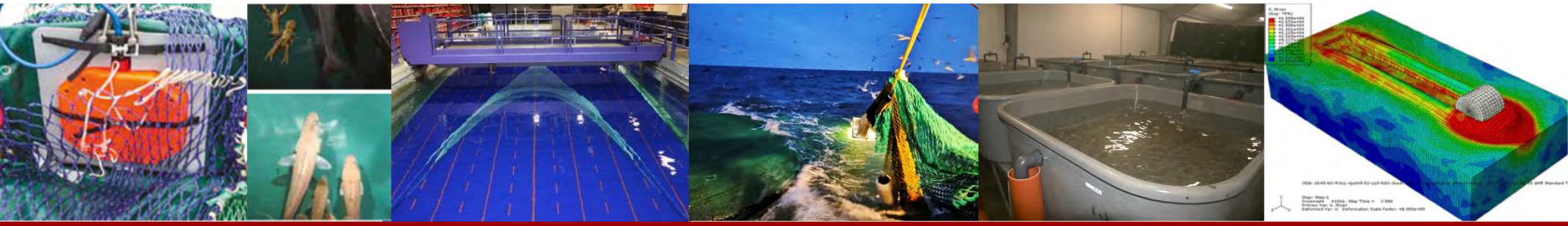
Norwegian Lobster, AG FISK, 13-14th May 2024

Tiago Veiga Malta, Fisheries Technology section, DTU Aqua

Development of fishing gear and technology for the Norwegian lobster fishery

Section for Fisheries Technology – DTU Aqua

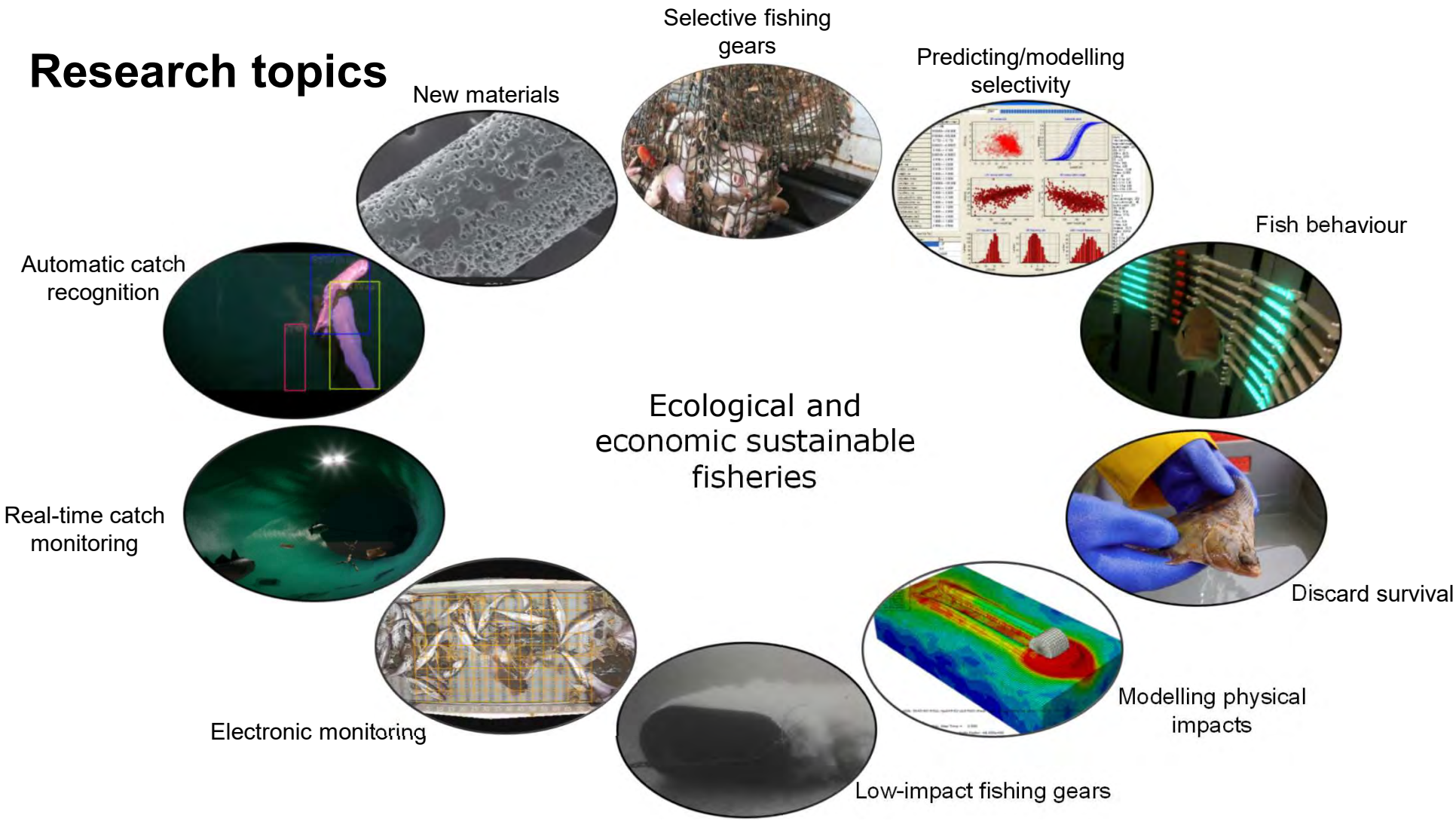
- Works with **technological development of gear, techniques and methods** that can contribute to promoting economic and environmental sustainability in the fishing industry, and which can support society's need to regulate fishing.



Fisheries Technology

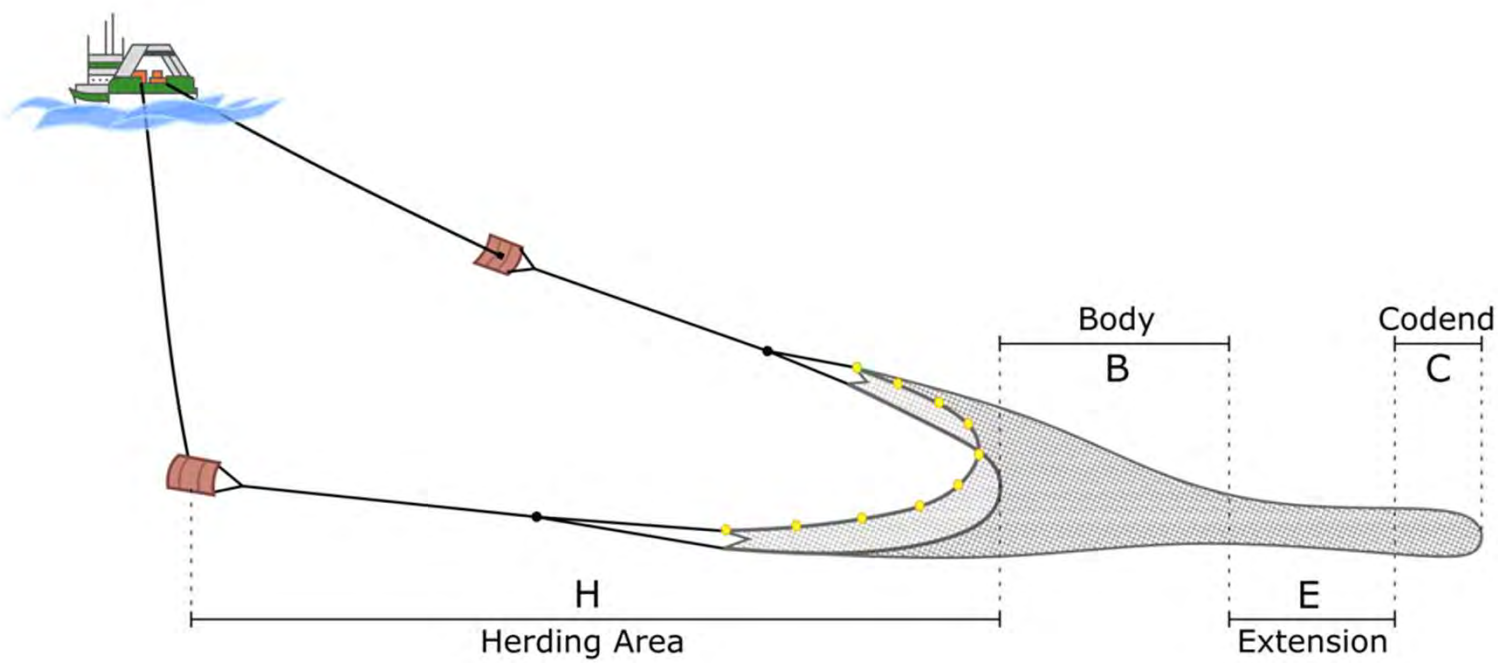
- Diverse in terms of research level
  - 3 Professors
  - 3 Senior Researchers
  - 4 Researchers
  - 7 PhD students
  - 1 Research Technician
- Diverse in competences
- Demographically diverse in terms of age and gender
- Diverse in terms of nationality
  - 11 nationalities

Research topics

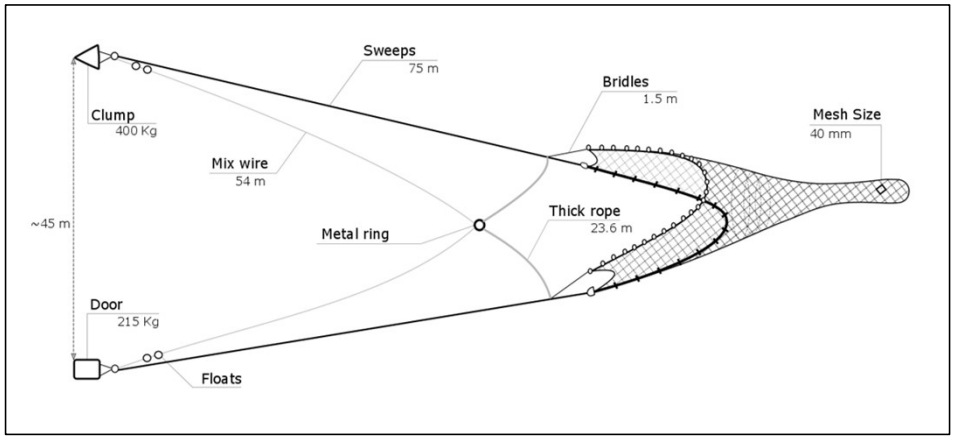


Fishing gear development for the Norwegian lobster fishery

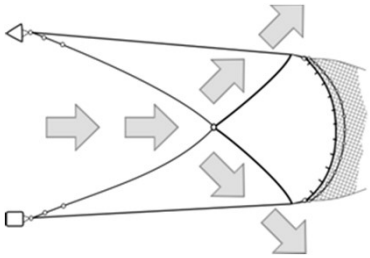
Development in the entire fishing gear



Scaring Lines (FLEXSELECT)



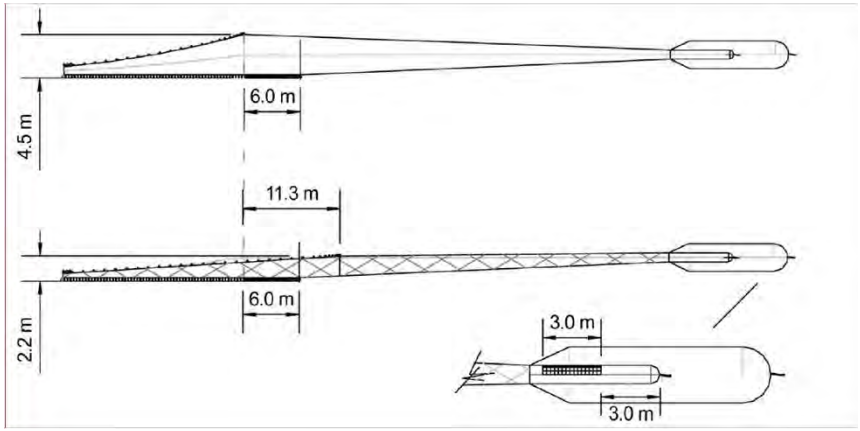
Species	N individuals measured	Mean effect	ST.D.
Nephrops	5850	+ 7 %	18 %
Cod	4350	- 8 %	25 %
Haddock	6850	- 61 %	24 %
Whiting	15250	- 55 %	17 %
Plaice	12100	- 27 %	23 %
Lemon sole	2050	- 65 %	14 %



Melli et al., 2018

- **Increased catch of Norwegian lobster** – around MCRS length
- **Significant reduction of fish** catches
  - Lower effect on cod

Topless trawl



Krag et al., 2015

Trawl height ~half of standard trawl

Topless trawl was **effective at selecting** species that swim up in the water column when trying to evade a trawl, e. g., **haddock**, **pollock**, **hake** and **whiting**.

Cod swims up to a lesser extent and an effect was only achieved when the low height trawl design was used.

Topless trawl had **no effect on Norwegian lobster** and **flatfish**.

Horizontally divided codend

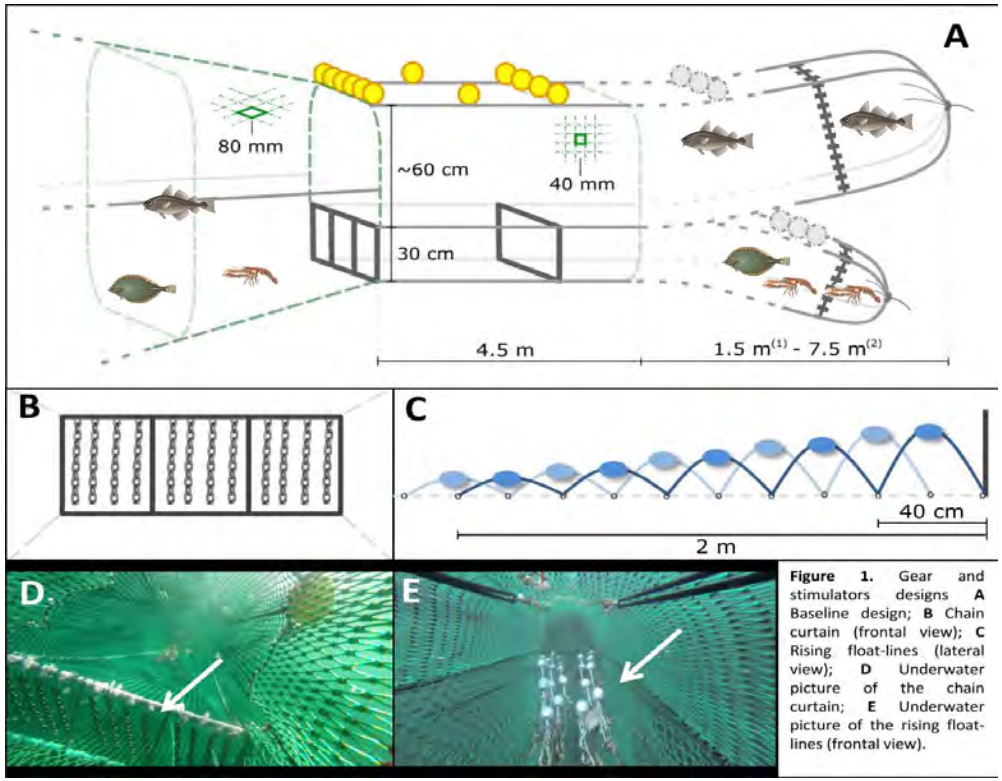
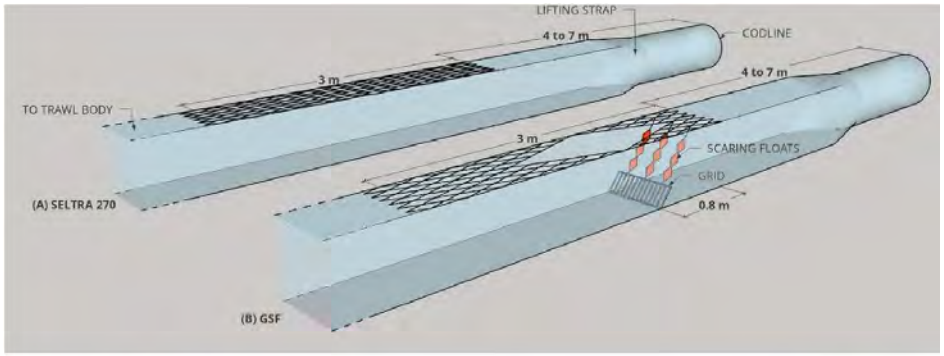
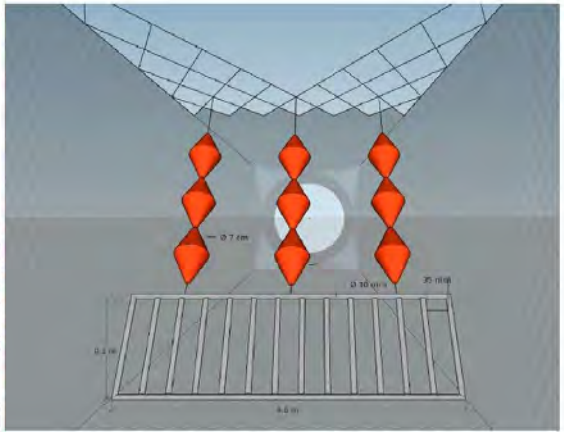


Figure 1. Gear and stimulators designs **A** Baseline design; **B** Chain curtain (frontal view); **C** Rising float-lines (lateral view); **D** Underwater picture of the chain curtain; **E** Underwater picture of the rising float-lines (frontal view).

Melli et al., 2019

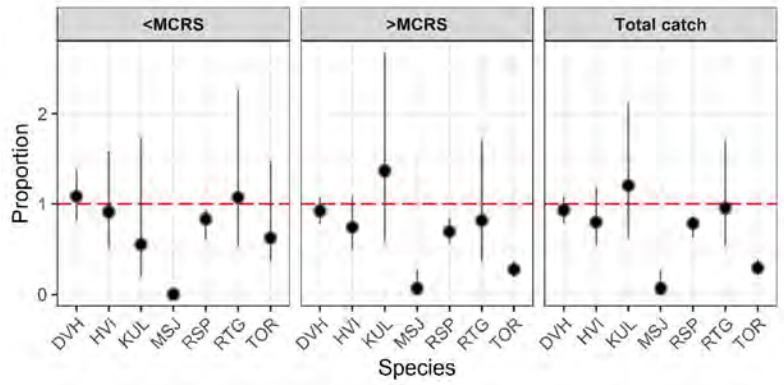
Scaring floats – Modified SELTRA panel





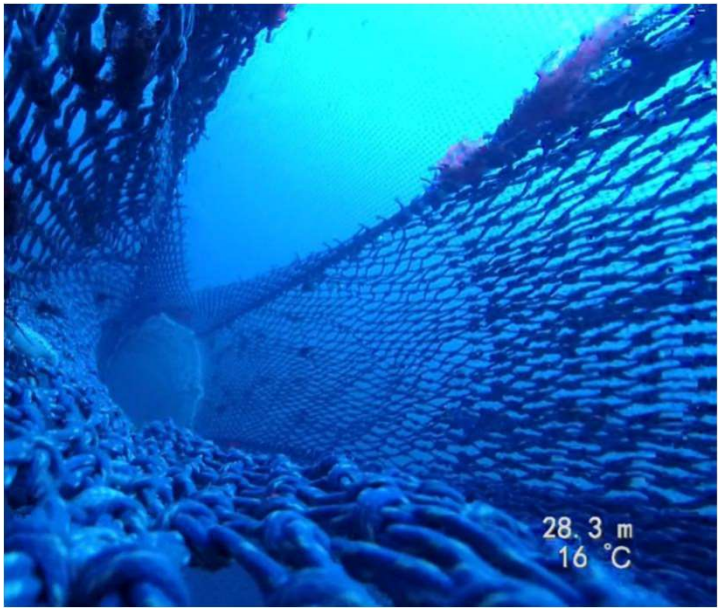
Savina et al., 2022

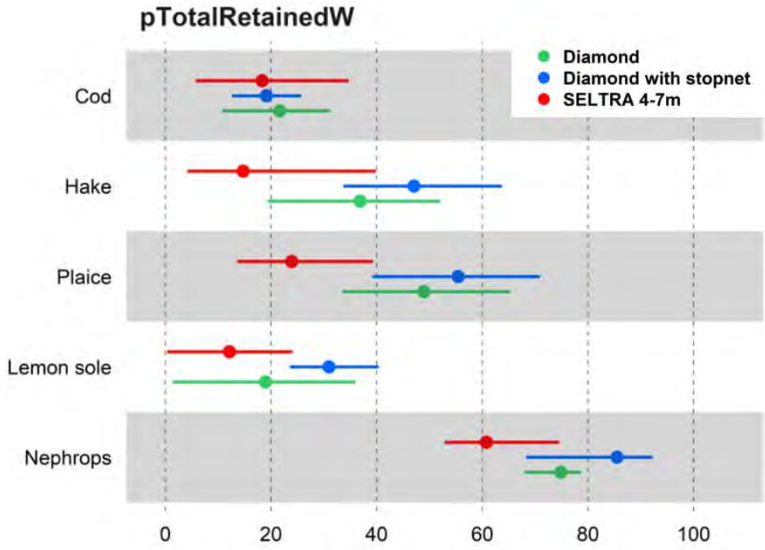
- Significant reduction of **cod** (~70 %)
- Significant reduction (~30%) of **plaice** with length around MCRS (27 cm)
- **No effect on Norwegian lobster** catches
- Catches of pollock, whiting, haddock, lemon sole also reduced



Diamond opening

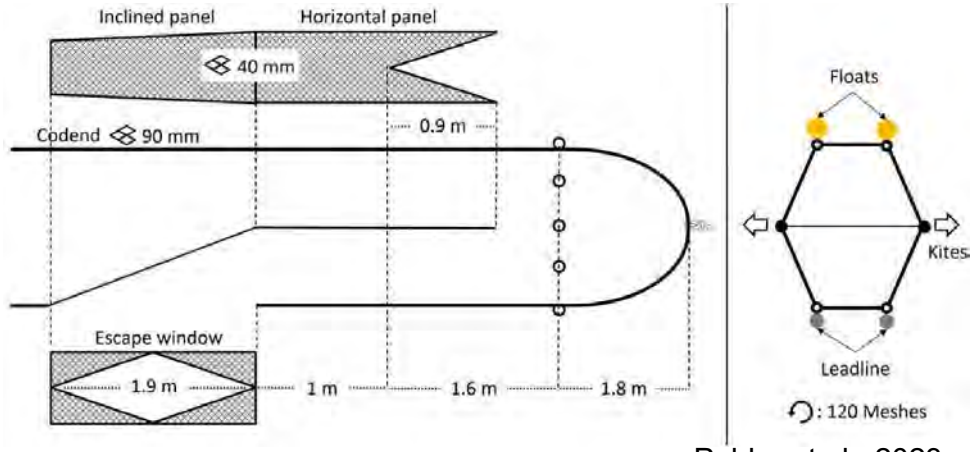
- A large diamond-shaped opening at the top – Why diamond in shape?
  - To ensure that the tension is equal in all sections
  - Ensures that the section remains stable
  - No need for additional floats and weights



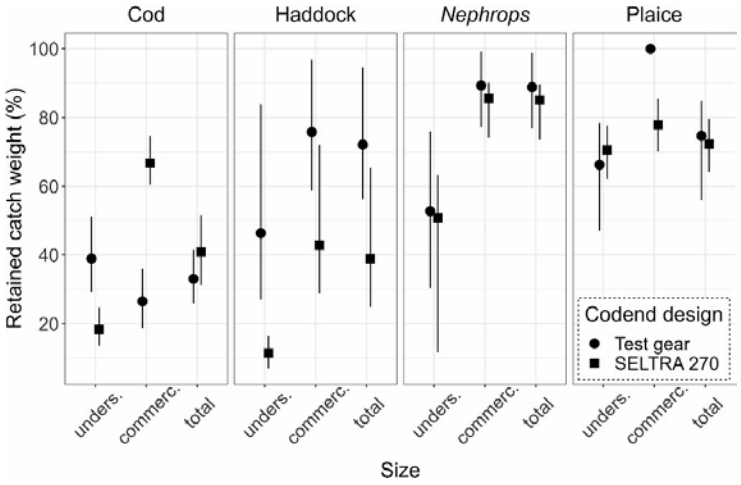


Bottom escape window

- Most of the unwanted bycatch of **cod** was released (~70%).
- Catches of the **Norwegian lobster were not significantly affected**.
- Catch of **commercial bycatch** of other round and flatfish was mostly **not affected**.



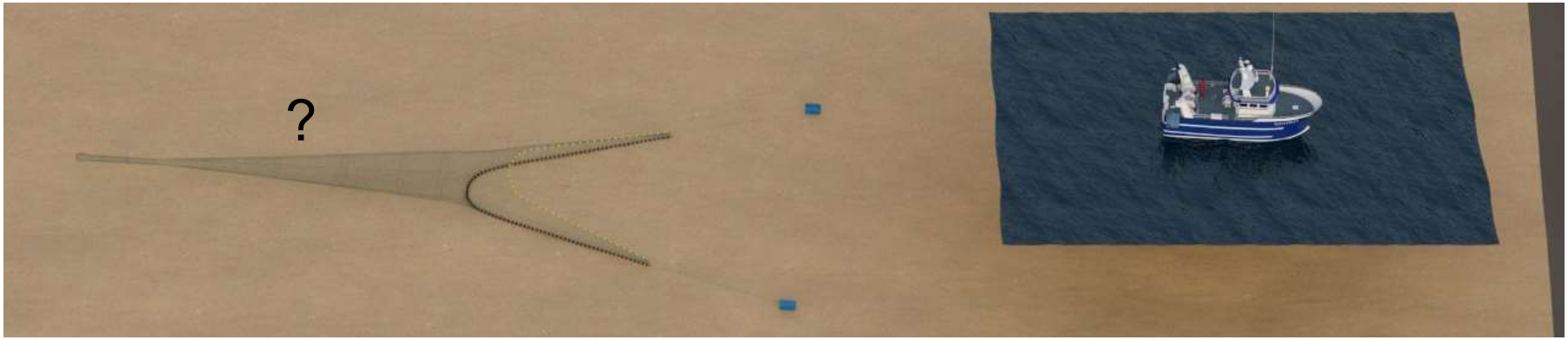
Palder et al., 2023



Digitalisation of fisheries

A blind process

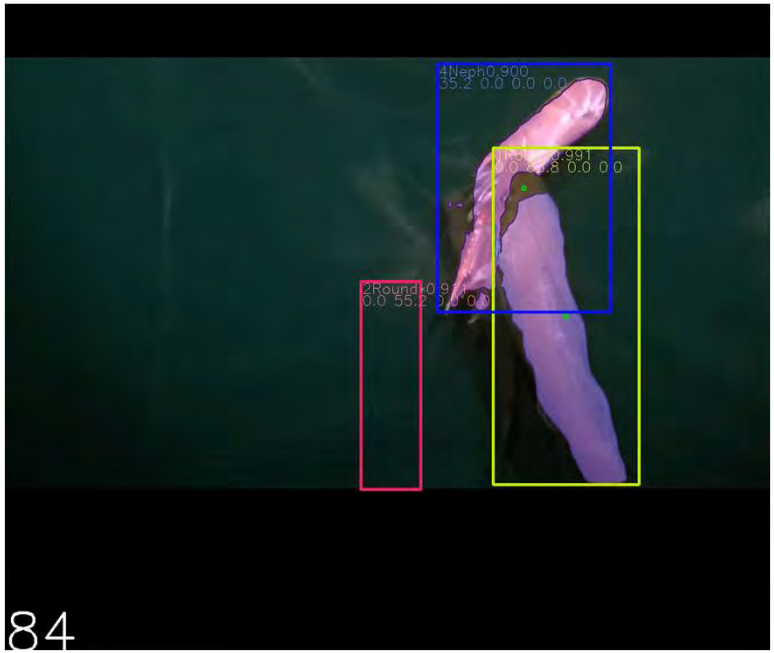
- Information on what is caught while fishing is limited
- Decisions based on catch composition from the last haul
- Each haul ~ 16-32 km long
- High operating costs



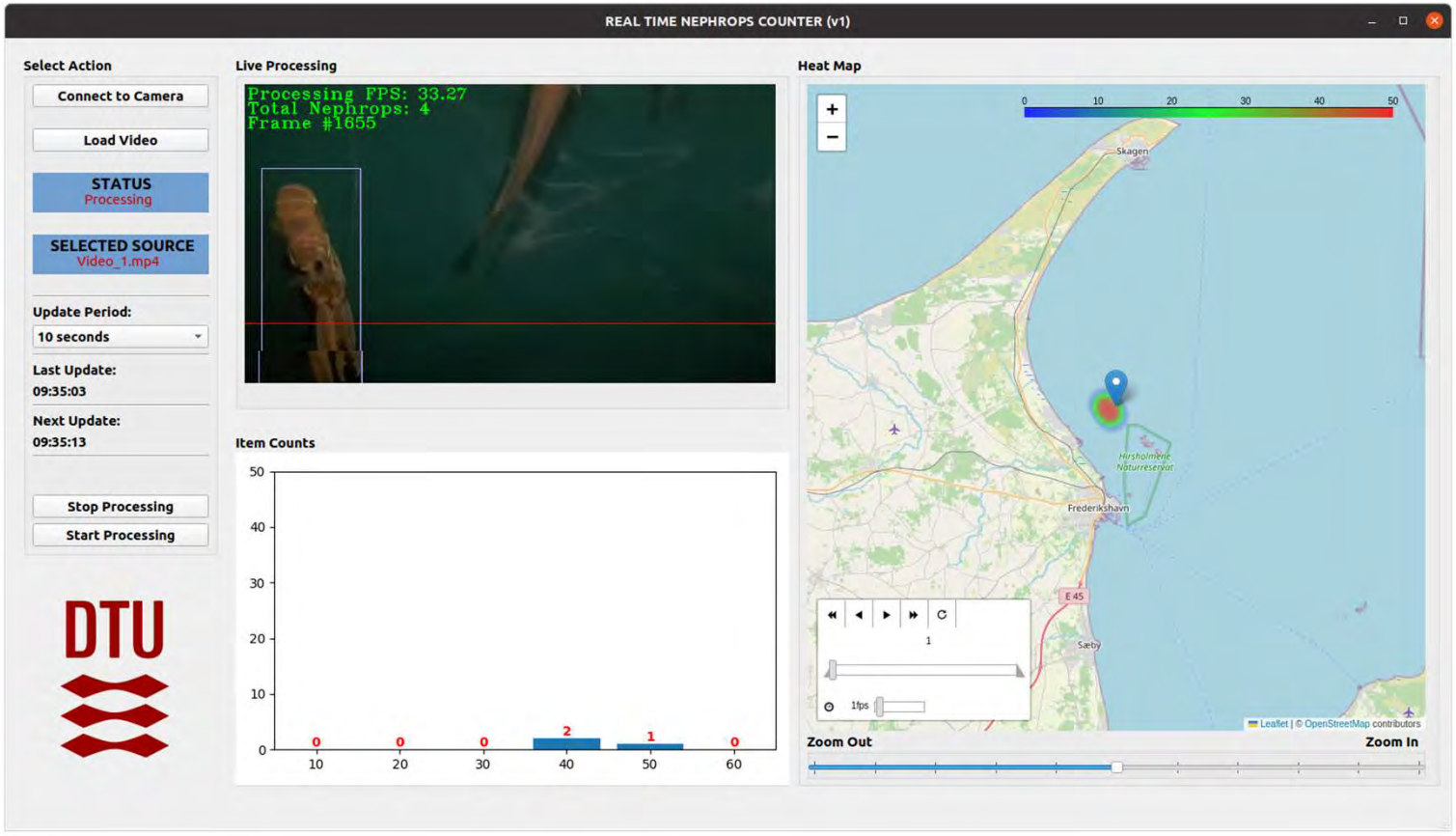
Moving fisheries from a blind to an informed process

- Which species and sizes are caught
- Whether or not the target species is present
- Whether or not the size of the target species is acceptable

Examples of real-time observations and automatic species recognition



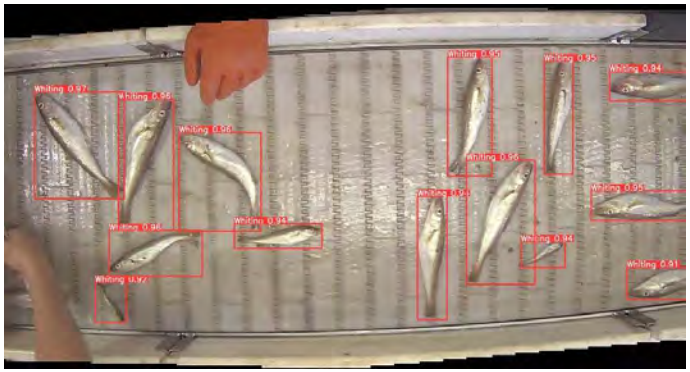
Interface for the fishermen



Electronic monitoring

- Offers the possibility to document entire catches
- Consequently, certain aspects of the technical measures could become less prescriptive
- Important knowing **what** is extracted **not how** it is extracted
- Therefore, the shift towards a more detailed control and enforcement can potentially facilitate a more flexible and simple management framework

Electronic monitoring

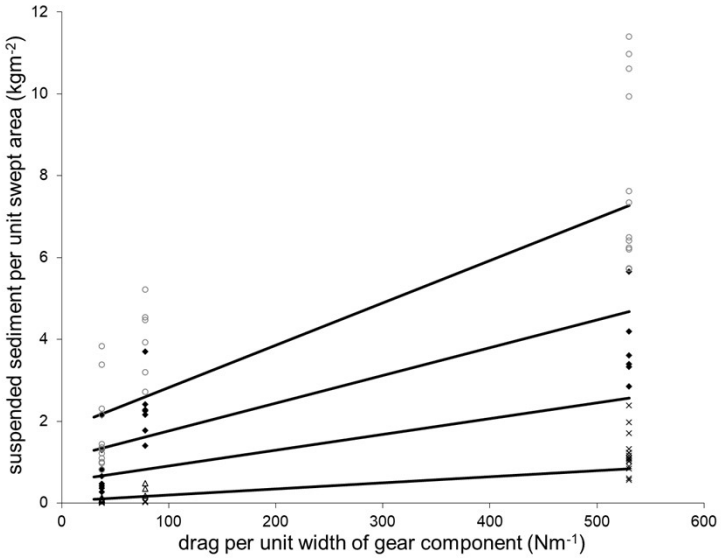


Horizon 2020, Smartfish

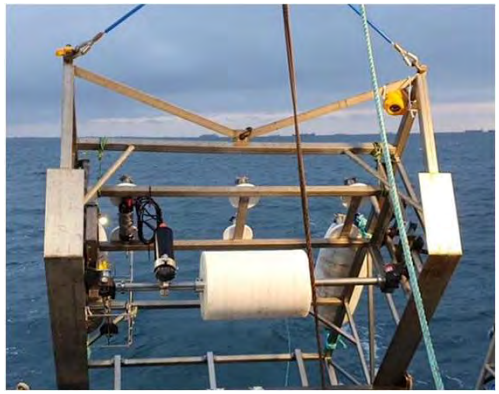
- Better control/enforcement may facilitate a more flexible and **simple management framework**
- Fishers able to **better** tailor **catch profiles** to the quota combinations available. i.e. better resource utilisation
- May also provide **additional access to markets** through more accurate catch reporting
- Possibility to **exploit** underutilized and **new species**
- **Reduce environmental impacts** (e.g. reduce unwanted catches, seabed impact and carbon emissions)

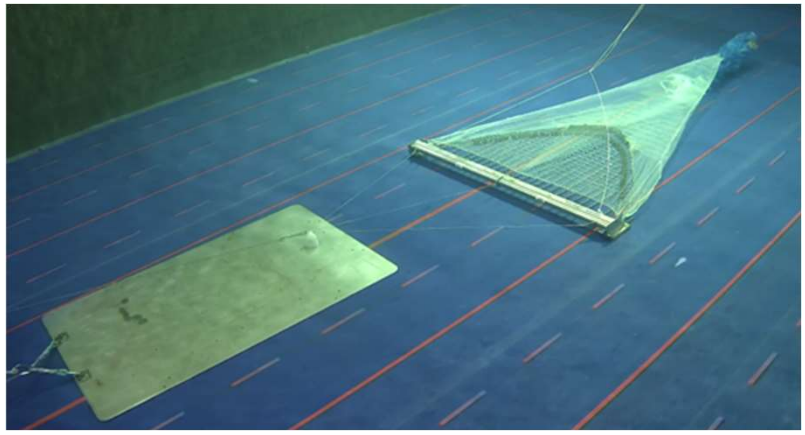
Reduction of seabed impact and fuel consumption

Physical impacts of fishing gears

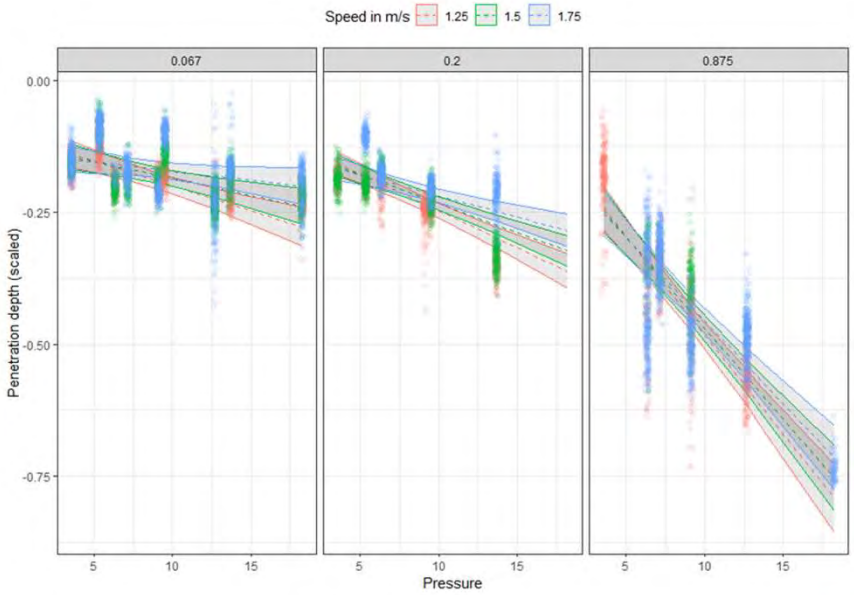


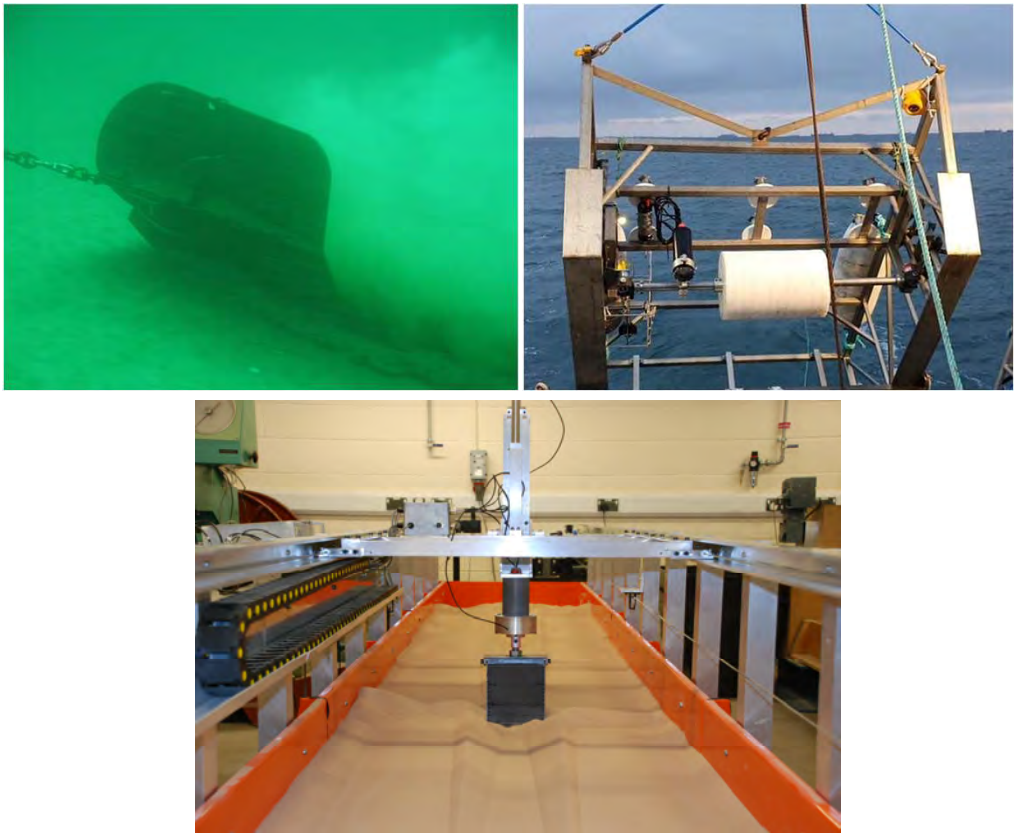
Sediment resuspension – seabed carbon





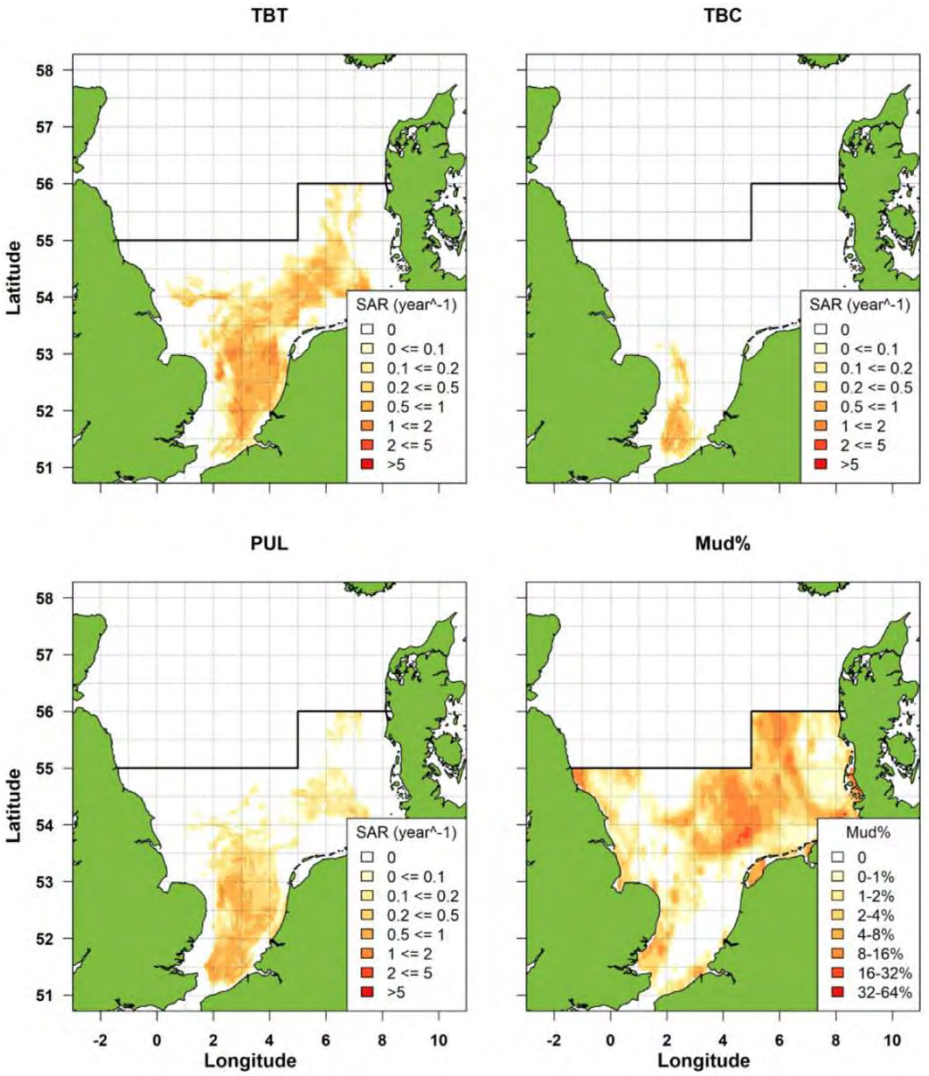
Physical impacts of fishing gears



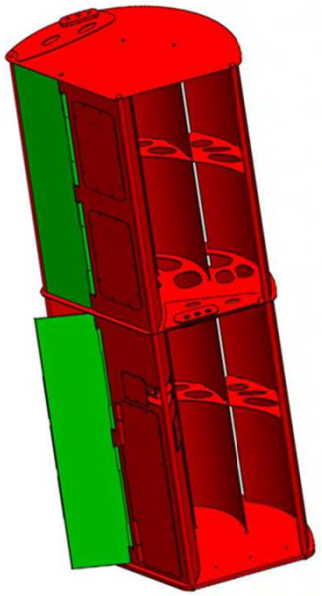


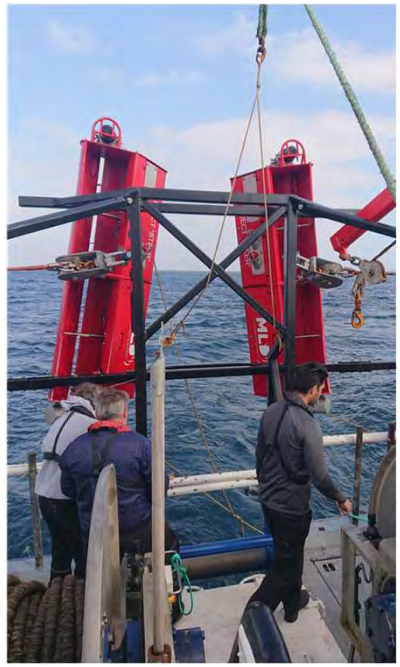
Penetration into the sediment – gear drag and fuel efficiency

- Fleet level assessments of impacts
- If we can relate sediment resuspension to carbon release
  - Input to ecosystem models



Self-adjusting semi-pelagic trawl doors for demersal fisheries



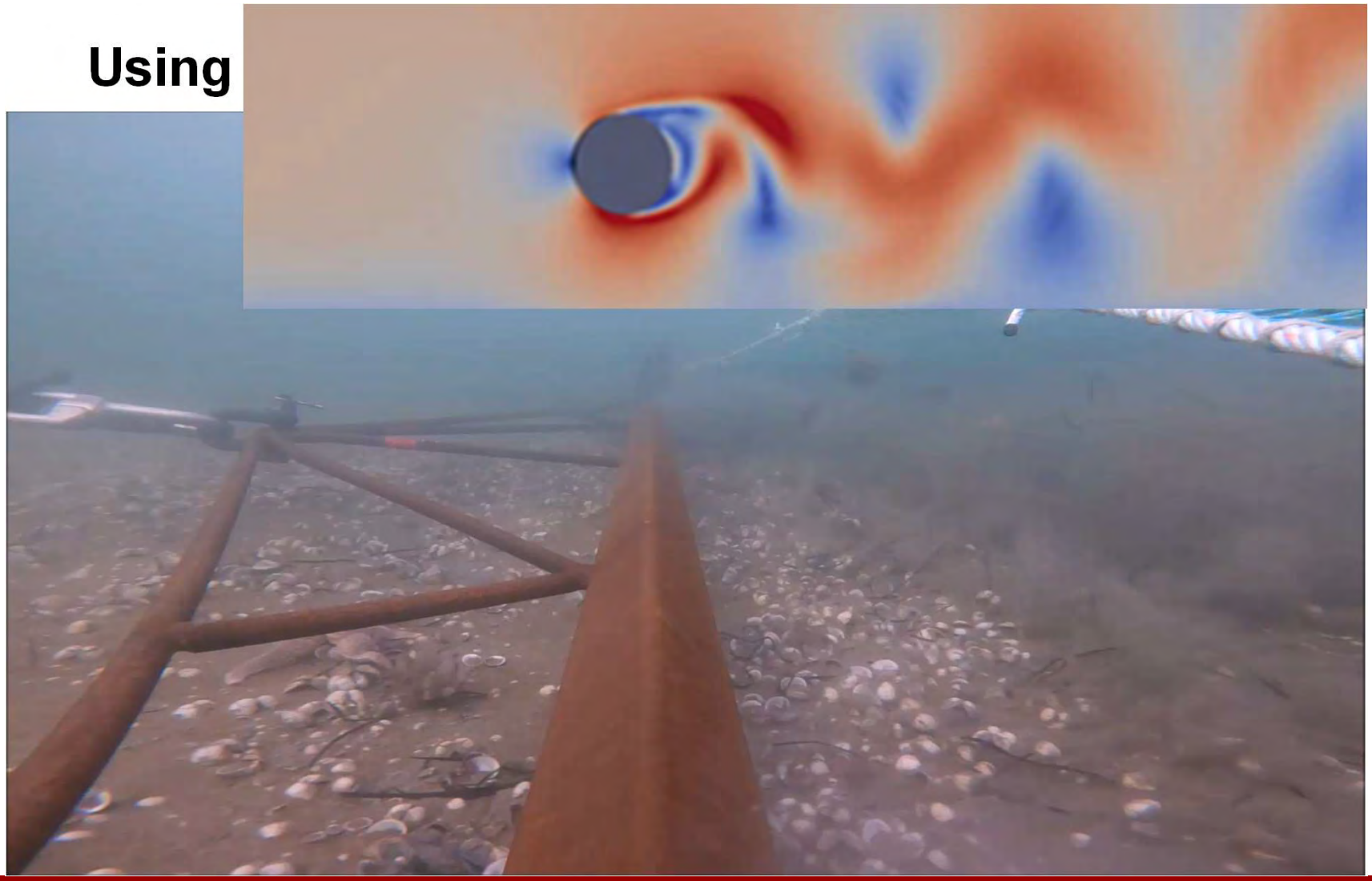


PID system uses data from on-board altimeters to control actuators that open and close the flaps

Conventional door

MLD door

Using



Bæredygtighed af jomfruhummerfiskeri med tejner i dansk farvand (JomfruTejn)

Project period: 31/8 2023 – 6/12 2024

Partners: DFPO, Læsø Fisk & Københavns Universitet

Consultants: Stars, Danmarks Naturfredningsforening, WWF

AIM: To investigate if fishing with creels is viable in a Danish setting

Challenges:

- To engage a good vessel / crew
- To make sure both NGOs and DFPO trust the results – and stay in the ”room”!
- To dessiminate results in a balanced and comprehensive way


Tak!