 2000, Heritage site, Maritime Hunting reserve...
- Area with many **human activities:** fishing, diving, sailing, navigation, ferries, military vessels...



21/04/2020



Monitoring around tidal turbines - Sabella D10 example

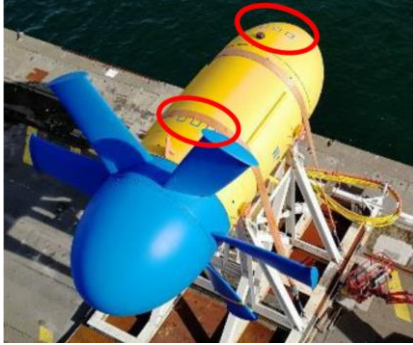


Environmental monitoring around the turbine

- Environmental monitoring protocol developed in collaboration with the Iroise Marine Natural Park
- Integration of **several instruments** on the turbine and on separate structures connected to the turbine or autonomous
- Main aspects monitored:
 - **Acoustic** impacts of turbines (marine mammals)
=> hydrophones, C-PODS, surface measurements...
 - **Collision** risks (marine mammals, fishes, birds...)
=> video cameras
 - **Biofouling** development => video survey by divers, sampling when recovering the turbine
 - Impact on **currents, turbulence** and sediment transportation
=> ADCPs, numerical models



Turbine instrumentation



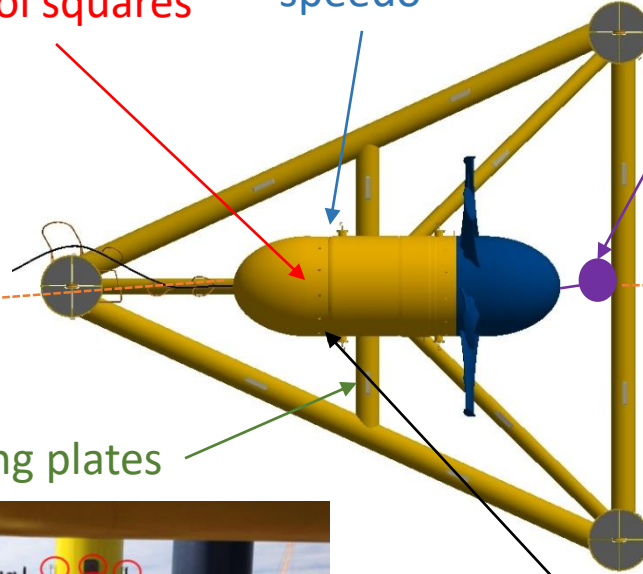
ADCP, fouling control squares

Video camera, swell sensor, speedo

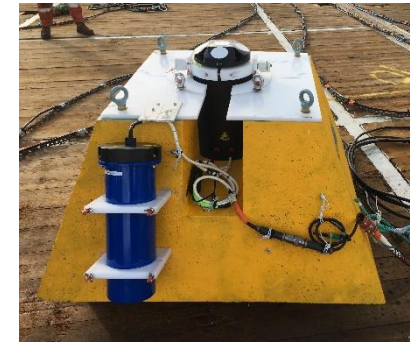


Cameras, hydrophone, C-POD

ADCP



ADCP



Fouling plates



Corrosion sensor

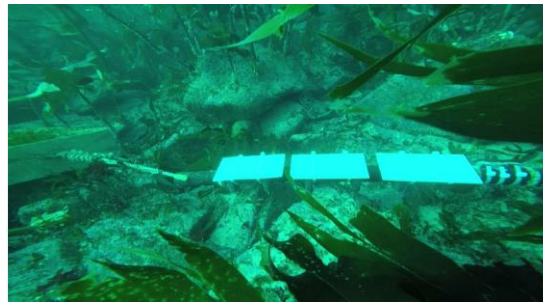
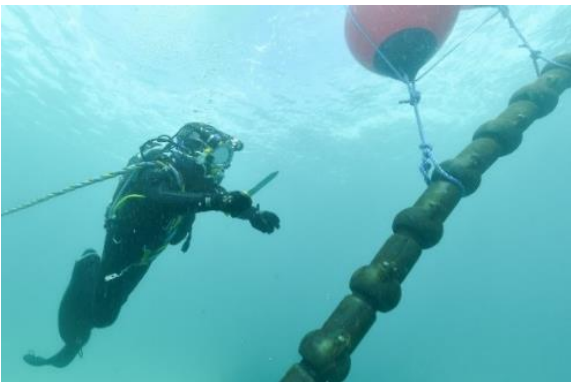
Collision risk

- Observation of very few fishes around the rotor, only during tide slacks



Cable monitoring

- Participation in the SPECIES project, managed by France Énergies Marines
- Regular dives on the cable and control cables to monitor the development of biofouling on the cable
- Electromagnetic measurements nearby the cable planned after turbine reinstallation



***Thank you
for your attention!***



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SA with a capital of 10 955 789 € - RCS Quimper N°509 163 689