DRACCAR-MMERMAID

Monitoring marine megafauna in an offshore wind farm context

Newsletter #1

September 2024

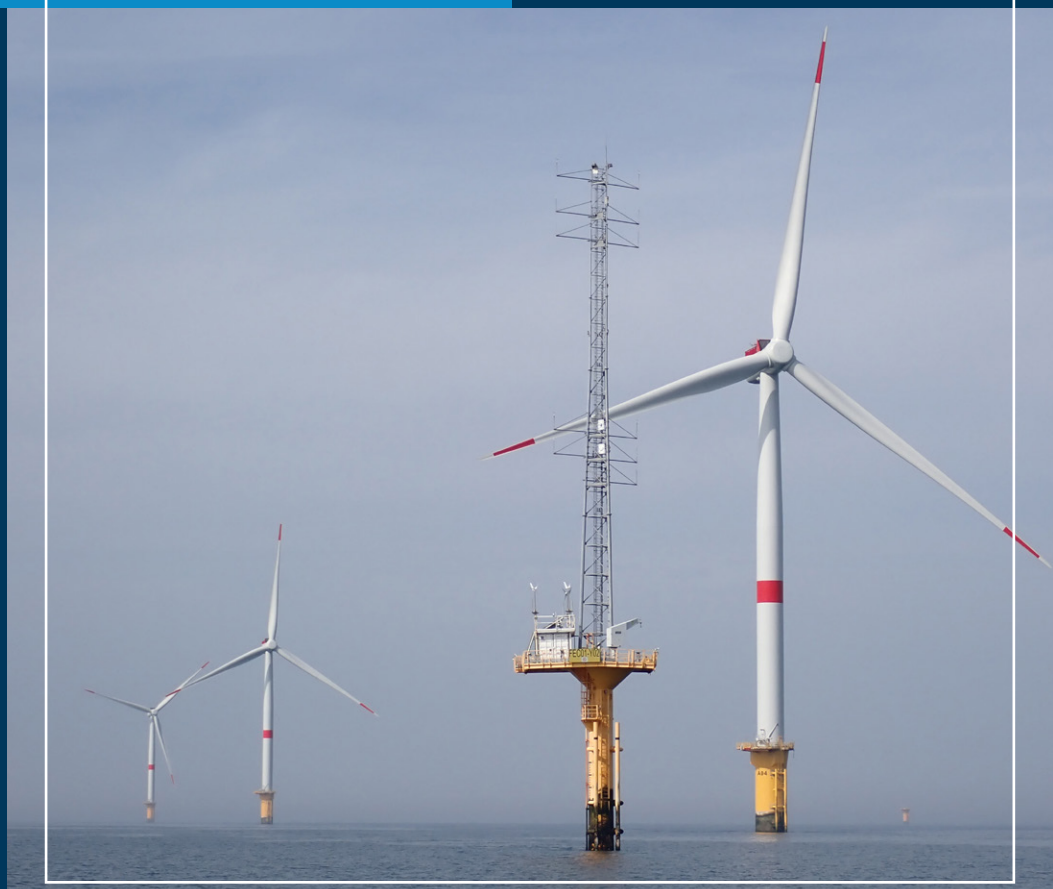
IN SHORT

« The growing number of offshore wind farms is raising environmental and societal questions about their impact on marine fauna, including birds, fish and marine mammals. Furthermore, the fact that wind farms are located out at sea makes it more difficult to collect data. It is therefore essential to develop appropriate monitoring methods to characterise the effects of the wind farms on the marine environment. This is the aim of the DRACCAR-MMERMAID project, led by France Energies Marines and bringing together 21 partners. Through the instrumentation of a met mast located off the coast of Fécamp, it is developing an innovative approach to the integrated, long-term and continuous monitoring of marine megafauna. »

Karine Heerah, scientific coordinator of the project

48 months (2023-2027)

Total budget: 6,3 M€



The project was officially launched on 27 September 2023 in Fécamp.

PARTNERS

This project receives French State funding managed by the National Research Agency under the France 2030 investment plan

With the financial support of Normandy, Brittany, Occitanie, SUD Provence-Alpes-Côtes d'Azur regions and the Directorate General for Energy and Climate (as part of the French Observatory for Offshore Wind Energy)

An offshore mast, what for?

The met mast located off the coast of Fécamp is used as an offshore research platform. An array of complementary instruments is being deployed to study the different compartments of the marine megafauna. The aim is to find out what species are present, how many there are and how they use the habitat, as well as understanding the links between the different compartments of the ecosystem.

Motus station

360° cameras

Recorders

Telemetry

Camera traps

Hydrophones

Underwater video

Sonar

Environmental DNA

Acoustic telemetry

Crédit image : Yohann Boulin

Extensive instrumentation work

Since the project was launched, a number of cutting-edge instruments have been deployed on or near the mast to monitor the marine megafauna. Here's a look back at what has already been deployed

JULY 2023

4 acoustic recorders to identify bird and bat species present at sea, particularly during migration periods. They are part of a set of recorders deployed by the Muséum National d'Histoire Naturelle throughout the Atlantic arc, as part of the MIGRATLANE programme.

APRIL 2024

A **Motus station** capable of detecting the passage of birds and bats equipped with radio transmitters. This is the first time that such an antenna has been deployed in mainland France! It paves the way for the deployment of other antennas to track the movements of birds along the French coast.

4 camera traps to understand and quantify, by day and by night, the effect of an offshore structure as a resting place for birds.

MAY 2024

12 360°/4K cameras to view birds in flight around the mast and marine mammals when they come to the surface to breathe.

10 great black-backed gulls have been fitted with GPS tags by the Groupe Ornithologique Normand. They will provide information on the movements of this locally present seabird, particularly within the offshore wind farm, as well as on its flight behaviour. Anecdote: one bird regularly visits the wind farm and comes to rest on the mast.

JULY 2024

12 acoustic telemetry receivers to track the movements of various fish species fitted with acoustic tags

AUGUST 2024

1 F-POD + 1 hydrophone to detect the presence of marine mammals and gather information about their behaviour.

© Placidplace / Pixabay

FOCUS

What about the data collected?

The monitoring carried out by the various instruments deployed will generate hundreds of terabytes of data: photos, videos and acoustic recordings. Several researchers and engineers are already working on receiving and processing this data by :

- setting up an infrastructure to store, access and manage data flows efficiently,
- structuring databases,
- developing AI algorithms to automate the detection of marine fauna,
- the creation of annotation platforms essential for the learning phase of the algorithms developed.

Upcoming deployments:

- Sonar
- Environmental DNA
- Underwater video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The ecosystem approach in DRACCAR-MMERMAID

The ecosystem approach is a holistic method that aims to understand and model the complex interactions between the different species in a food web. By considering all the species and their prey-predator relationships, this integrated vision makes it possible to analyse the direct impacts of human activities and climate change on the environment, as well as the indirect effects that can spread throughout the ecosystem. In DRACCAR-MMERMAID, this approach is used on two scales. On a local scale, around the Fécamp mast, a model is being developed to assess the potential impacts of the offshore wind farm on the surrounding ecosystem. The data collected on the mast will be of great value to this model. On a regional scale, a second model representing the highly human-impacted ecosystem of the eastern Channel and southern North Sea will be used to assess the cumulative impact of the various human activities and climate change.

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In autumn, launch of the annotation platforms!

The cameras and acoustic receivers operate 24/7, generating large quantities of photos, videos and acoustic data. Algorithms using artificial intelligence will analyse this data and, in the future, automatically detect the presence of birds and marine mammals. Before this happens, they need to be trained to identify targets of interest in images or acoustic recordings. This can only be done after a long and thorough process of manual annotation. To this end, several annotation platforms are being finalised and will soon be put online so that everyone can contribute to this work. The DRACCAR-MMERMAID project is counting on you!

LEARN MORE

The project's webpage

The project in 3 questions (French)

Public webinar (French)

Do you have any questions or would you like to get involved in the annotation phase? Contact Karine Heerah, the project's scientific manager: karine.heerah@france-energies-marines.org

DRACCAR-MMERMAID

Monitoring marine megafauna in an offshore wind farm context

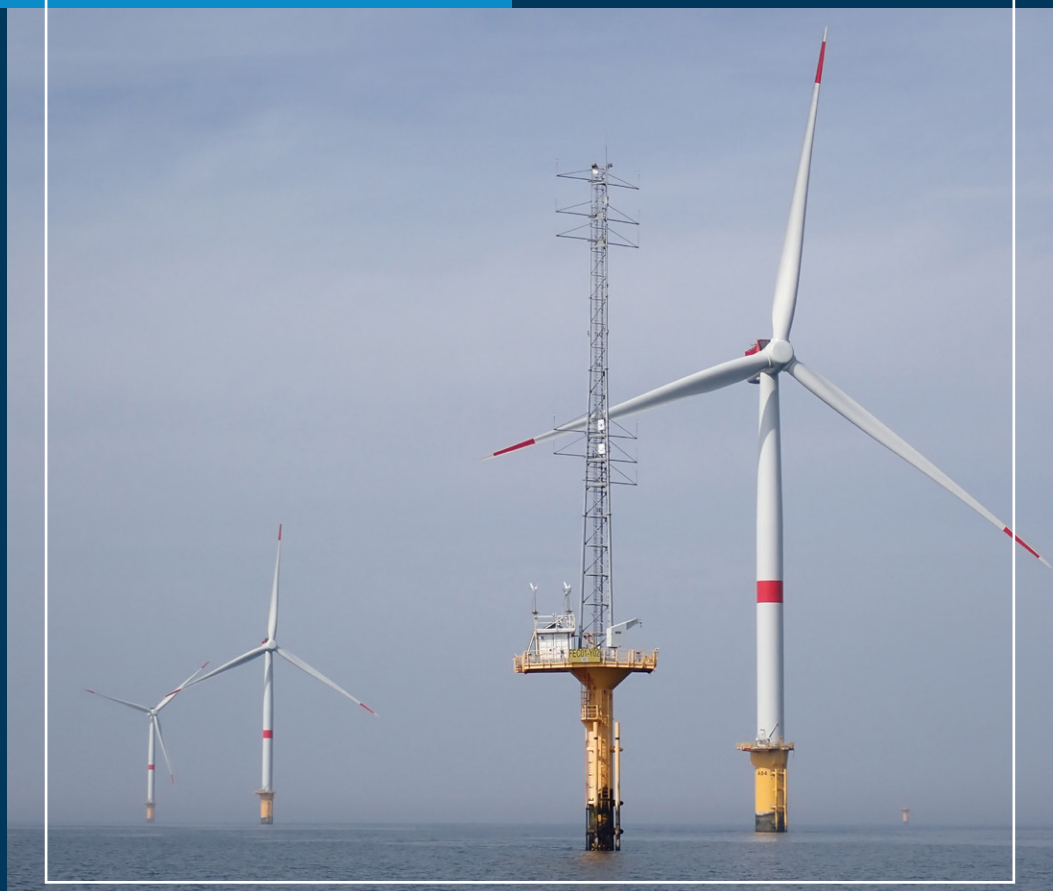
Newsletter #2

May 2025

IN SHORT

« In recent months, numerous instruments have been deployed on both the aerial and underwater sections of the Fécamp met mast to monitor animals moving near the offshore wind farm. Birds, in particular, are being tracked using a range of complementary tools: GPS tags, HD cameras, camera traps, and a Motus station. This newsletter focuses on that aspect. A large volume of data has already been collected. To facilitate its processing, an initial participatory annotation campaign has been carried out, and artificial intelligence tools are currently being developed. Ultimately, the project will provide effective monitoring methods that will help better assess the impact of offshore wind farms on birds

Karine Heerah, scientific coordinator of the project



Birds are monitored from the mast using a range of instruments

48 months (2023-2027)

Total budget: 6,3 M€

PARTNERS

FRANCE ENERGIES MARINES · EDF · EDF renouvelables · Parc éolien en mer de Fécamp · Université de Caen Normandie · ENSTA BRETAGNE · RTE Le réseau de transport d'électricité · GOMO · IBERDROLA · Quiet Oceans · exail · CeSigma · GIS EOLIEN EN MER · IMT Atlantique Bretagne-Pays de la Loire Ecole Mines-Télécom · Muséum National d'Histoire Naturelle · UMS Patrimoine Naturel · TotalEnergies · RWE · FEBUS optics · skyborn · ulco Université du Littoral Côte d'Opale · UBO Université de Bretagne Occidentale

FRANCE 2030

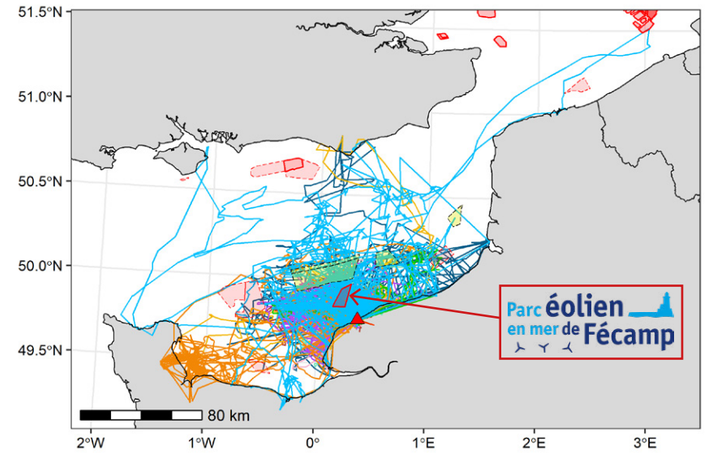
This project receives French State funding managed by the National Research Agency under the France 2030 investment plan

With the financial support of Normandy, Brittany, Occitanie, SUD Provence-Alpes-Côtes d'Azur regions and the Directorate General for Energy and Climate (as part of the French Observatory for Offshore Wind Energy)

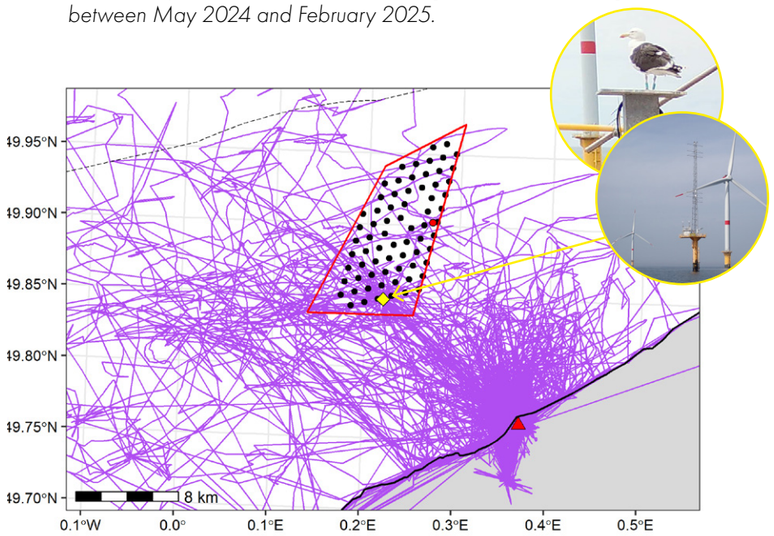
Gulls tracked by GPS

In May 2024, ten great black-backed gulls were fitted with GPS/GSM tags in Fécamp with the support of the Groupe Ornithologique Normand (GONm). Since then, the movements of these individuals have been closely monitored, allowing researchers to visualise the marine areas used by the birds. Some of them occasionally visit the Fécamp offshore wind farm. This is the case for individual FC07, nicknamed Fernande, who travels around the wind farm (purple track) and regularly lands on the Fécamp met mast, located on the edge of the park (yellow diamond). Fernande has often been "caught on camera" by the camera traps installed on the mast (see comic strip on the last page).

In May 2025, ten more individuals were equipped with GPS/GSM tags, further enriching the telemetry tracking database. The tracks of birds within the wind farm will be specifically analysed to better understand the interactions between the wind farm and the great black-backed gulls.



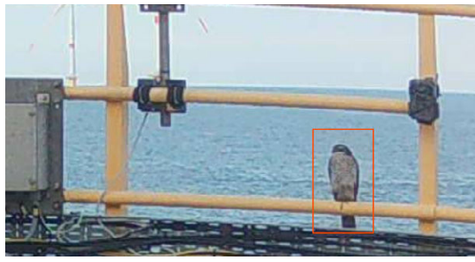
Combined plots of the movements of ten great black-backed gulls between May 2024 and February 2025.



Plot of the movements of individual FC07 known as 'Fernande' between May 2024 and February 2025. The red frame delimits the Fécamp offshore wind farm, while the yellow diamond indicates the location of the mast.

A successful first participatory annotation campaign

32,361 — that's the number of images from the camera traps on the Fécamp mast that were annotated in just one month through a participatory campaign conducted between last December and January as part of the project. Thanks to the efforts of 26 participants, 2,422 birds were identified: 2,383 great black-backed gulls, 29 herring gulls, 4 yellow-legged gulls, 4 peregrine falcons, 1 white wagtail, and 1 rock pigeon were recorded perching on the mast! Project partners actively contributed to this effort. All annotations were subsequently reviewed and confirmed by experts from the Groupe Ornithologique Normand. These annotations will be used to train artificial intelligence algorithms — first to automatically detect birds, and then to identify certain species. This annotation work is essential for analysing the full set of collected data. 100% of the images available at the start of the campaign were annotated and verified. Given this very positive outcome, further participatory campaigns will be organised in 2025. The current one is going on until the end of June and focuses on images from the mast's 360° video cameras.



Examples of participatory annotations made on the RESCANNOT annotation platform. From top to bottom: great black-backed gull, peregrine falcon and white wagtail.

While AI should eventually make it easier to process large volumes of data (several hundred thousand images), it will never be able to do without the work of experts.

Already a lot of data!

To better understand the behaviour of birds near an offshore structure, various instruments have been deployed on the aerial part of the Fécamp mast, including 12 4K/360° cameras and 4 camera traps. Since their installation, more than 30,000 photos and 175 days of video have been recorded by these devices. A dozen operations at sea were also necessary to recover this data. Data acquisition is an important part of the DRACCAR-MMERMAID project.

AI put to work

Hundreds of terabytes of data are generated as part of the project and have to be processed before they can be analysed. This is a real challenge, and one that would be too time-consuming and tedious to carry out manually. The project team is therefore developing artificial intelligence tools to carry out this task, so that all the data collected can be used effectively. To achieve this, two steps are essential: manual annotation of datasets and training of algorithms on these annotated datasets.

Icon credits: popcornarts, lnjanamul haq miraz, arjuazka / Nounproject

A MET MAST AT SEA... MONITORING BIRDLIFE