Fisheries Innovation & Sustainability

Kara Brydson & Professor Paul Fernandes

Smartrawl

THE GATEWAY TO INTELLIGENT FISHING

FIS is a coalition of experts driving strategic innovation for a prosperous & sustainable UK seafood industry.

Our remit is to facilitate, coordinate & leverage investment for innovation in UK seafood.

FIS Fisheries Innovation & Sustainability

www.fisorg.uk

Sainsbury's

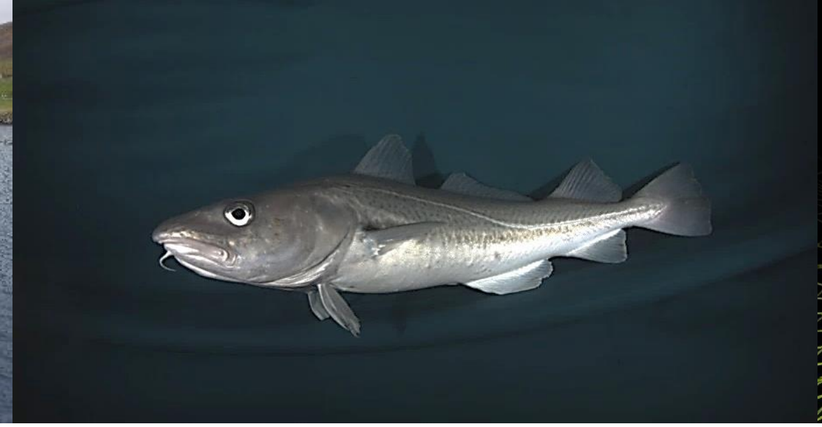
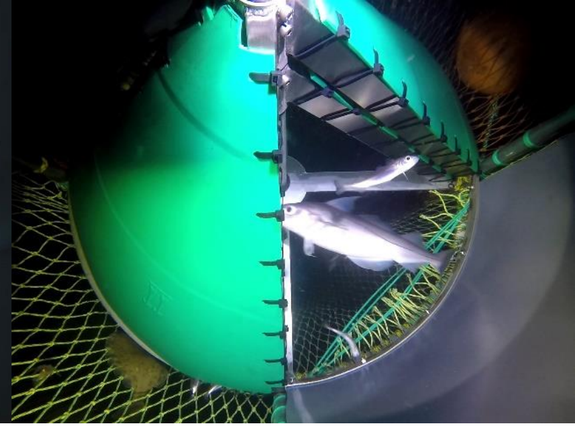
The FISHMONGERS' Company's FISHERIES CHARITABLE TRUST

M&S EST. 1884

seafish

SOFINA

Est. 1805 Young's

Smartrawl

THE GATEWAY TO INTELLIGENT FISHING

Paul G Fernandes[1], John Polanski[2],
Vivek Chacko[2], Dewei Yi[2] & Shaun Fraser[3]

UK SEAFOOD INNOVATION FUND

Department for Environment Food & Rural Affairs

The Scottish Government

1 HERIOT WATT UNIVERSITY

the Lyell centre

THE NATIONAL ROBOTARIUM
PEOPLE CENTRED :: INTELLIGENCE DRIVEN

2 1495 UNIVERSITY OF ABERDEEN

3 UHI University of the Highlands and Islands
Oilthigh na Gàidhealtachd agus nan Eilean

FIS Fisheries Innovation & Sustainability

Discarding & bycatch, are big problems

Perez Roda *et al* (2019): 46 % (4.2 Mt) of annual discards were from bottom trawls

Gray & Kennelly (2018), annual bycatch:

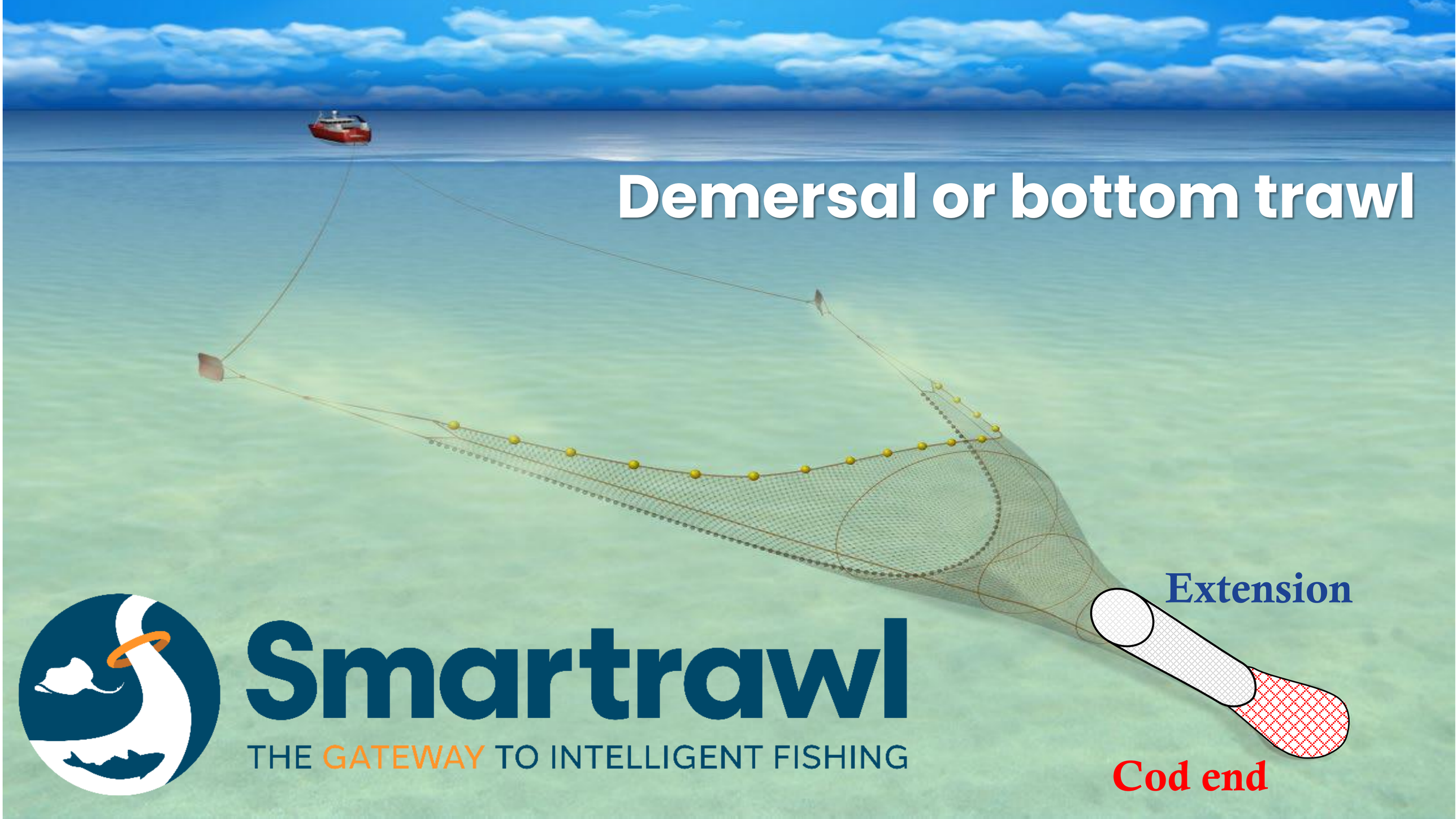
- hundreds of marine mammals
- thousands of seabirds & sea turtles
- millions of sharks, skates & rays

EUROPEAN FISHERIES CONTROL AGENCY

Evaluation of Landing Obligation Compliance in the North Sea

[2016-2017] "…non-compliance widespread…"
"…traditional control tools have proven to be inefficient.."

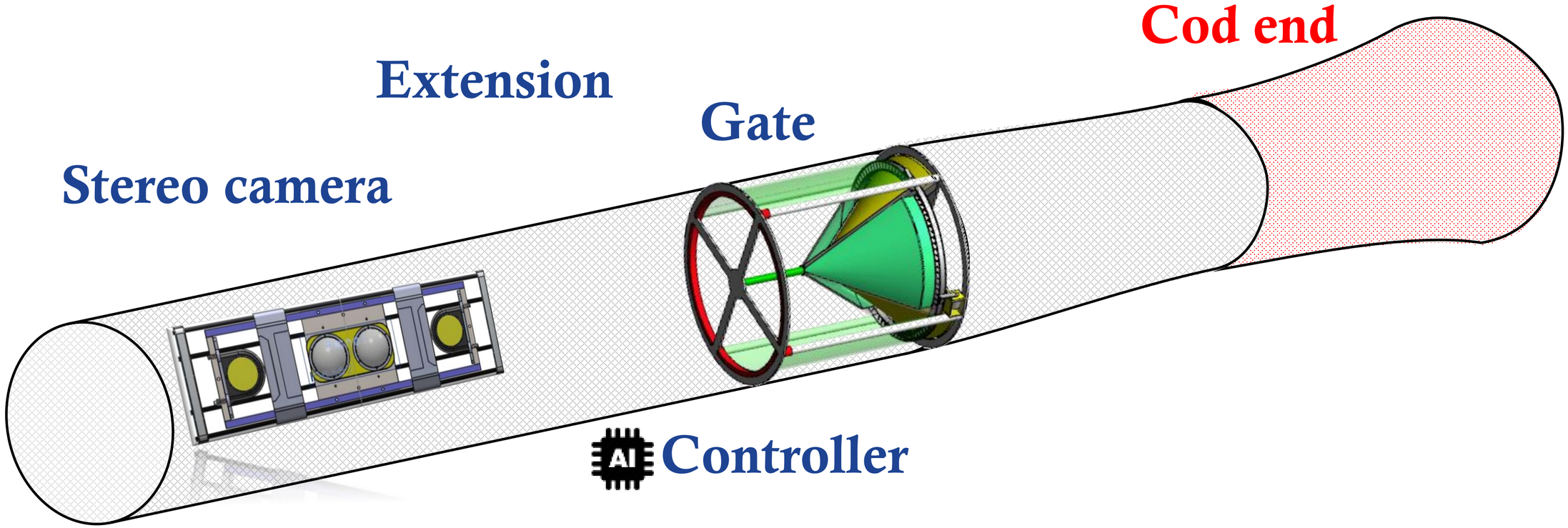
Demersal or bottom trawl



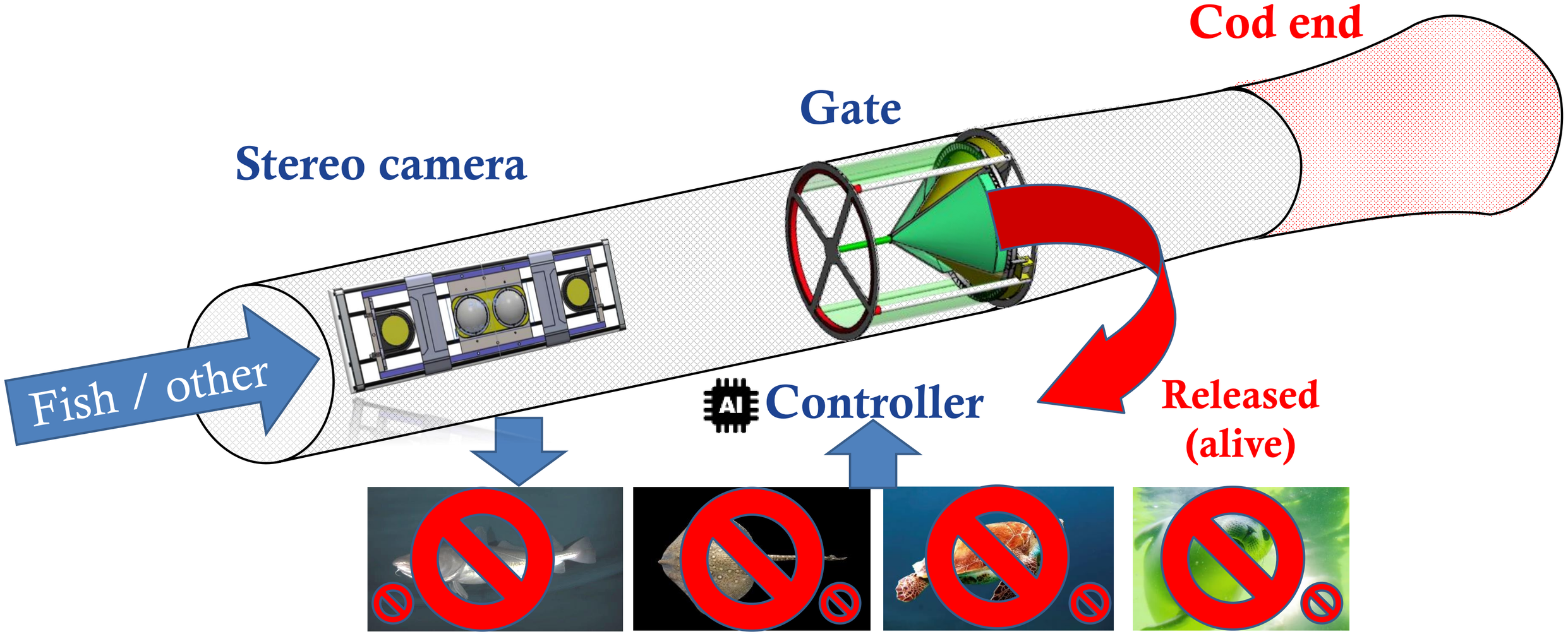
Smartrawl

THE GATEWAY TO INTELLIGENT FISHING

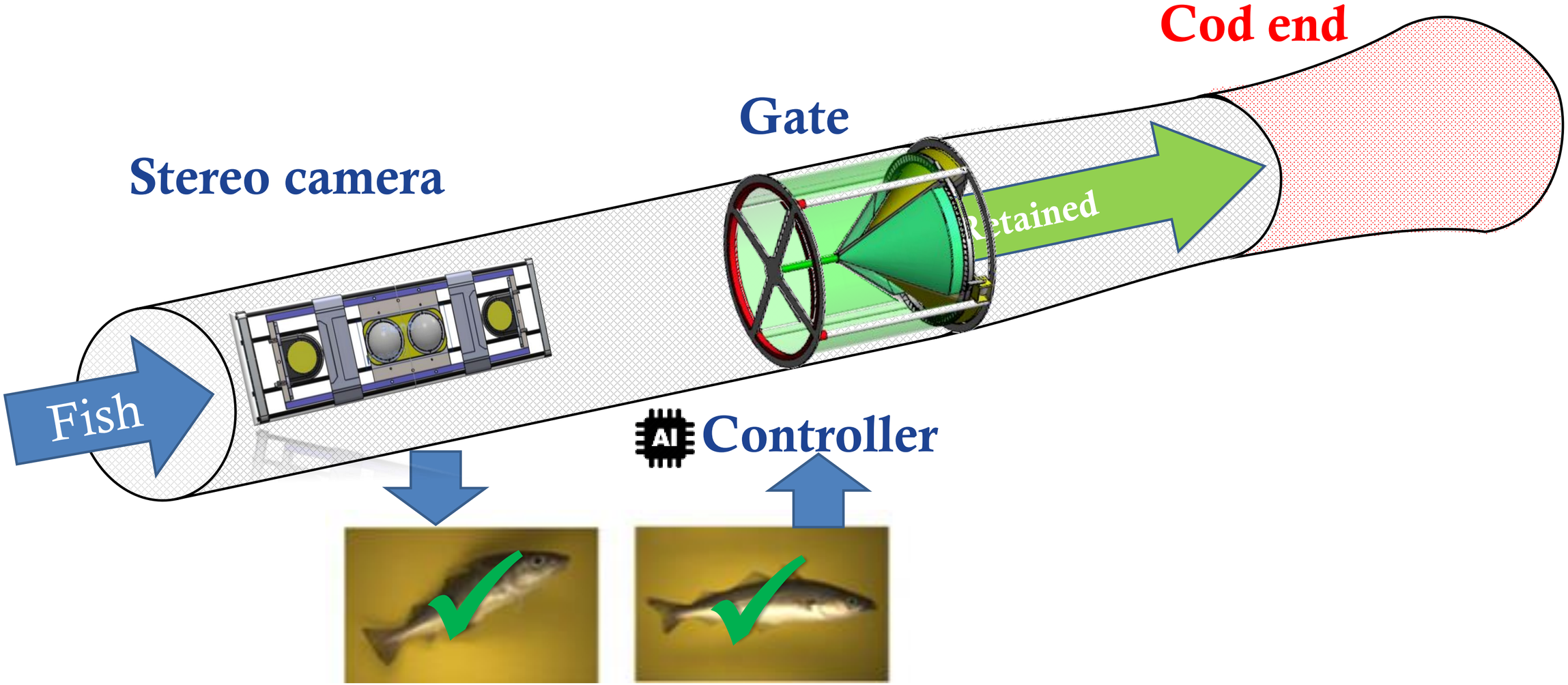
Smartrawl has 3 major components



Smartrawl releases unwanted animals



Smartrawl retains wanted animals



Shetland trials

Gate fitted neatly & easily into the trawl!

Shetland trials

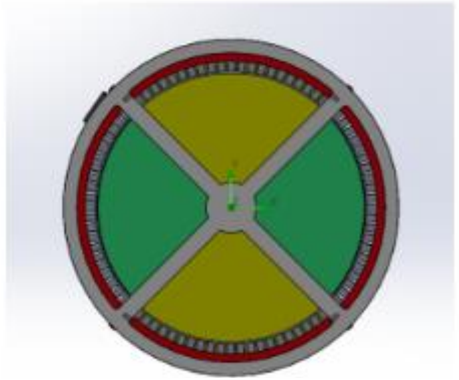
Gate also slotted in easily onto the aft deck

Shetland trials

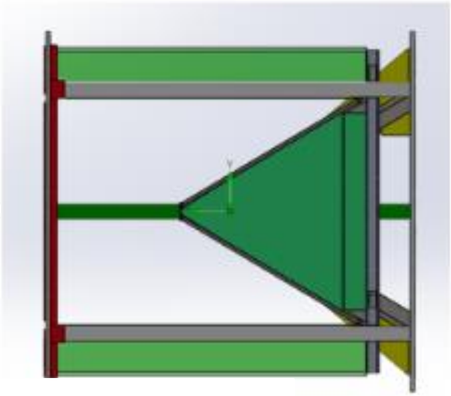
Gate was also remarkably easy to deploy and recover!

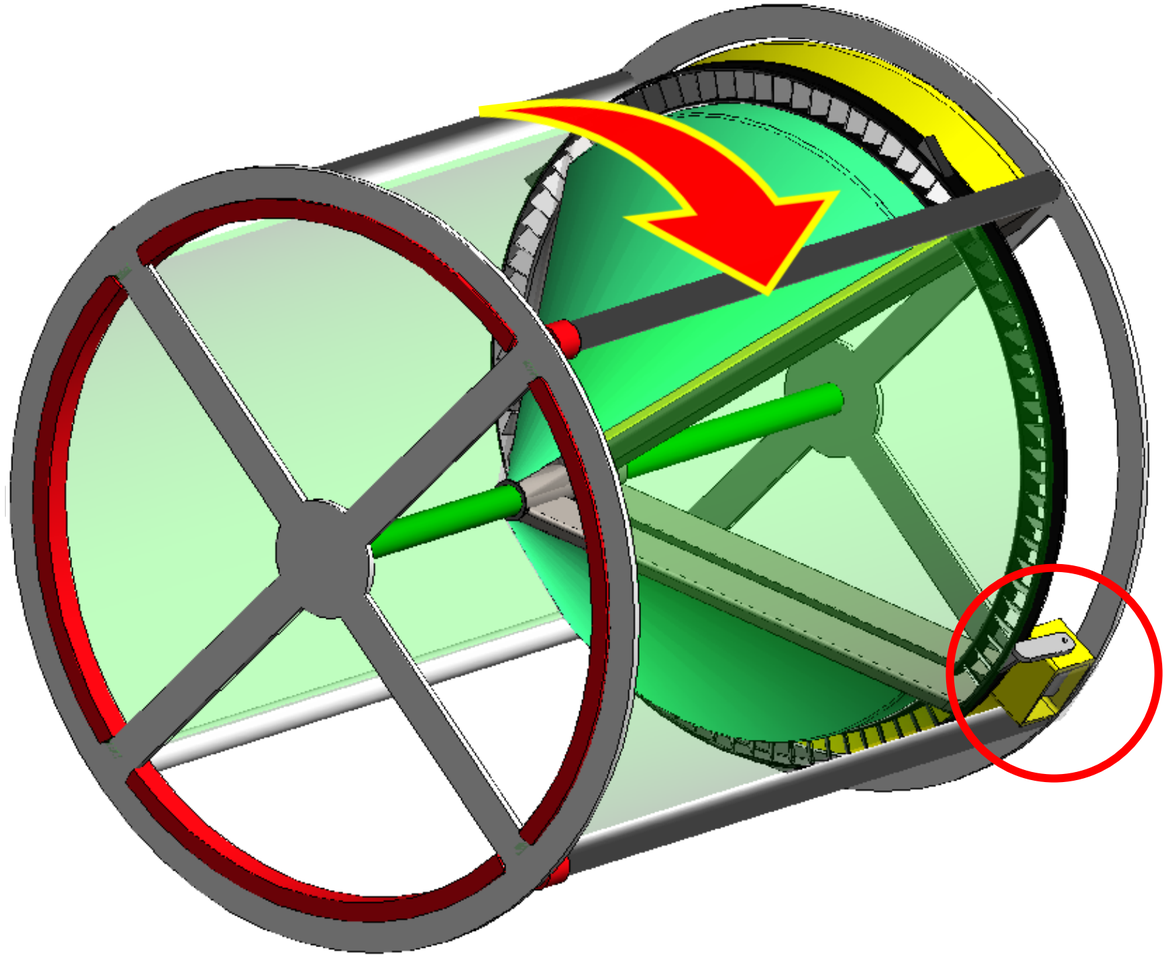
Smartrawl: patented gate

GB2603251

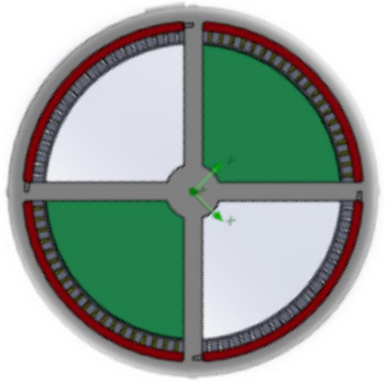


Release

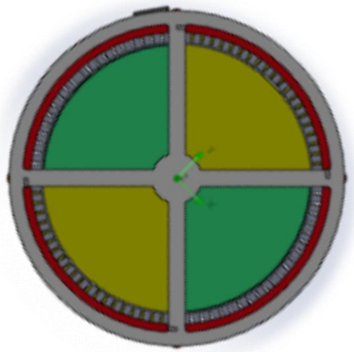


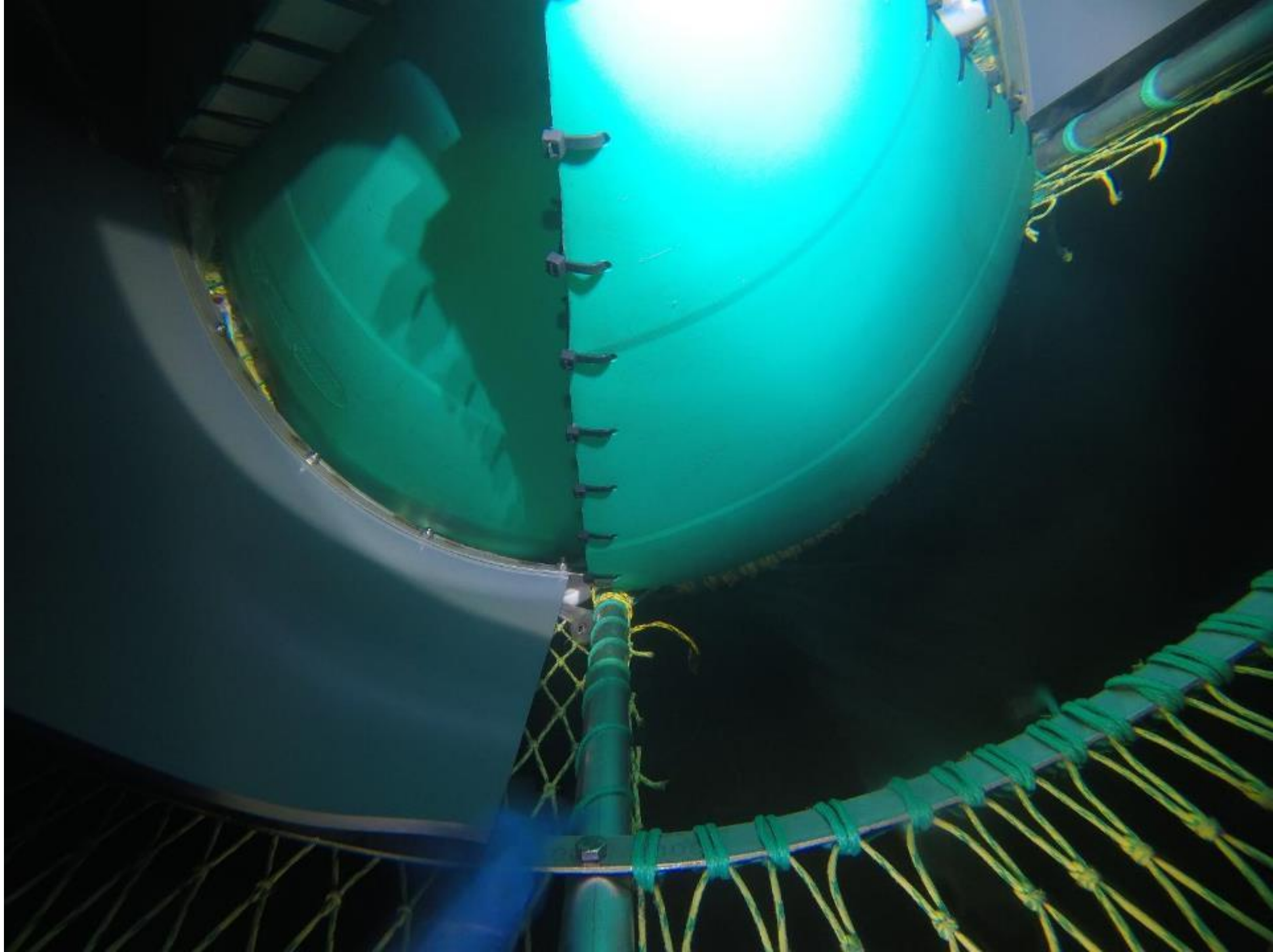


Catch images

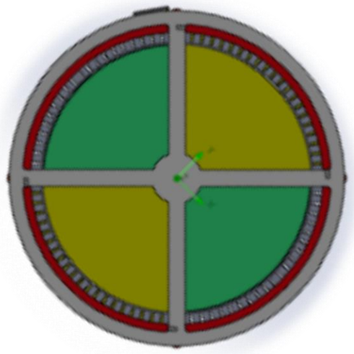


Release images

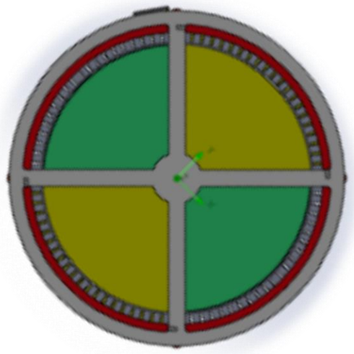




Release of a thornback ray



Release of a thornback ray



Improving image quality

University of the Highlands and Islands
Oilthigh na Gàidhealtachd agus nan Eilean

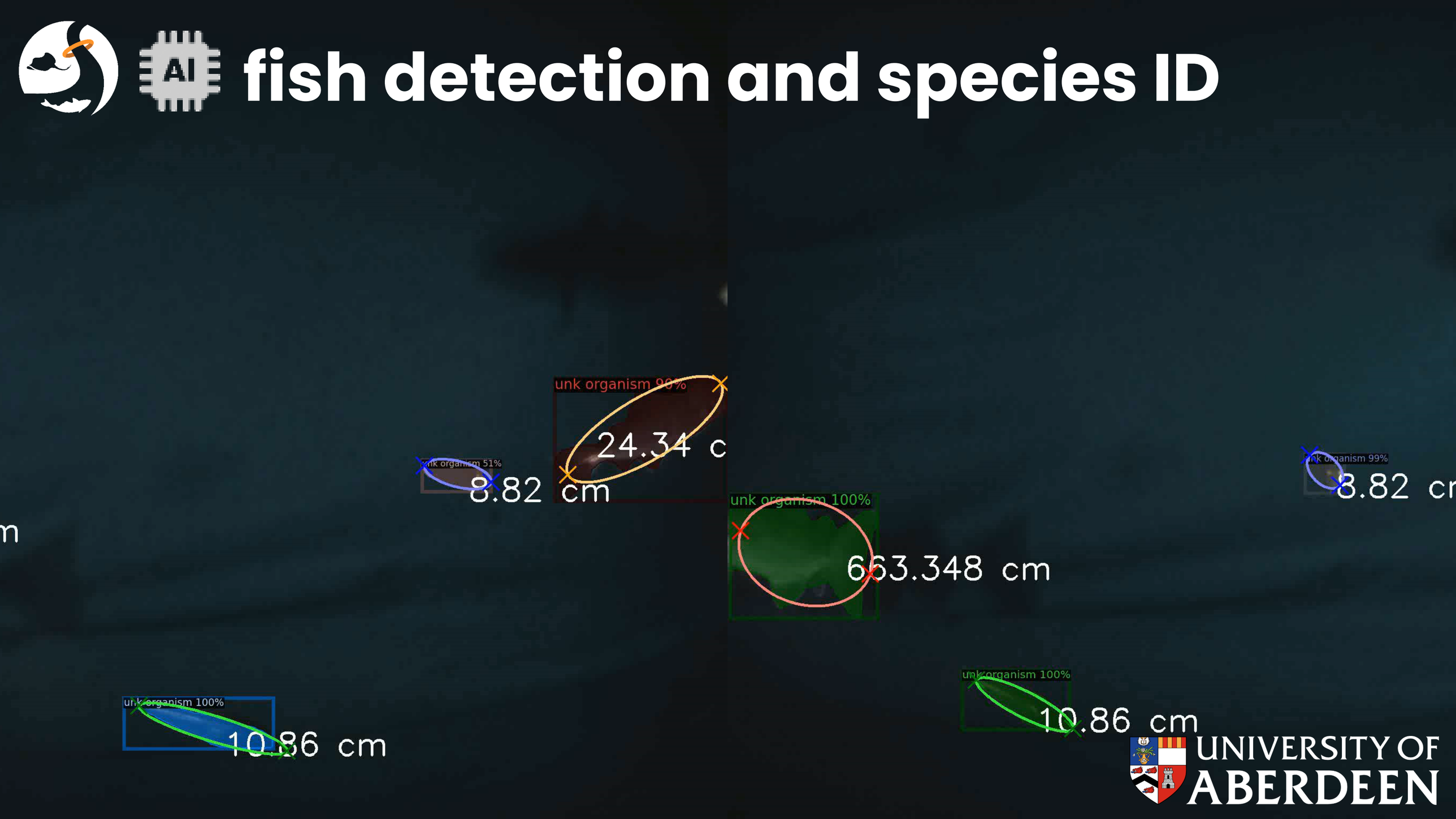
Improving image quality

Improving image quality

fish detection and species ID

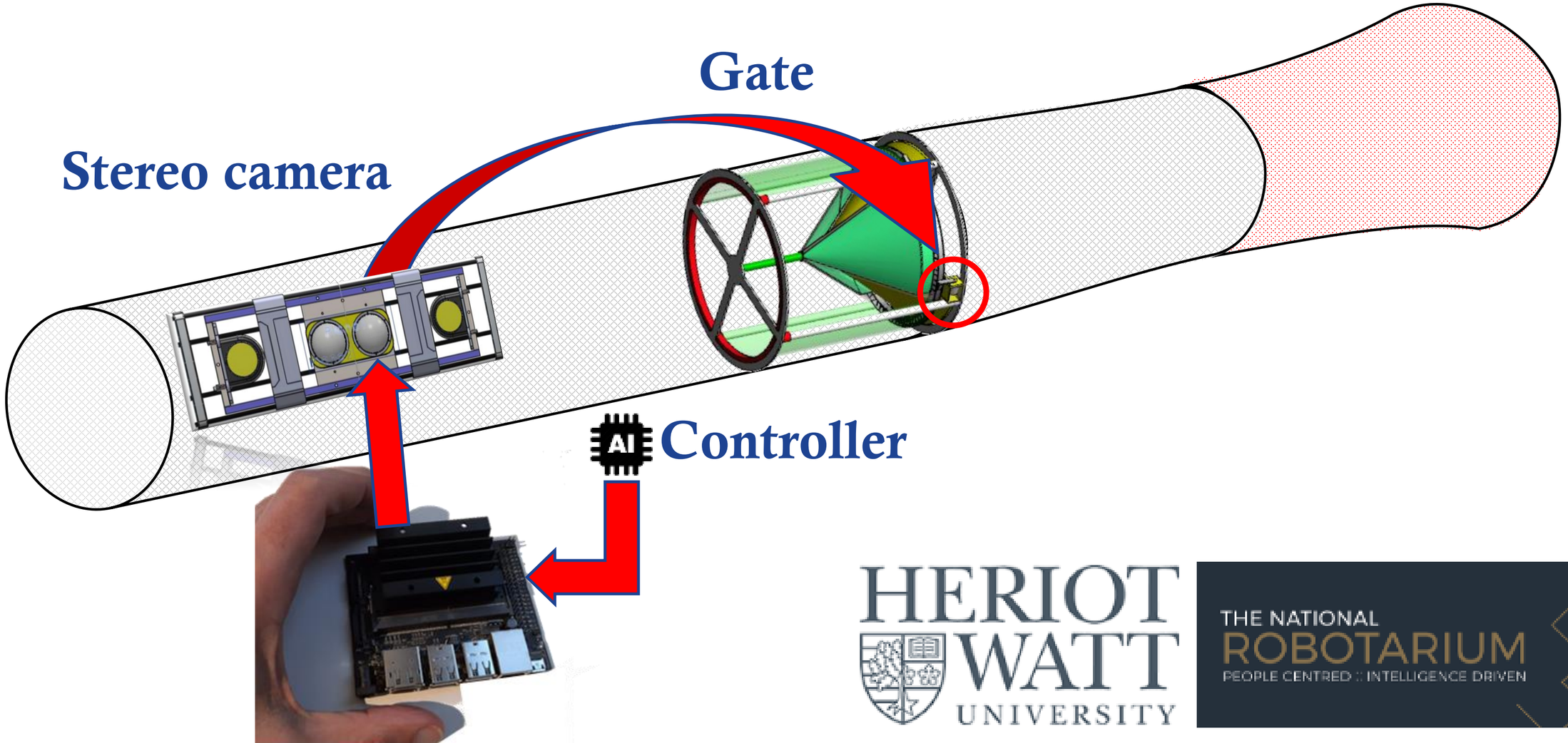
UNIVERSITY OF ABERDEEN

fish detection and species ID



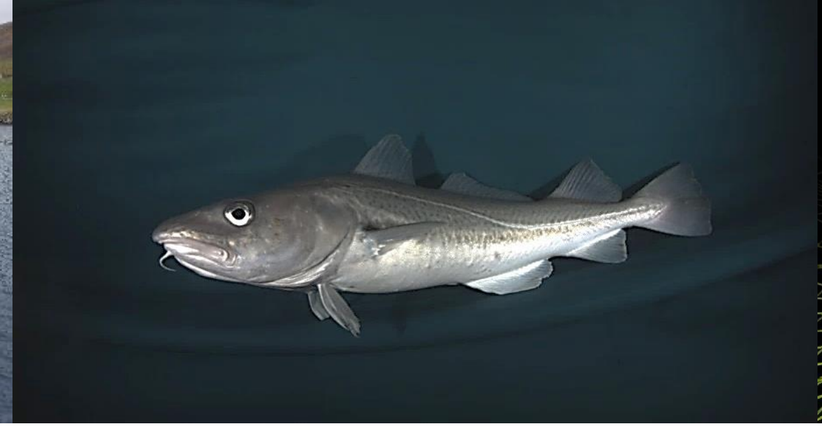
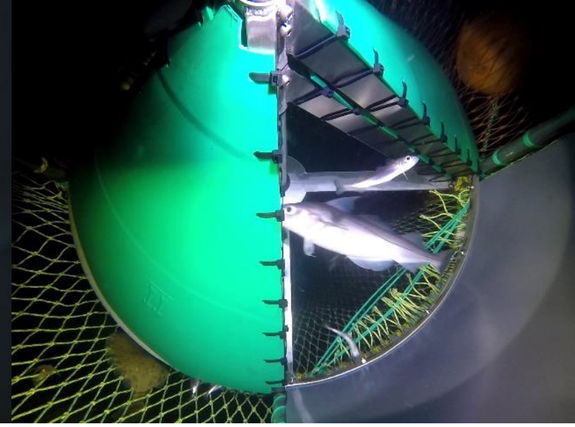
UNIVERSITY OF ABERDEEN

Next steps: system integration



HERIOT WATT UNIVERSITY

THE NATIONAL ROBOTARIUM
PEOPLE CENTRED :: INTELLIGENCE DRIVEN

Smartrawl

THE GATEWAY TO INTELLIGENT FISHING

Paul G Fernandes[1], John Polanski[2],
Vivek Chacko[2], Dewei Yi[2] & Shaun Fraser[3]

UK SEAFOOD INNOVATION FUND

Department for Environment Food & Rural Affairs

The Scottish Government

1 HERIOT WATT UNIVERSITY

the Lyell centre

THE NATIONAL ROBOTARIUM
PEOPLE CENTRED :: INTELLIGENCE DRIVEN

2 1495 UNIVERSITY OF ABERDEEN

3 UHI University of the Highlands and Islands
Oilthigh na Gàidhealtachd agus nan Eilean

FIS Fisheries Innovation & Sustainability

Net Zero Fishing Vessels

FIS commissioned Macduff to identify most plausible pathways for UK fleet

Shows that from an economic, infrastructure & regulatory perspective, first fishing vessels at competitive disadvantage

All alternative fuels have a lower energy density & more complicated storage / handling requirements

Rapid changes in vessel design & infrastructure could create skills deficits

Regulatory & financial barriers to adopting new technology

First proof of concept net zero vessel designs based on existing ‘parent’ vessels

Foundation

Clyde Fishermen’s Trust

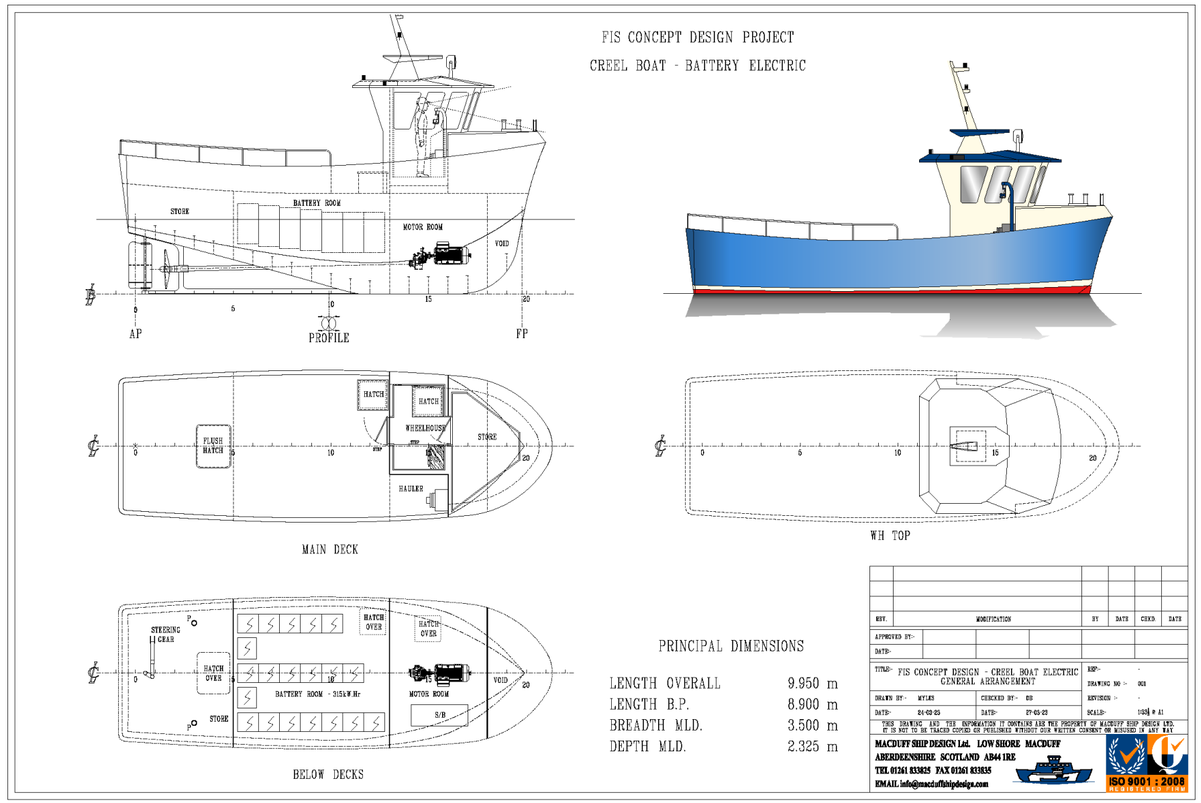
MACDUFF SHIP DESIGN

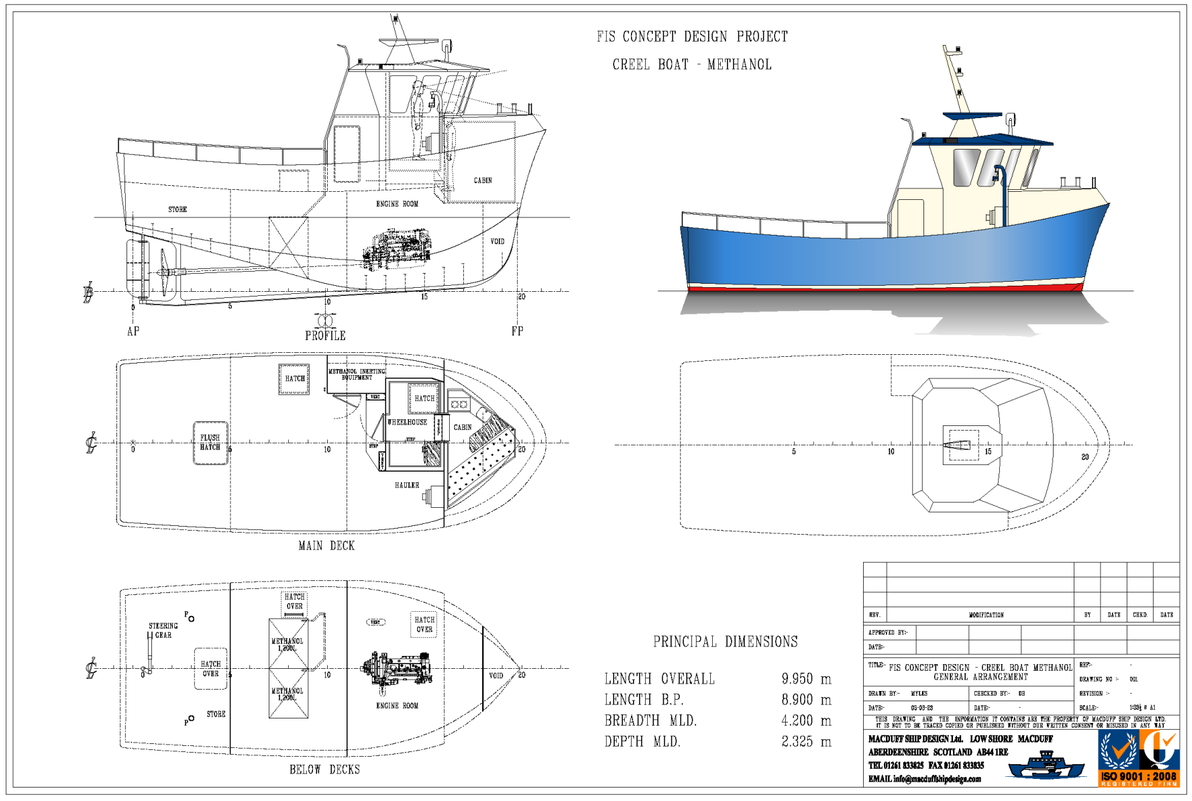
University of Exeter

Centre for Future Clean Mobility

10m creel boat – Battery Electric

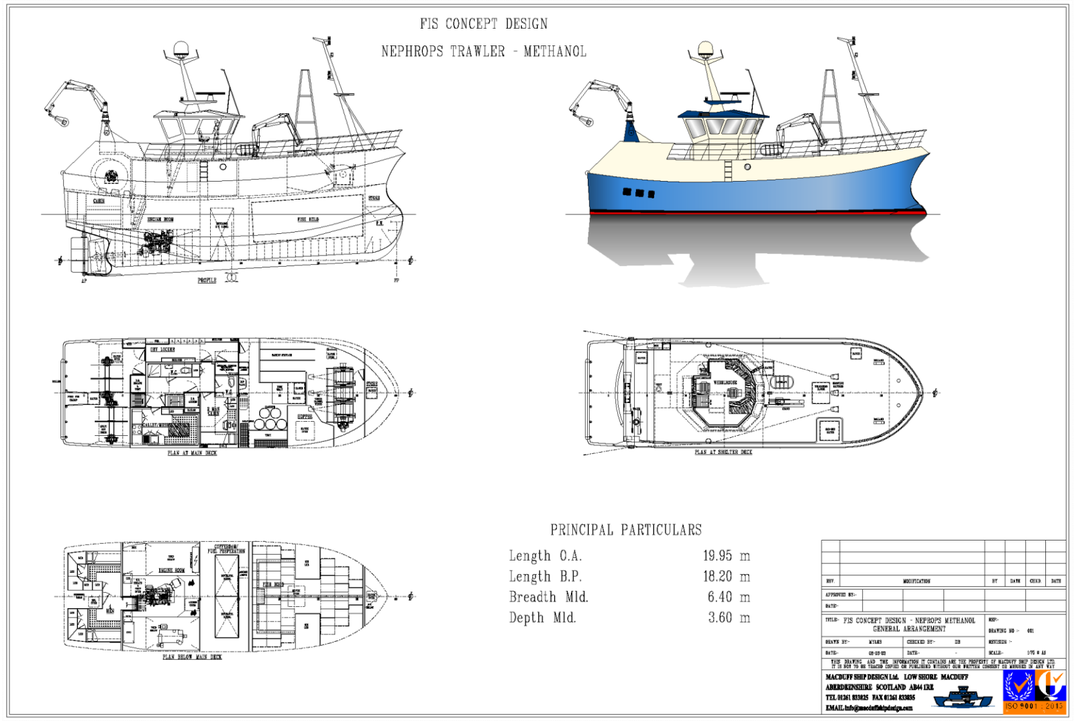
- Uncertain path to approval & subsequent uncertainties.
- Currently no international rules for fully electric vessels (only diesel battery hybrid).
- Uncertainty as to whether first of class vessels would need backup propulsion.

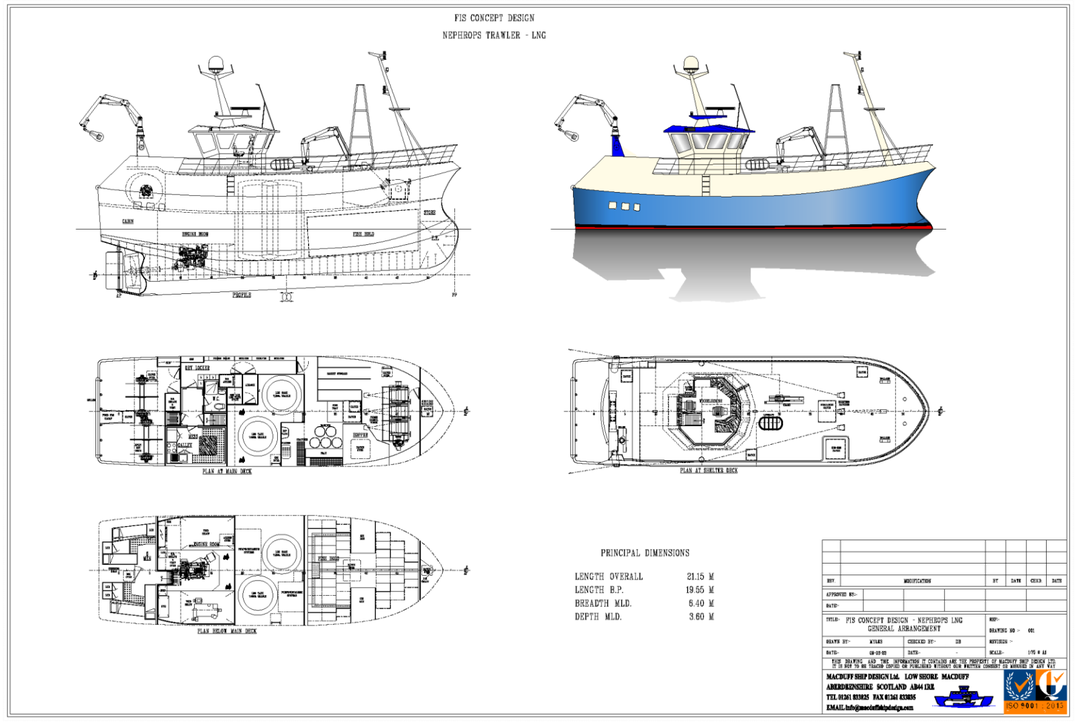




~15m Nephrops trawler – Methanol or LNG

- Methanol vessel would become 19.9m LOA, LNG would be 21m. Skipper would require additional certification compared to the much shorter parent vessel.
- Vessel could not be certified using standard regulations, and clarification not given until a build project commences. Uncertainty on additional requirements for skipper/engineer qualifications.
- Tonnage up by a quarter or 37%. As tonnage is limited for the UK fleet, if all vessels have similar changes, the overall capacity of the fleet will have to reduce.





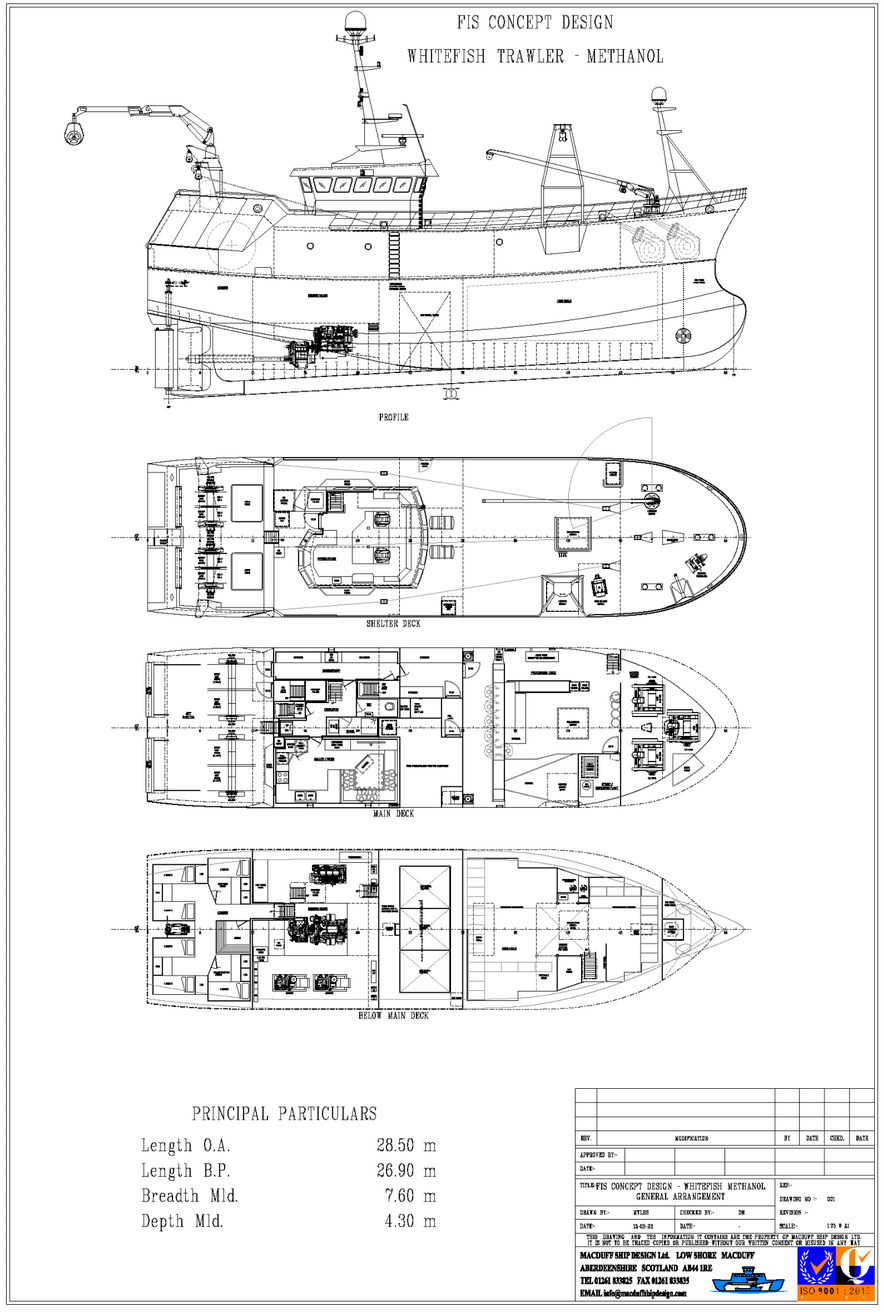
<24m reg whitefish trawler – Methanol or LNG

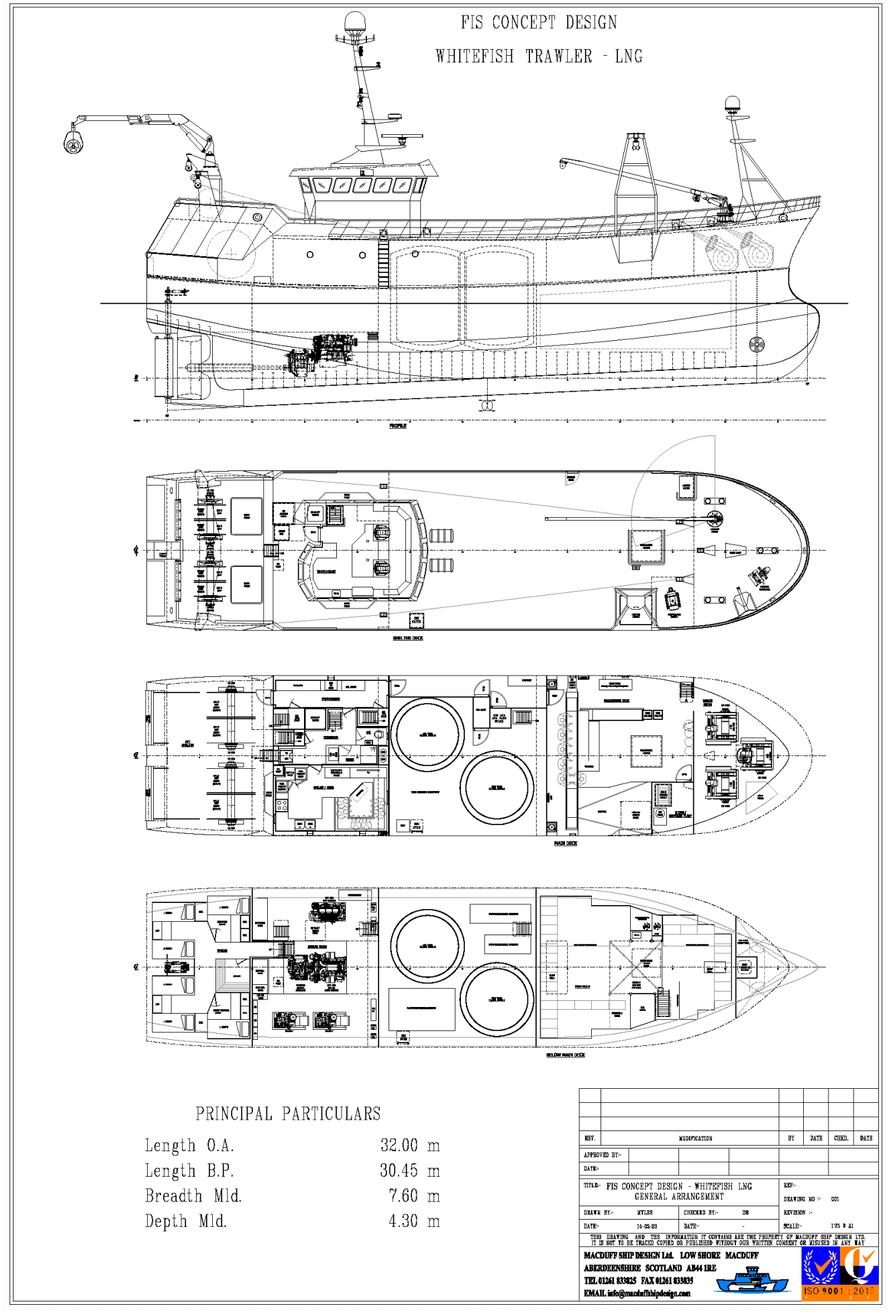
Methanol vessel now 28m – 16% longer & heavier.

LNG vessel now 32m!

– 33% longer & heavier & GT

Major changes to skipper & engineer qualifications, crew skills, safety requirements etc





Regulatory barriers

Vessels using methanol or LNG have more complicated tank, piping & safety requirements, taking up more space on board – so need to be larger & heavier to match operation of parent vessels.

This pushes vessels into higher class, with significant implications for capital costs, regulatory requirements, gross tonnage/licensing.

Uncertainties of regulatory sign off for ‘first of class’ vessels is barrier to securing investment & capital

Add in access to & price of fuels & materials, electricity charging infrastructure & prices, crew & onshore skills, and it’s a difficult proposition...

Conclusions

These first net zero vessel designs show what could be possible if we can address current financial, regulatory & technical barriers.

They verify concerns raised in our earlier project – that vessel owners trying to do the right thing will, for now, be at a critical disadvantage competing in a market with diesel vessels.

Early adopters must be able to access financial assistance, business advice & reg support.

Ports & harbour infrastructure, fuel supply chains, vessel finance packages, and skills & safety training all needed before designs can become a reality.

Must keep fishermen safe & businesses competitive while meeting gvt & retailer targets.

Now working on hydrogen designs – but ‘all just talk’ unless we actually build a vessel!

Fisheries Innovation & Sustainability

THANK YOU

www.fisorg.uk

@fisorguk

Fisheries Innovation & Sustainability

Fisheries
Innovation &
Sustainability