Offshore Norge, Forum for havvind og miljø

Spoor

AI based bird monitoring

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Enabling nature and industry to coexist

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“One of the **most relevant** non-technical **barriers** affecting the expansion of the offshore renewable energy sector is the **potential environmental risk** (**and related uncertainties**).”*

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*Galparsoro *et al*. 2022. Reviewing the ecological impacts of offshore wind farms

What we offer

Spoor allows developers, operators and owners in the renewables industry to **coexist with nature** while **mitigating risks** related to permitting and operations of wind farms.

Three main products building on same core, patent pending algorithms:

- Artificial Ornithologist:
  Pre-construction monitoring
- Artificial Ornithologist:
  Post-construction monitoring
- Detect-to-protect:
  Turbine specific shutdown-on-demand

Spoor solution

Off-the-shelf cameras and proprietary AI software

Off-the-shelf camera
Any high-quality off-the-shelf camera is used to collect data

Spoor AI software
The cutting-edge software gathers data on bird activity, it runs on the edge and/or cloud

Spoor Dashboard
Results are presented to customer in a web interface

License to operate
The wind developer gets a license to build and operate based on the data/system

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The quick “how does it work” illustration

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Hywind Tampen

Tracking birds 140 km offshore in rough North Sea conditions

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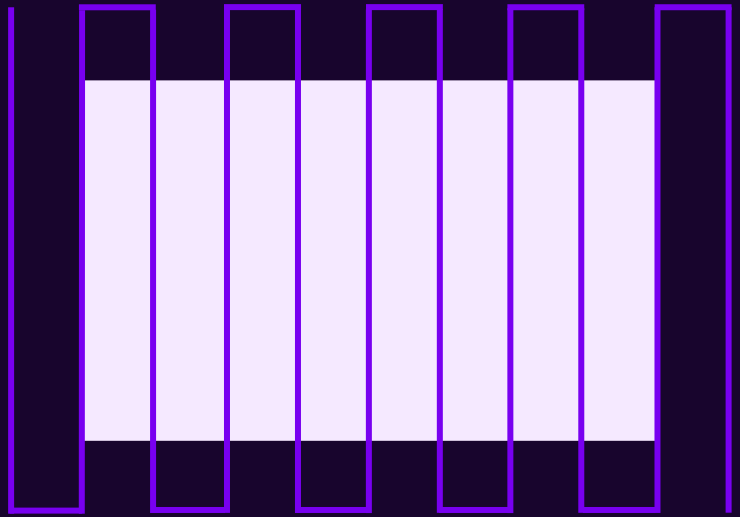
Pre-construction monitoring approaches

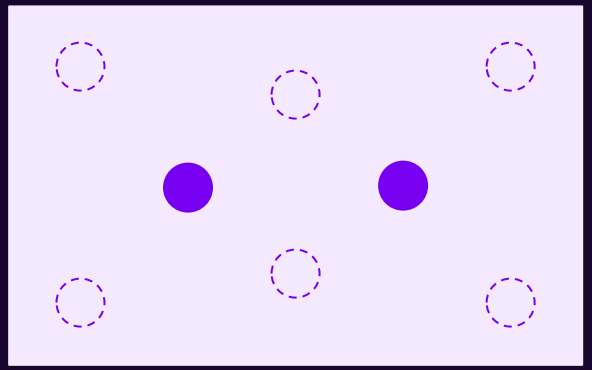
Aerial/vessel approach

Low temporal, but high spatial coverage



Spoor fixed position approach

High temporal, but low spatial coverage



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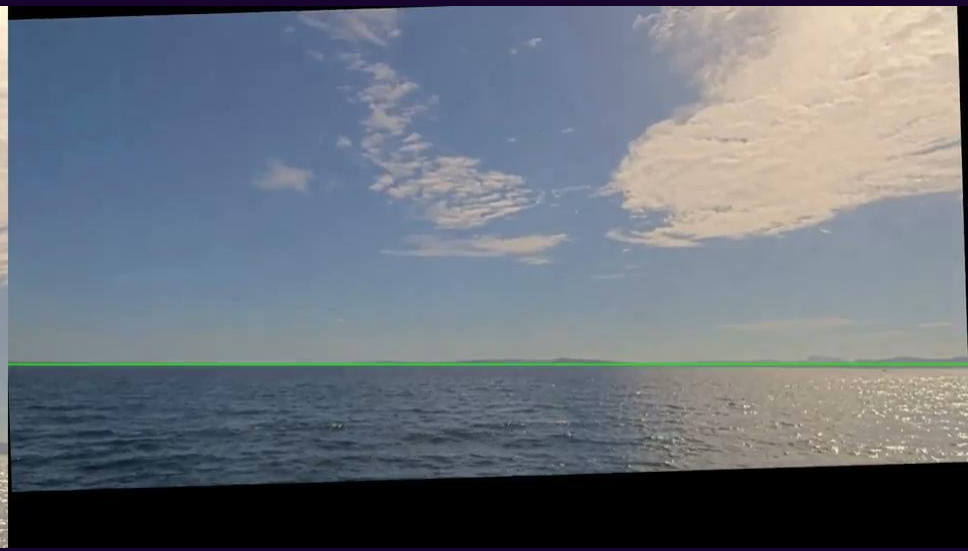
Pre-construction monitoring deployed offshore

Wave-buoy/flidar mounted cameras piggybacking on MetOcean campaigns



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Pre-construction monitoring deployed offshore

Image stabilization works in very rough conditions!

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Pre-construction monitoring deployed offshore

Image stabilization works in very rough conditions!

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Pre-construction monitoring deployed offshore

Overall deployment summary:

- Two different models of cameras
  - Four in total
- Deployment June to mid-October
- 10 hours/camera/day
  - Total **6,000 hours of bird monitoring** in 5 months!

Note on data storage:

- 6 month, 4 cameras,10 hours/day (total 7,200 hours) equals **60 TB**!
  - Excel sheet: 190 billion rows of 10 columns each… or
  - 1,536 movies of 4K resolution each 2 hours long

Data processed so far:

- 9,128 videos each 5 minutes
  - 1,077 (12%) processed
  - **1,750 bird detections**
  - Species labeling outstanding
  - **Video stabilization and bird detections working in North Sea conditions**

- Reports expected to be available in Spring 2024

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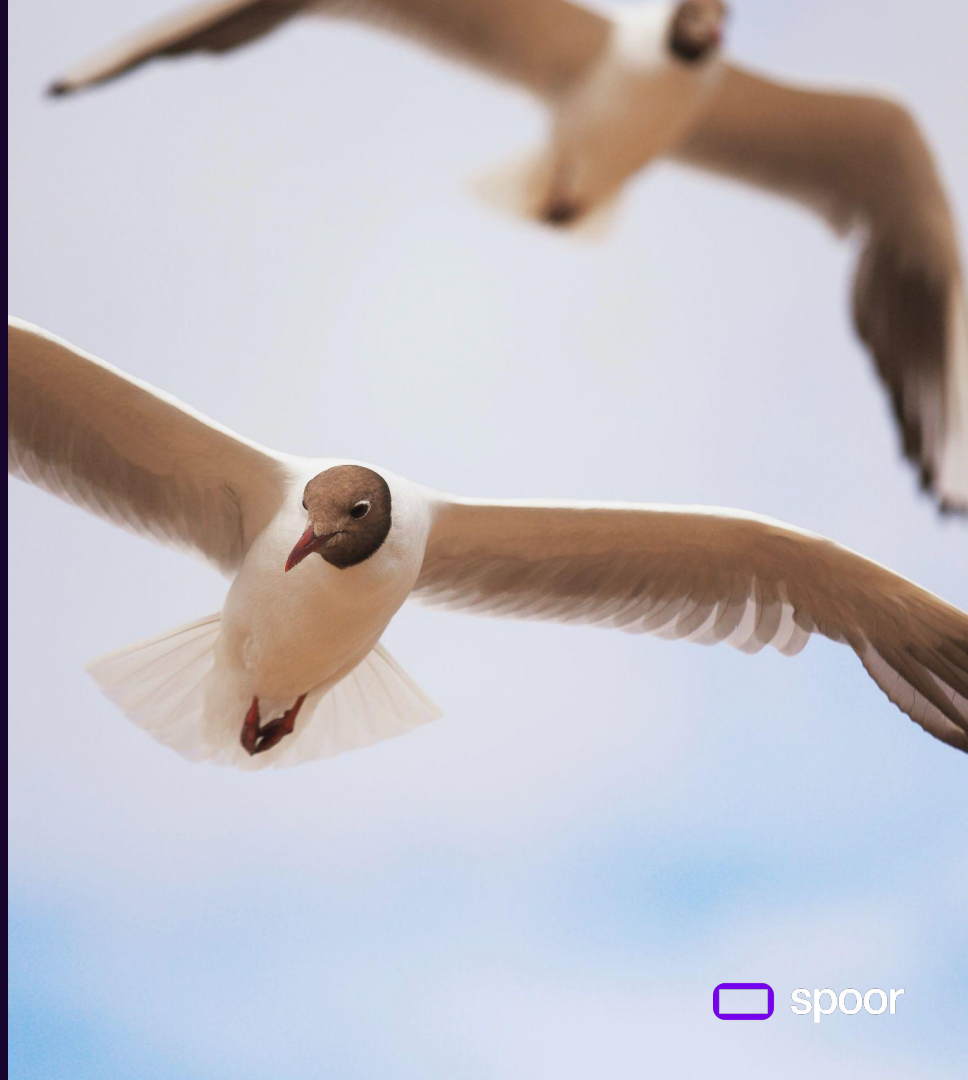
Perspectives

De-risk offshore wind tenders with high temporal resolution bird data:

- Combine MetOcean campaigns with bird monitoring to **reduce bidders' risk premium**

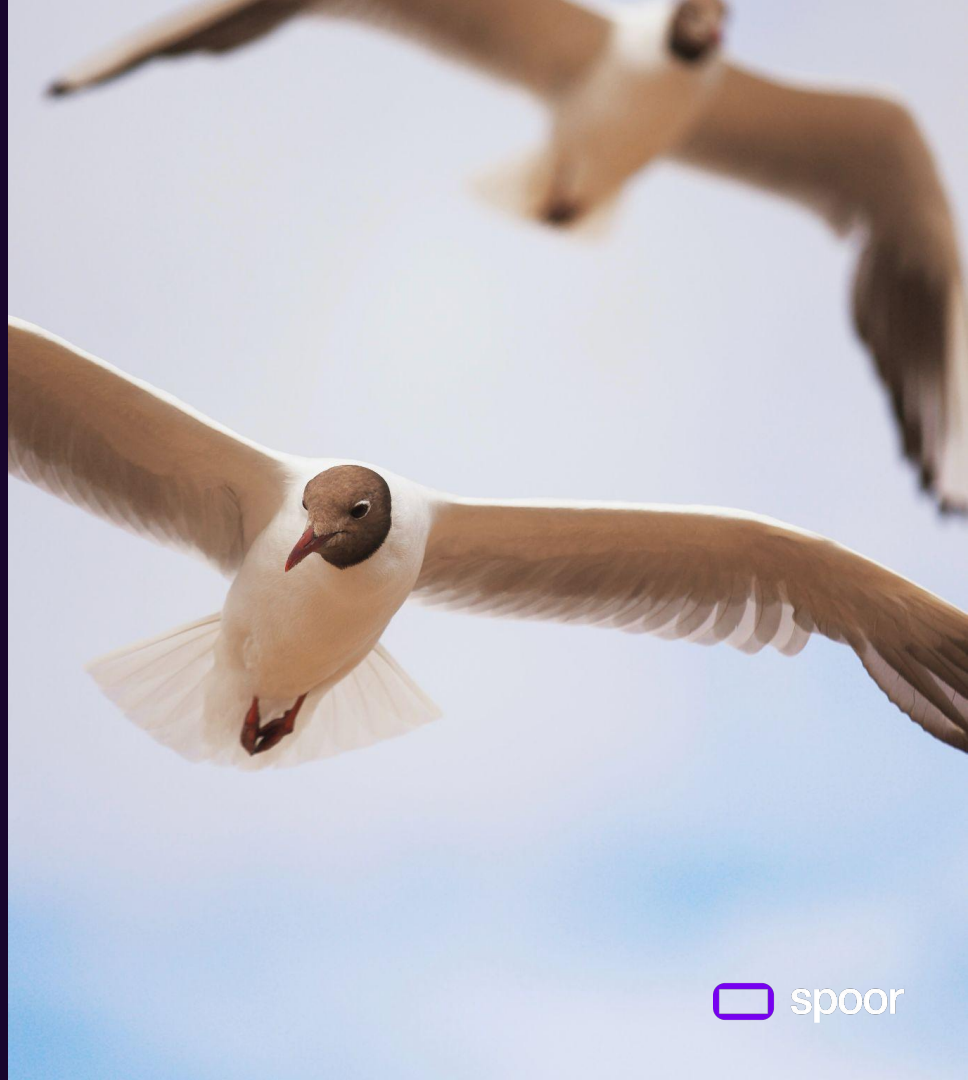
Integrate nature coexistence and sustainability in the early project planning phases:

- **Norway to take world leading position on bird-related project risks** in a large-scale offshore wind future
- **Setting the standard** for pre-construction monitoring
- Nurturing high-tech solutions to the coexistence space has **international impact**



Take aways

- The future is here!
- **AI is great**, but it takes time to develop applied solutions
- Regulators, industry and NGOs have to **take some risks** and take a leap into the future of new technologies
- **What if…?**
  …we had an extremely precise understanding of species specific wildlife interactions with wind farms?
  - Could we **avoid negative impacts**?
  - Could we **squeeze out more renewable energy** for the same area?



Thank you

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