



Smartrawl: a vision for sustainable fishing

Paul G. Fernandes





We believe that innovation is the key to releasing untapped potential for greater prosperity & sustainability in Scotland's seafood industry

We champion projects which will make the greatest positive change for Scotland's seafood industry and the people driving it

We are a unique collaboration between seafood experts, government and scientists of all disciplines

We create a pre-competitive environment to connect the supply chain around shared opportunities to add value to businesses & communities

The logo for M&S is the letters 'M&S' in a large, white, serif font.

EST. 1884

The logo for Sainsbury's features the word 'Sainsbury's' in a bold, orange, sans-serif font, with a thin orange swoosh underneath.

The logo for The Fishmongers' Company features the number '750' in a large, blue, serif font, with a small gold fish icon to its right.

The
FISHMONGERS'
Company

The logo for seafish features the word 'seafish' in a bold, blue, sans-serif font, with a blue checkered pattern above the 'i'.



Discarding of fish, & bycatch, are big problems



Perez Roda *et al* (2019). *FAO Tech. Pap. 633*

“...about 46 % (4.2 million tonnes) of total annual discards were from bottom trawls...”

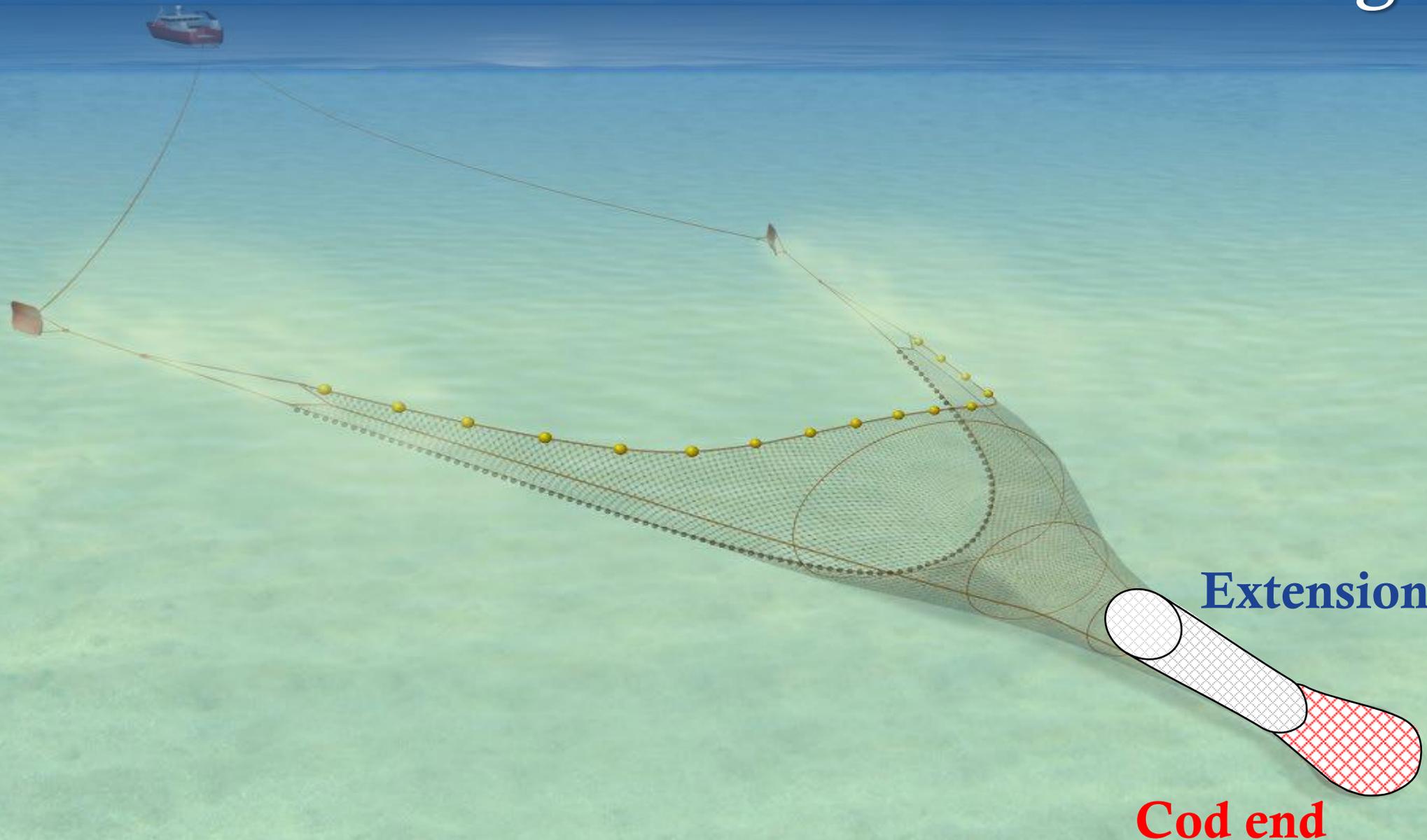


*Evaluation of Landing Obligation
Compliance in the North Sea*

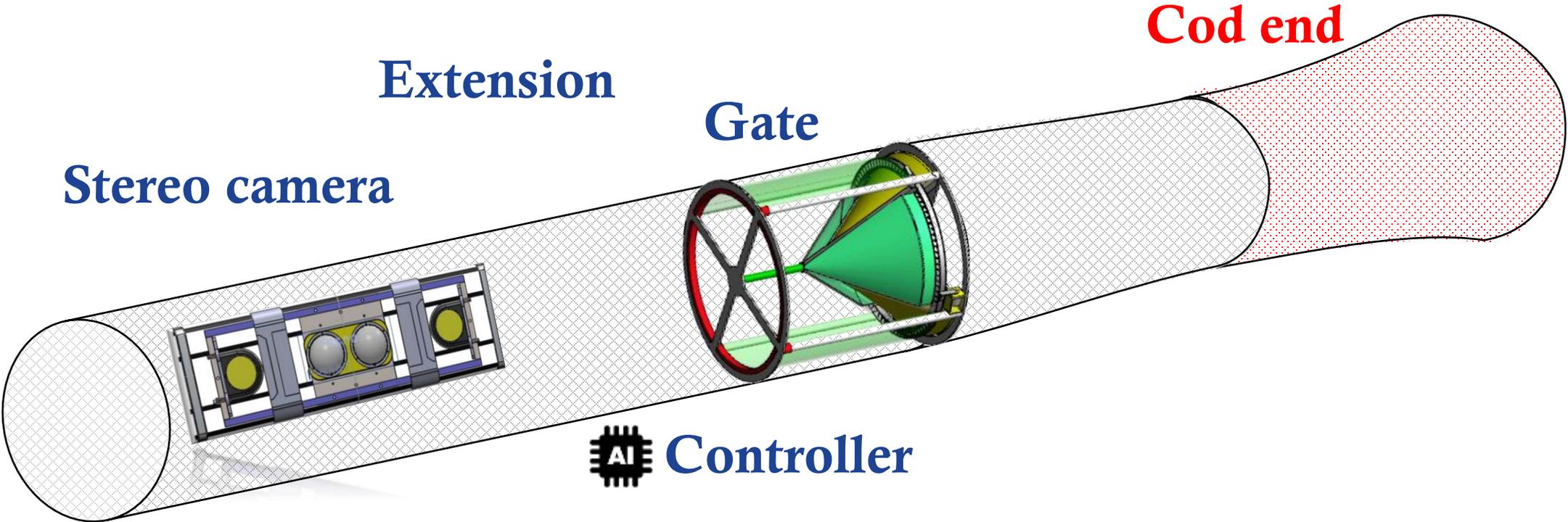
“...non-compliance widespread...”

“...traditional control tools have proven to be inefficient..”

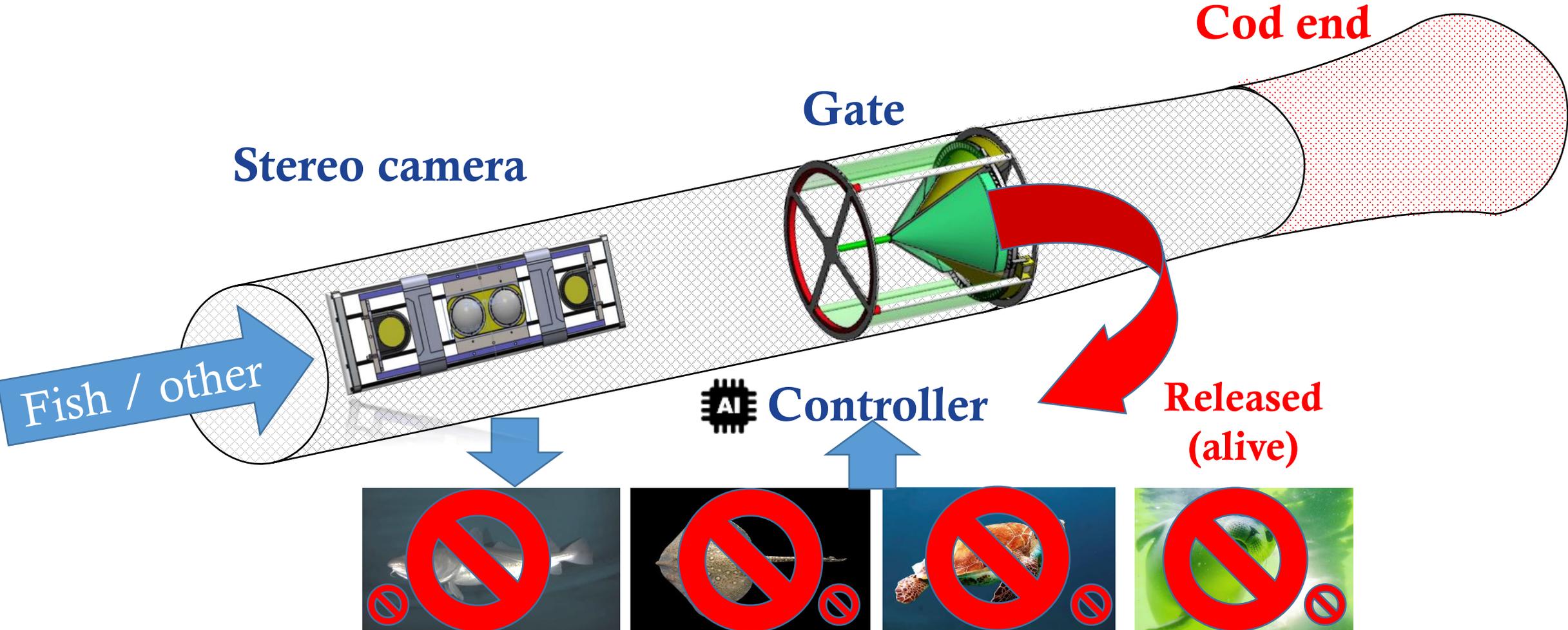
Smartrawl: a vision for the future of trawling?



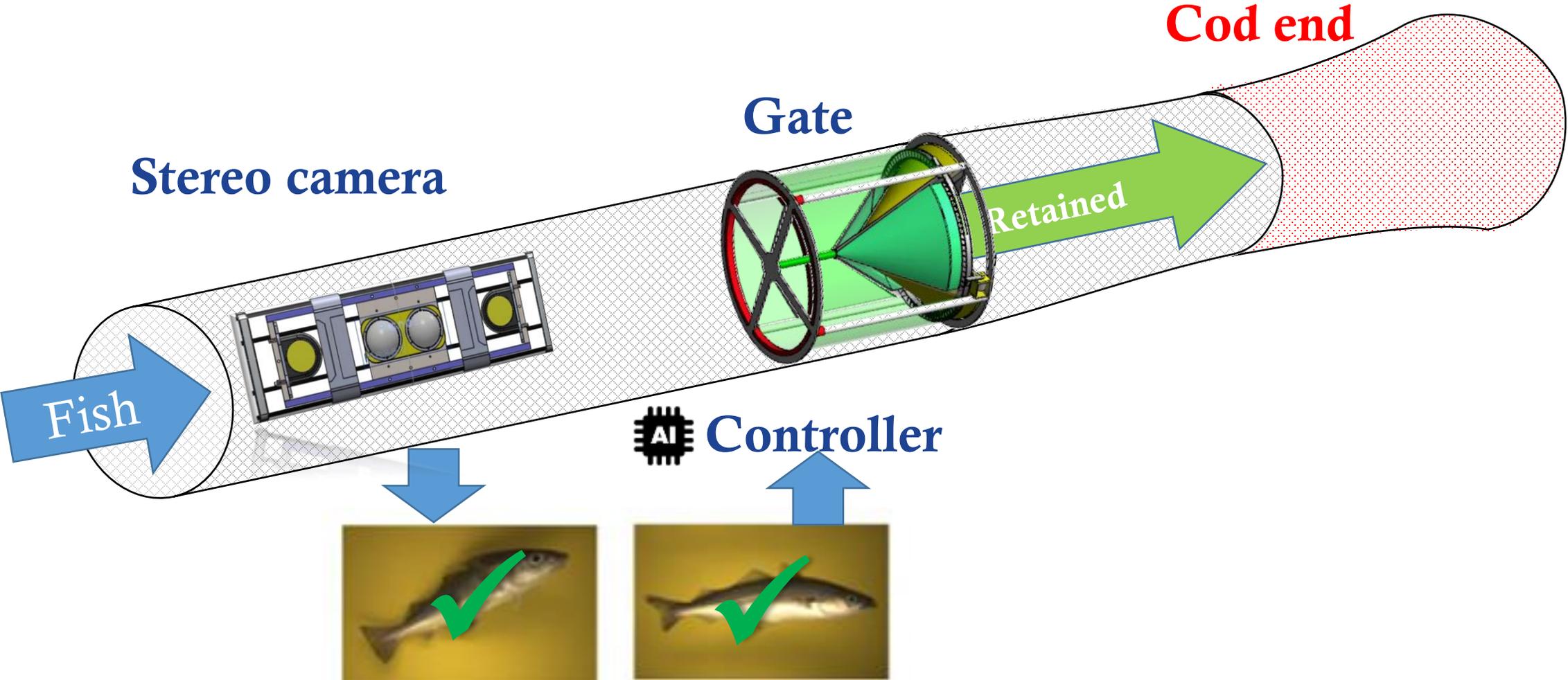
Smartrawl: 3 major components



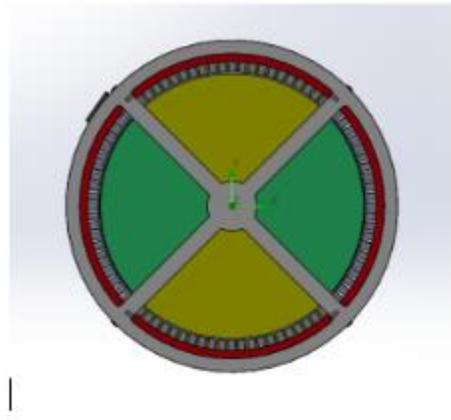
Smartrawl: releases unwanted organisms



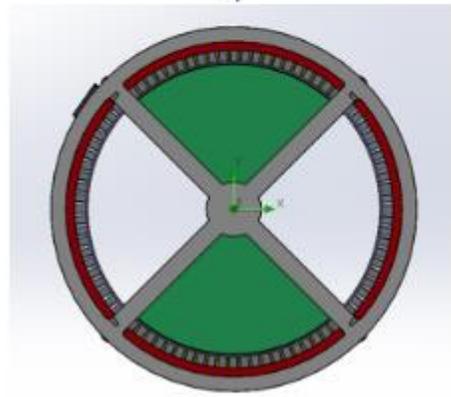
Smartrawl: retains only what is wanted



The Smartrawl gate ...designed for UK fishers

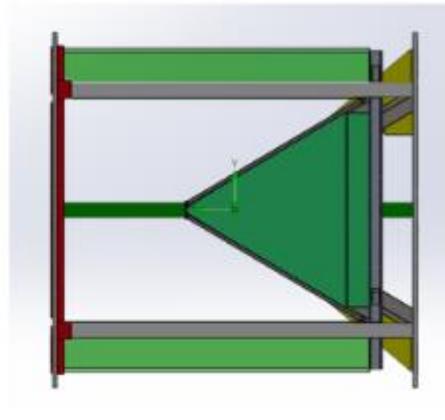


a)

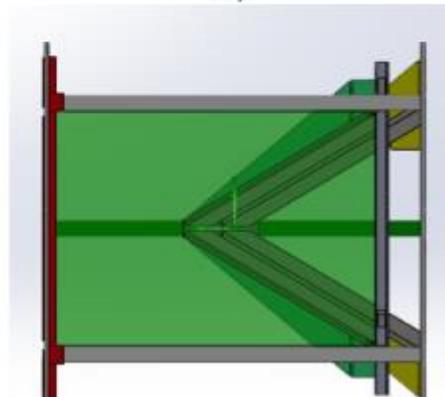


1m

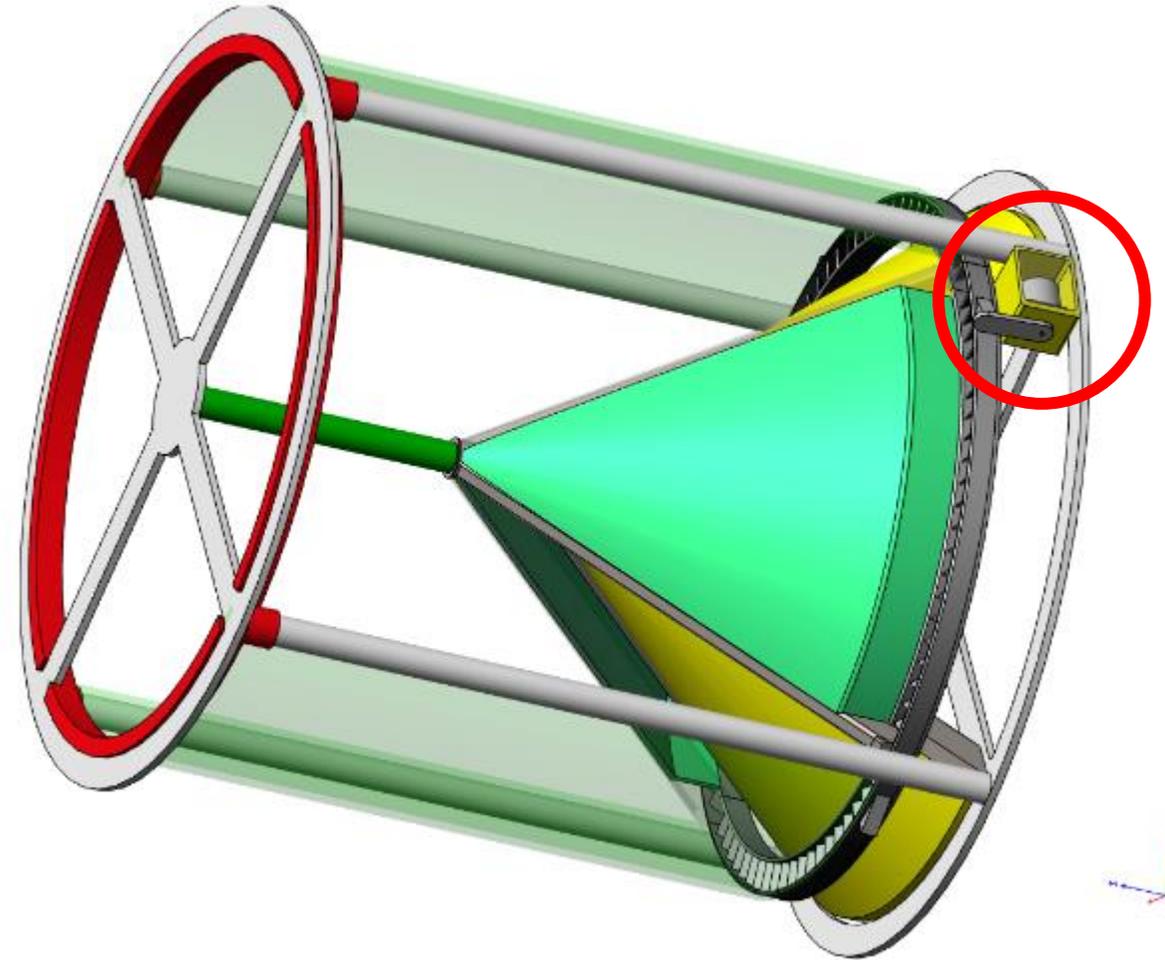
**v4
(built)**



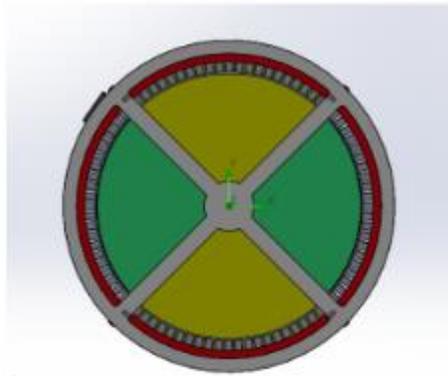
b)



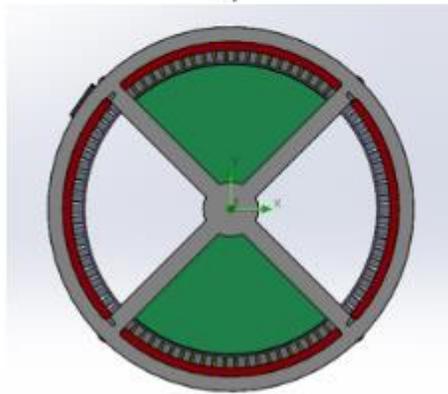
1m



The Smartrawl gate

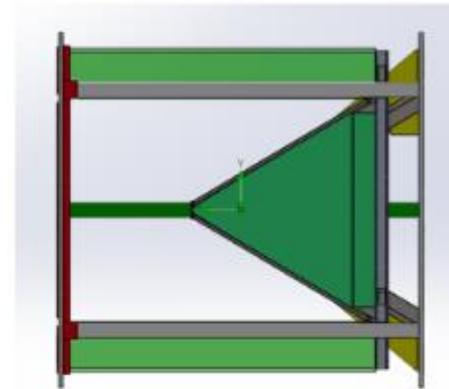


a)

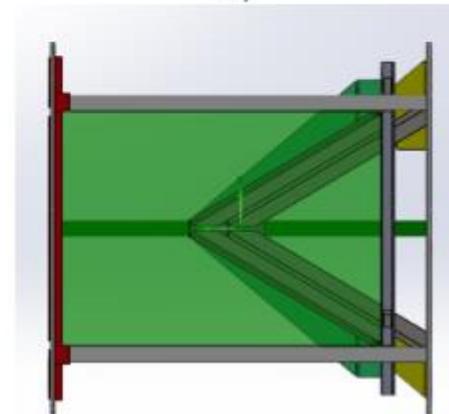


c)

v4
(built)



b)



d)



Patent filed



**United Kingdom Patent
Application No GB2116105.4**

Filed 9 Nov 2021

40 claims [describing the gate]

A technical examiner carried out a search investigating the novelty of the invention.

Published 3 August 2022

Catch position

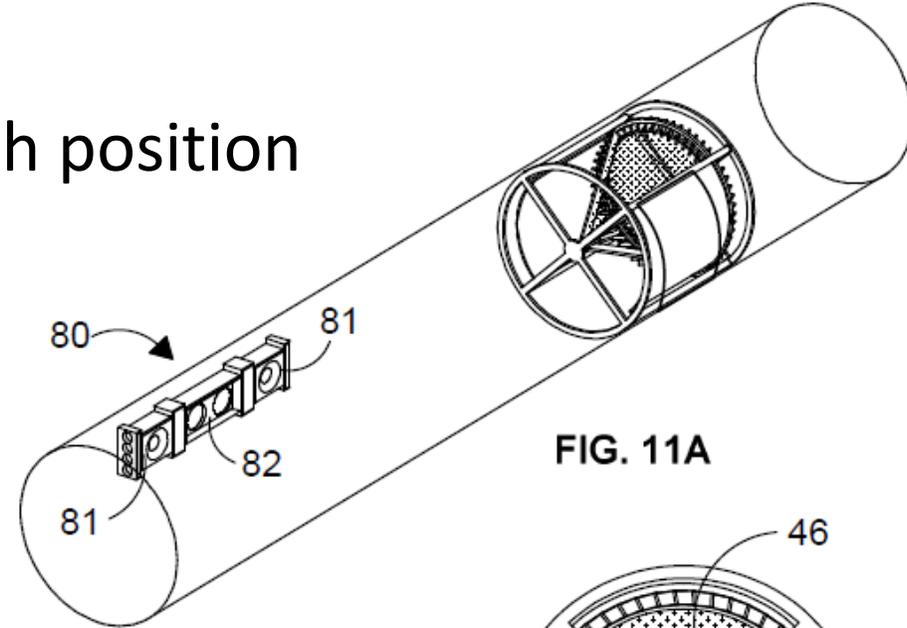


FIG. 11A

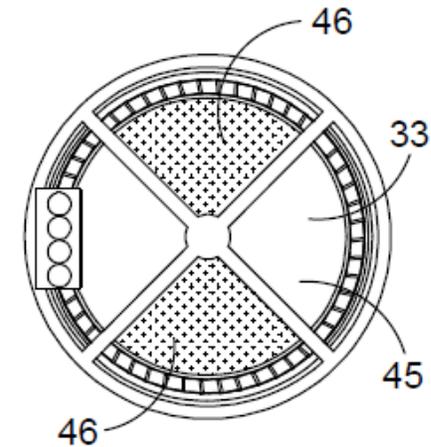


FIG. 11B

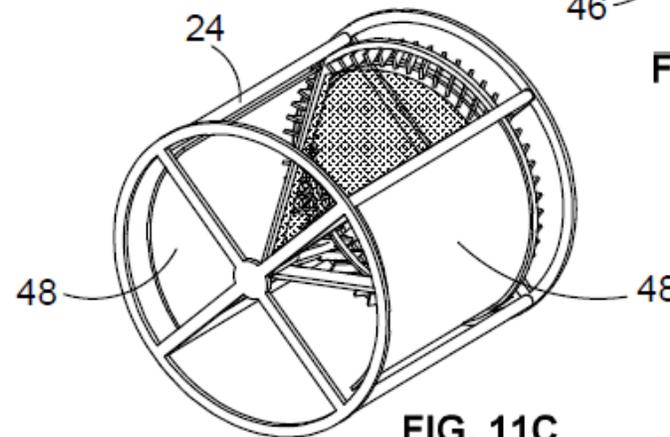


FIG. 11C



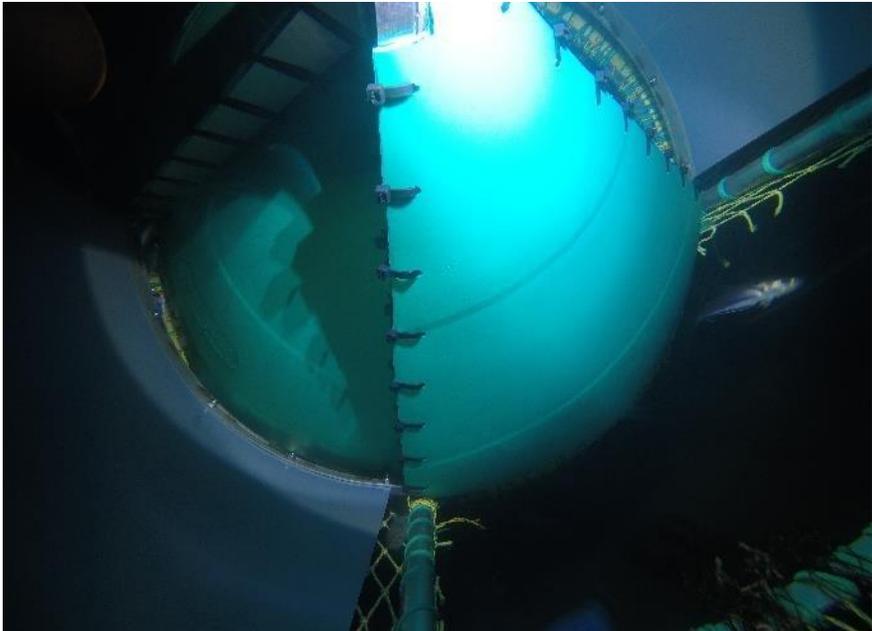
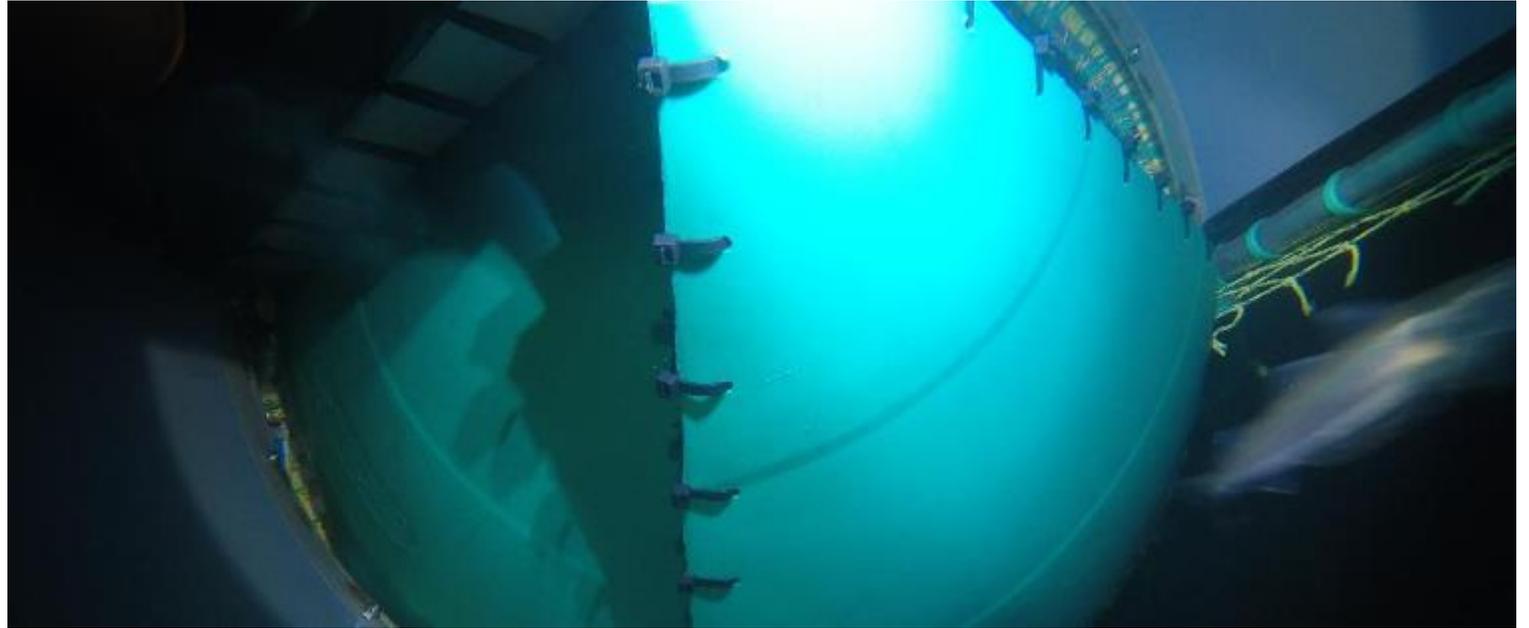
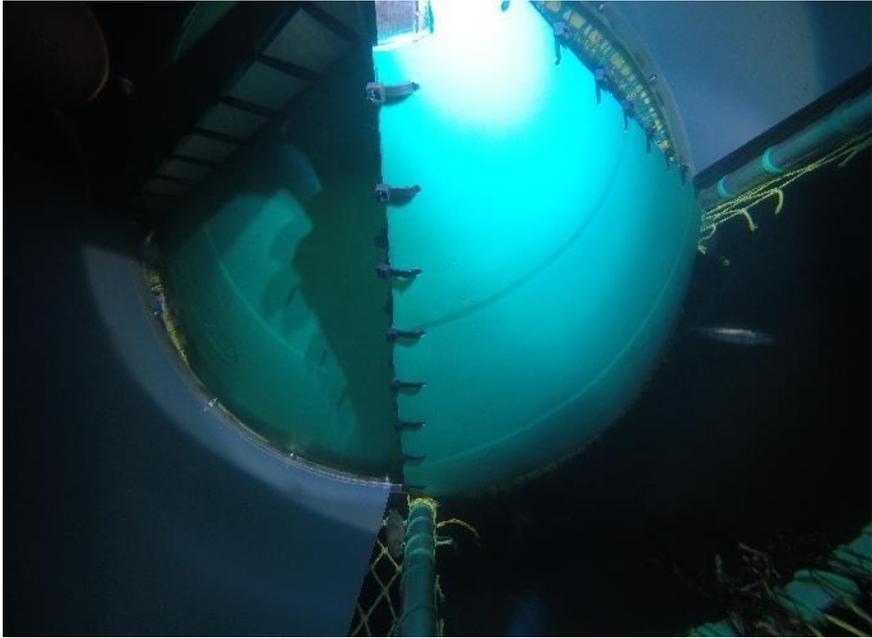
Gate fitted neatly & easily into the trawl!



Gate also slotted in easily
to the aft deck

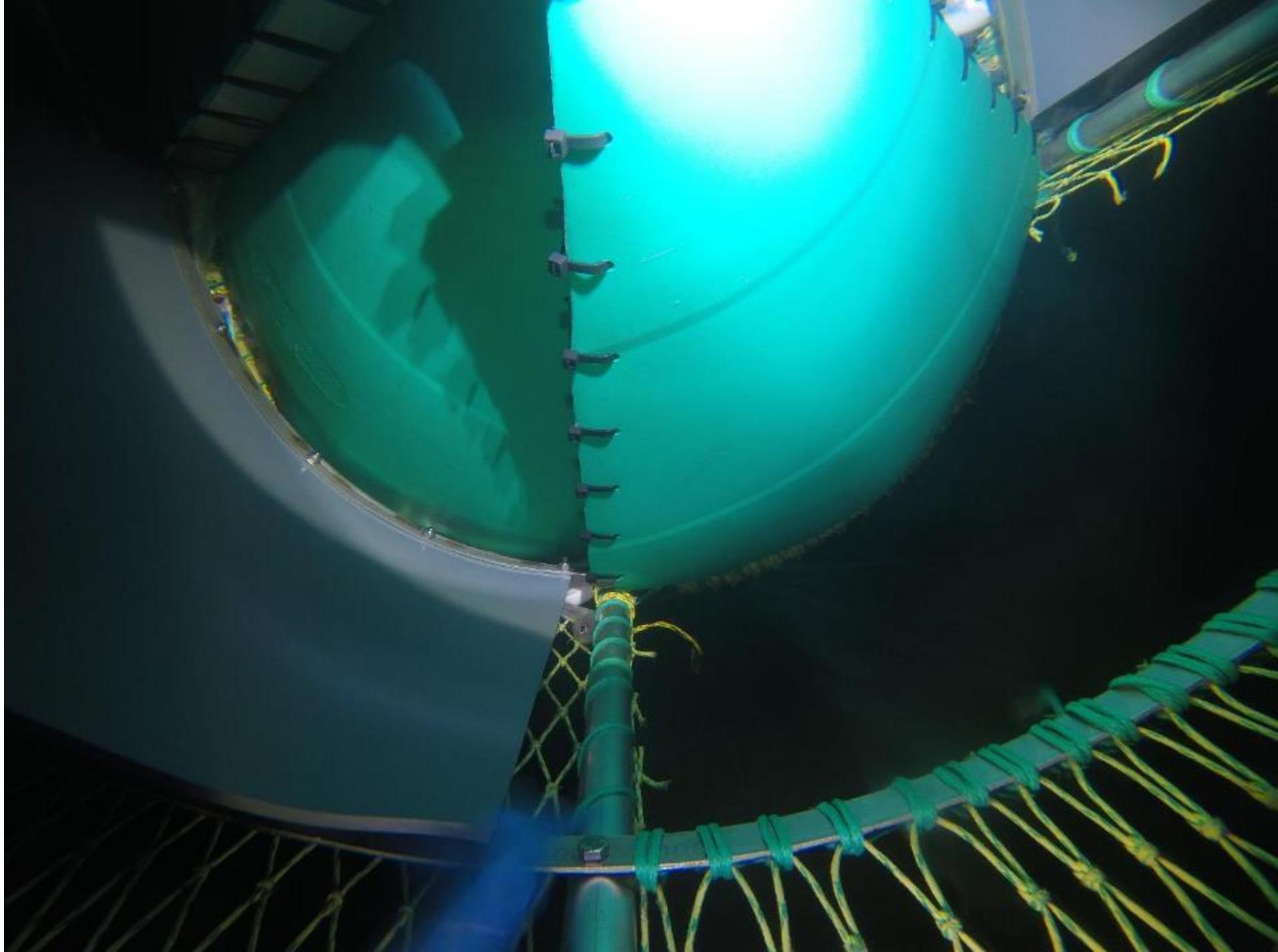


The gate was also remarkably easy to deploy and recover!

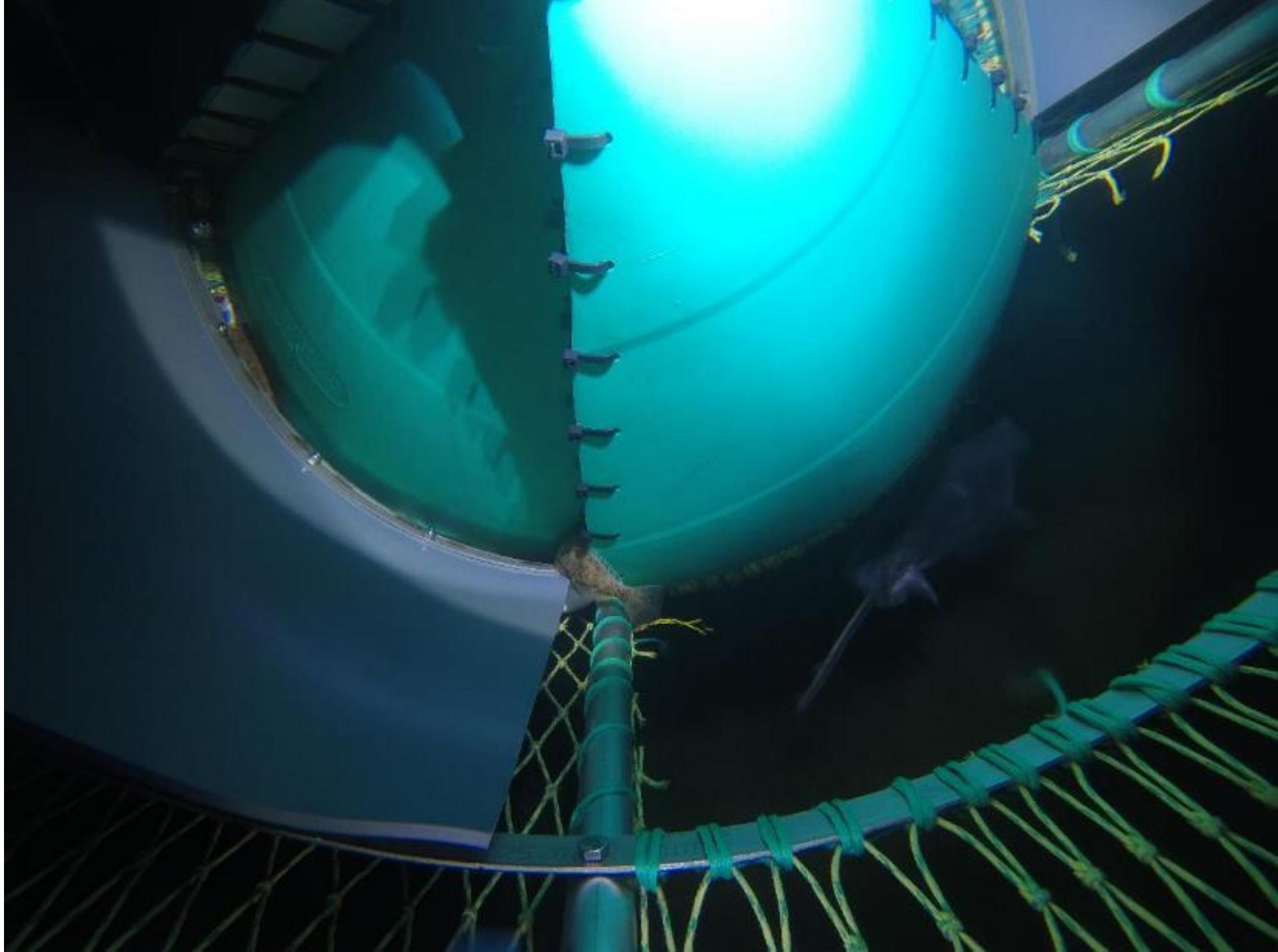


In “release” mode it worked so well,
that images of fish were totally
blurred

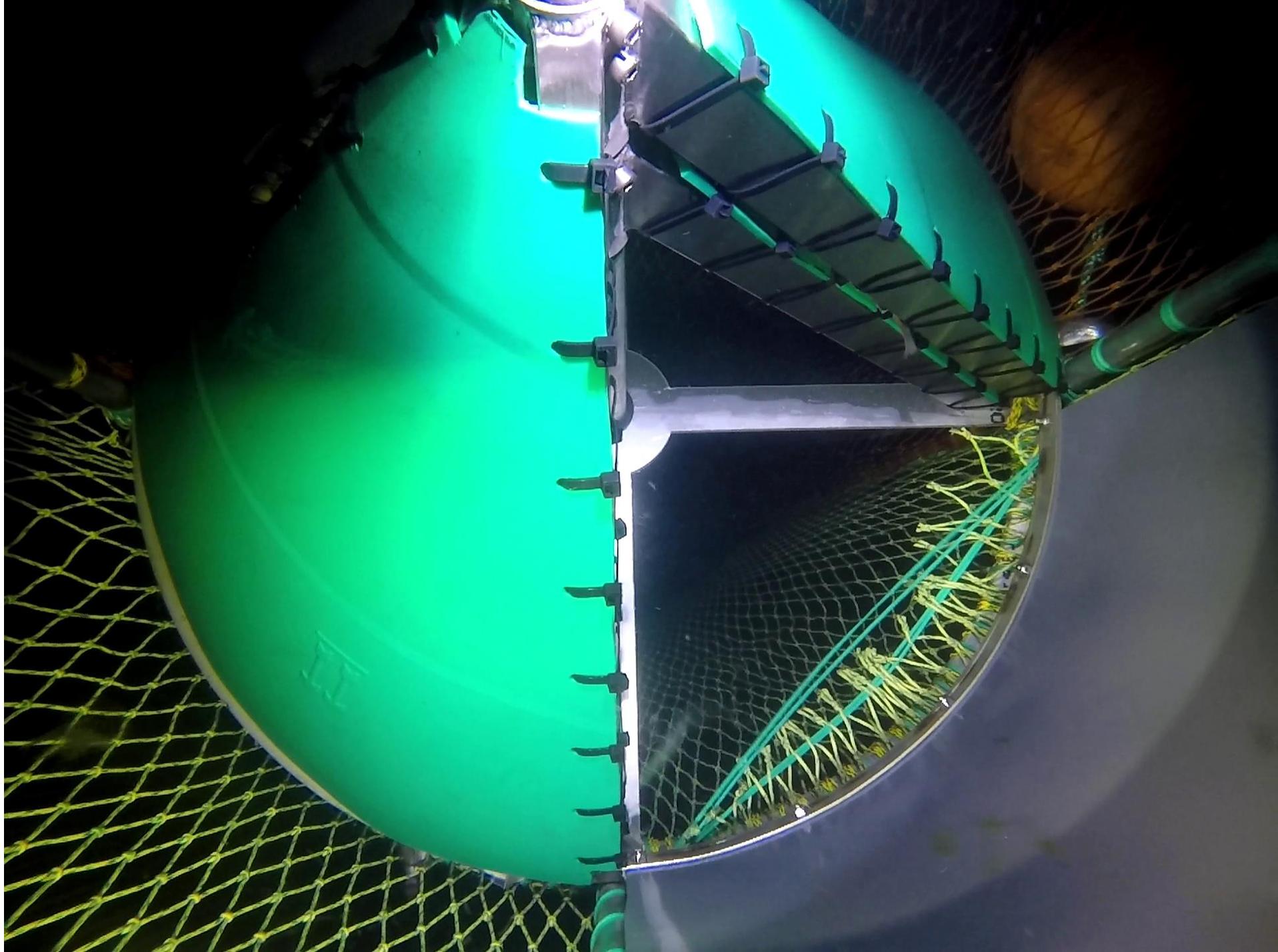
Release
images



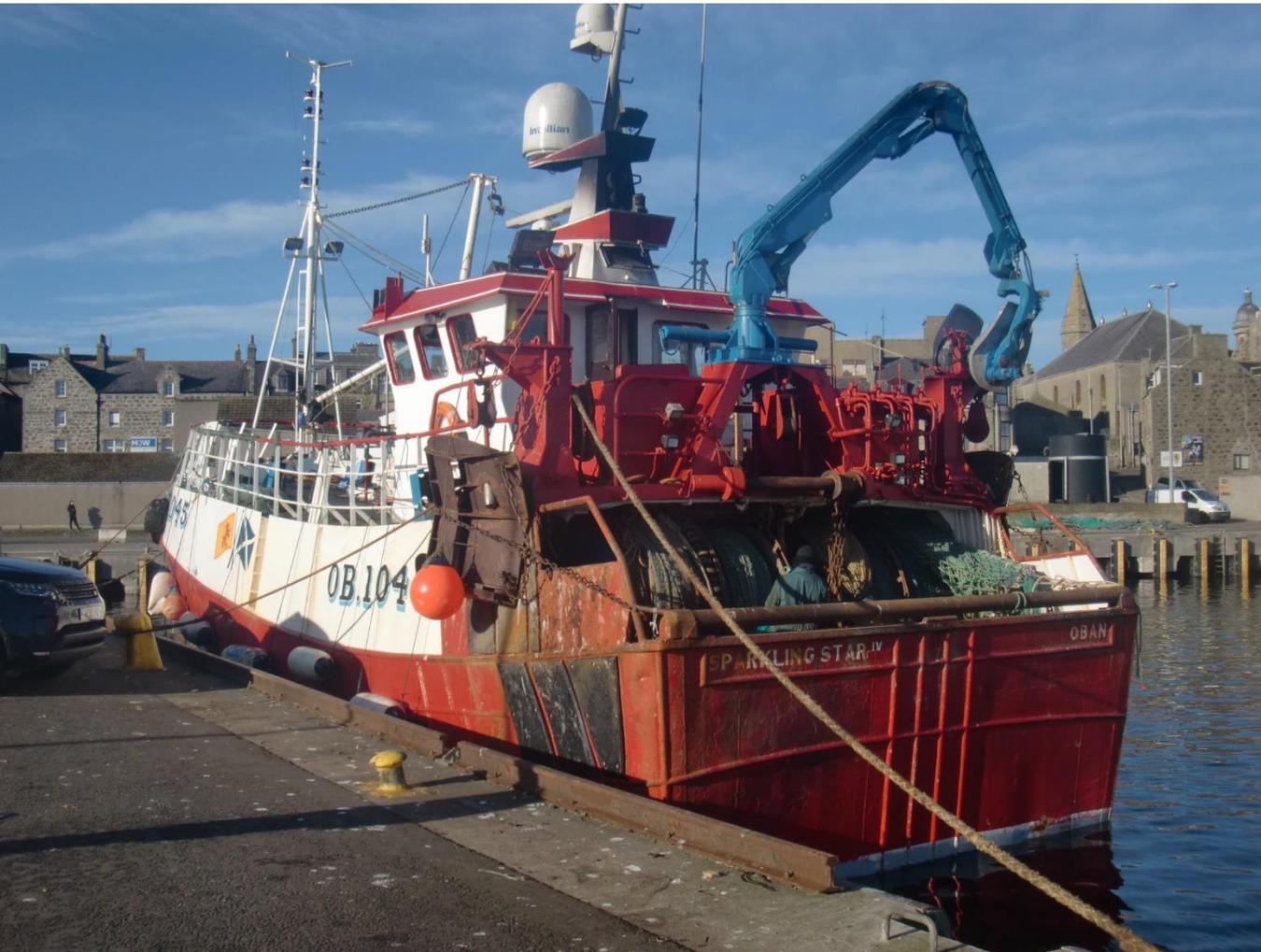
Release of
thornback
ray!



Catch
images



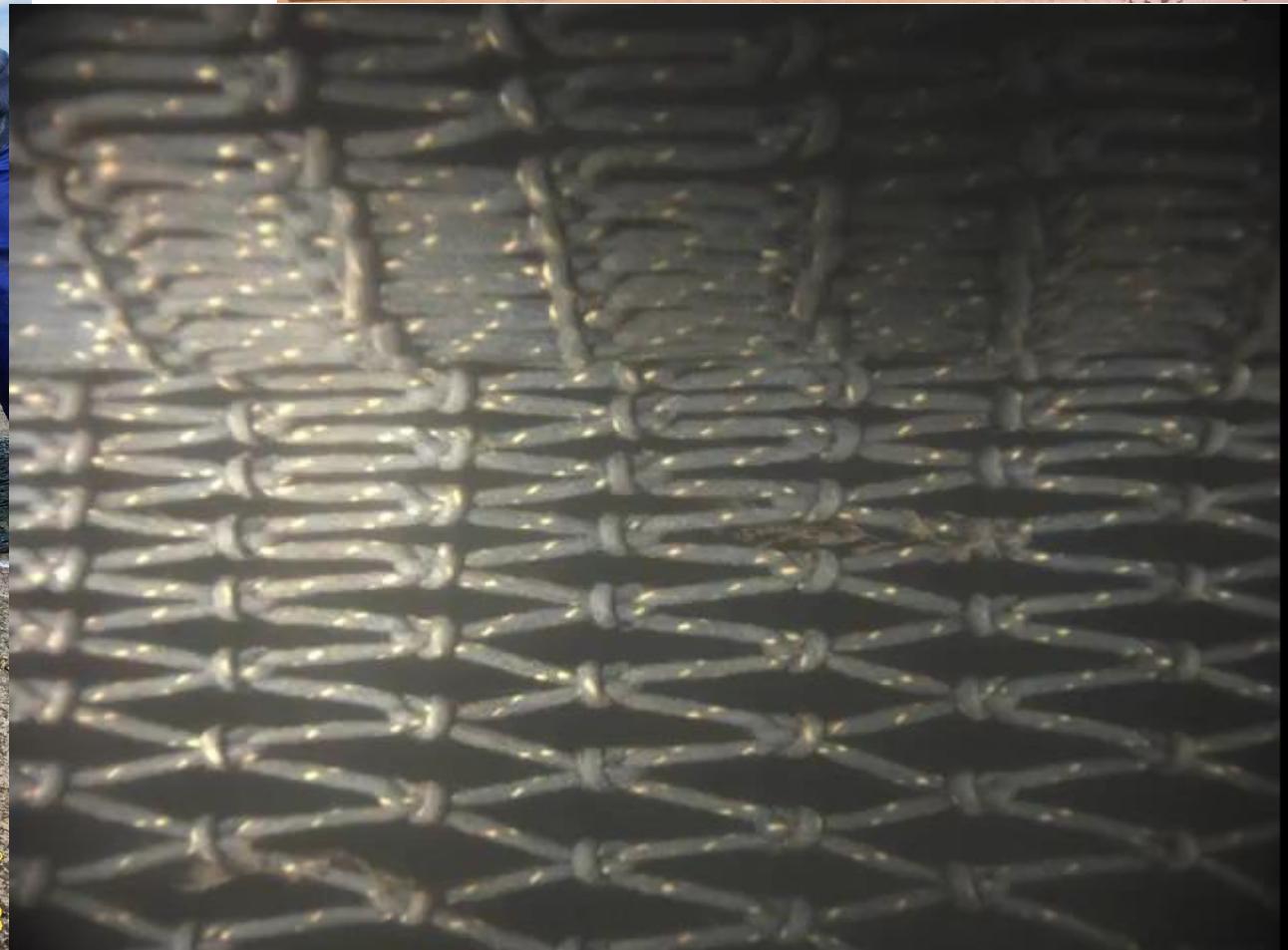
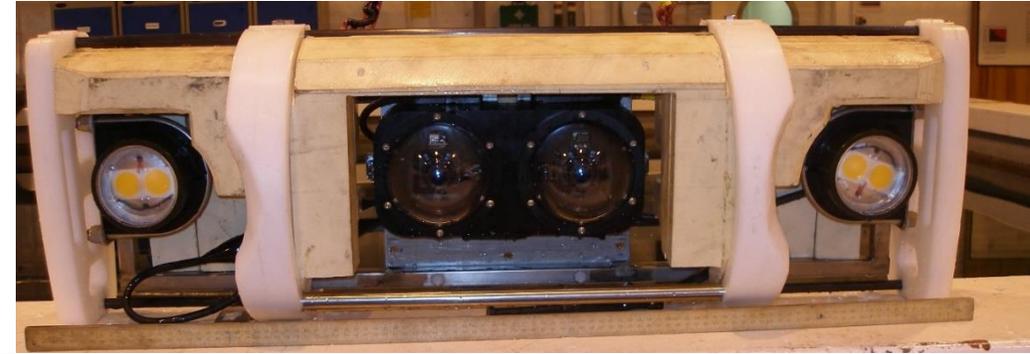
We have conducted trials of the camera system in the North Sea on a commercial fishing vessel



Smartrawl: field trials

- Deployment on commercial fishing vessels
- >200,000 images analysed

Stereo camera system



Passage rates are different for different animals at different times



E.g. 19 July 2019

1st haddock @ 10:44:42

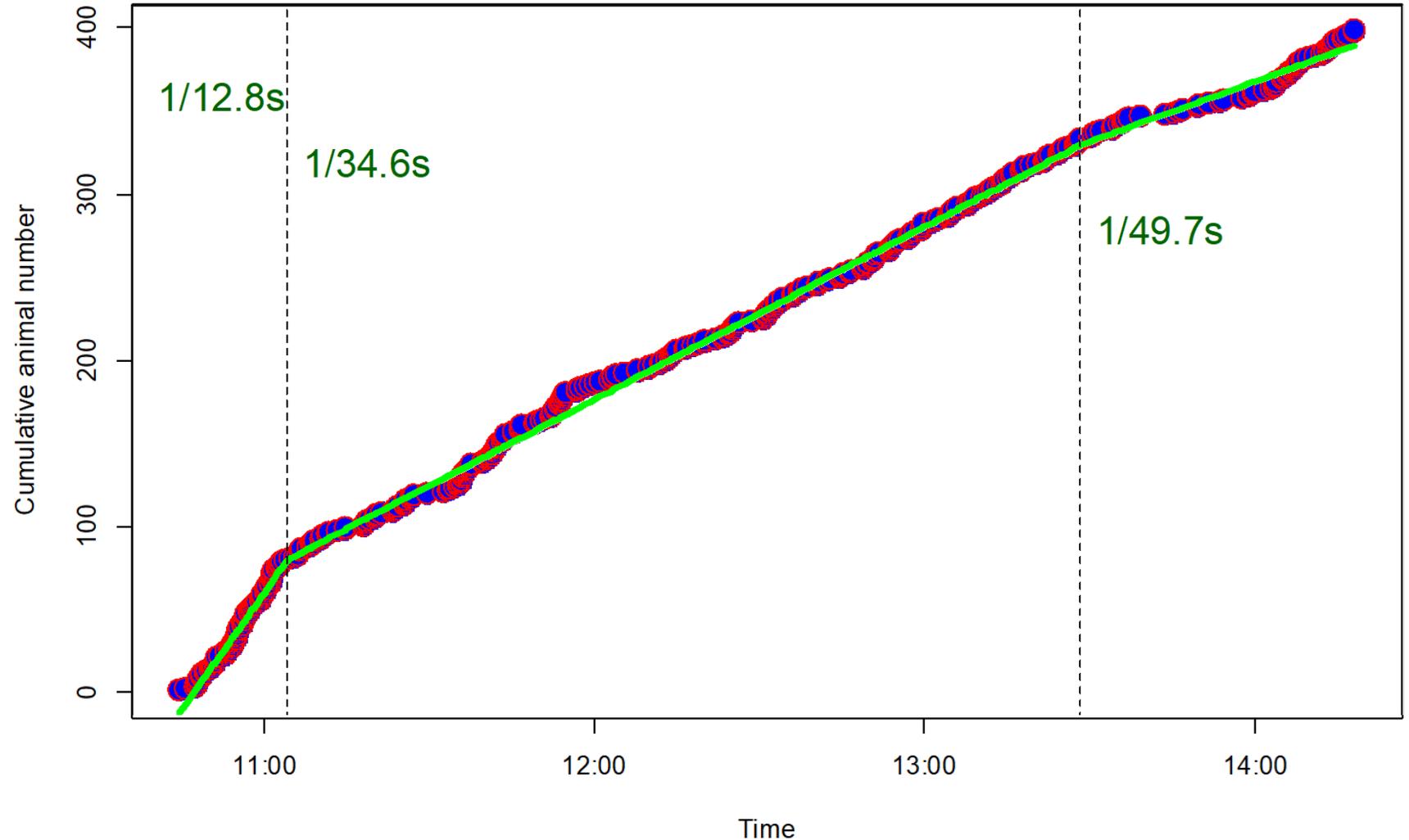
Last one @ 14:18:15

Duration = 12,813 seconds

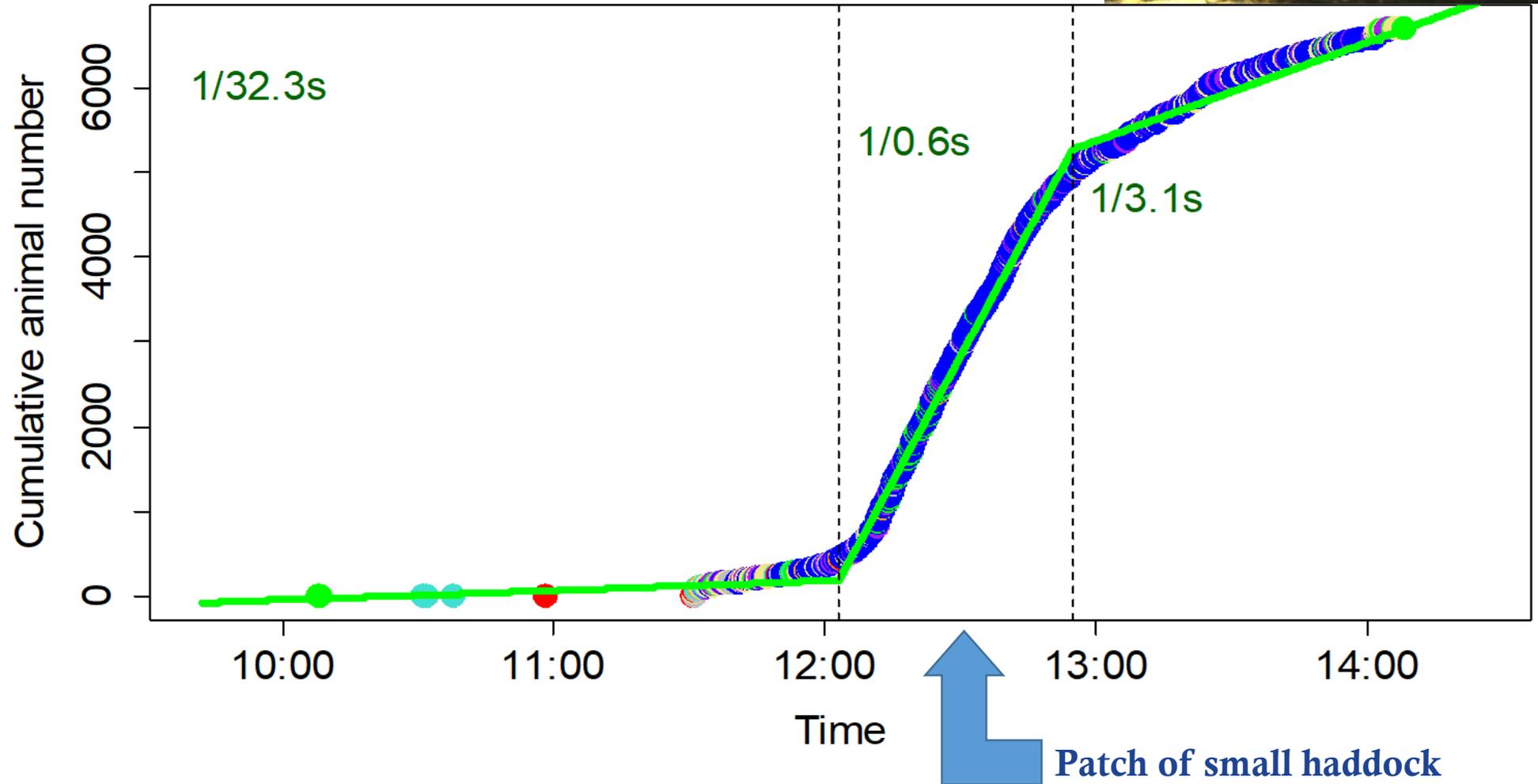
Σ haddock = 398

Passage rates calculated
(slopes of this line)

Segmented regression fits 3 slopes



There are occasional high passage rates- usually small fish



Shetland trials - improved image quality



Shetland trials - improved image quality

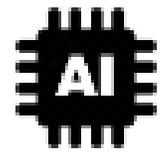


Shetland trials - improved image quality



Shetland trials - improved image quality





fish detection and species identification

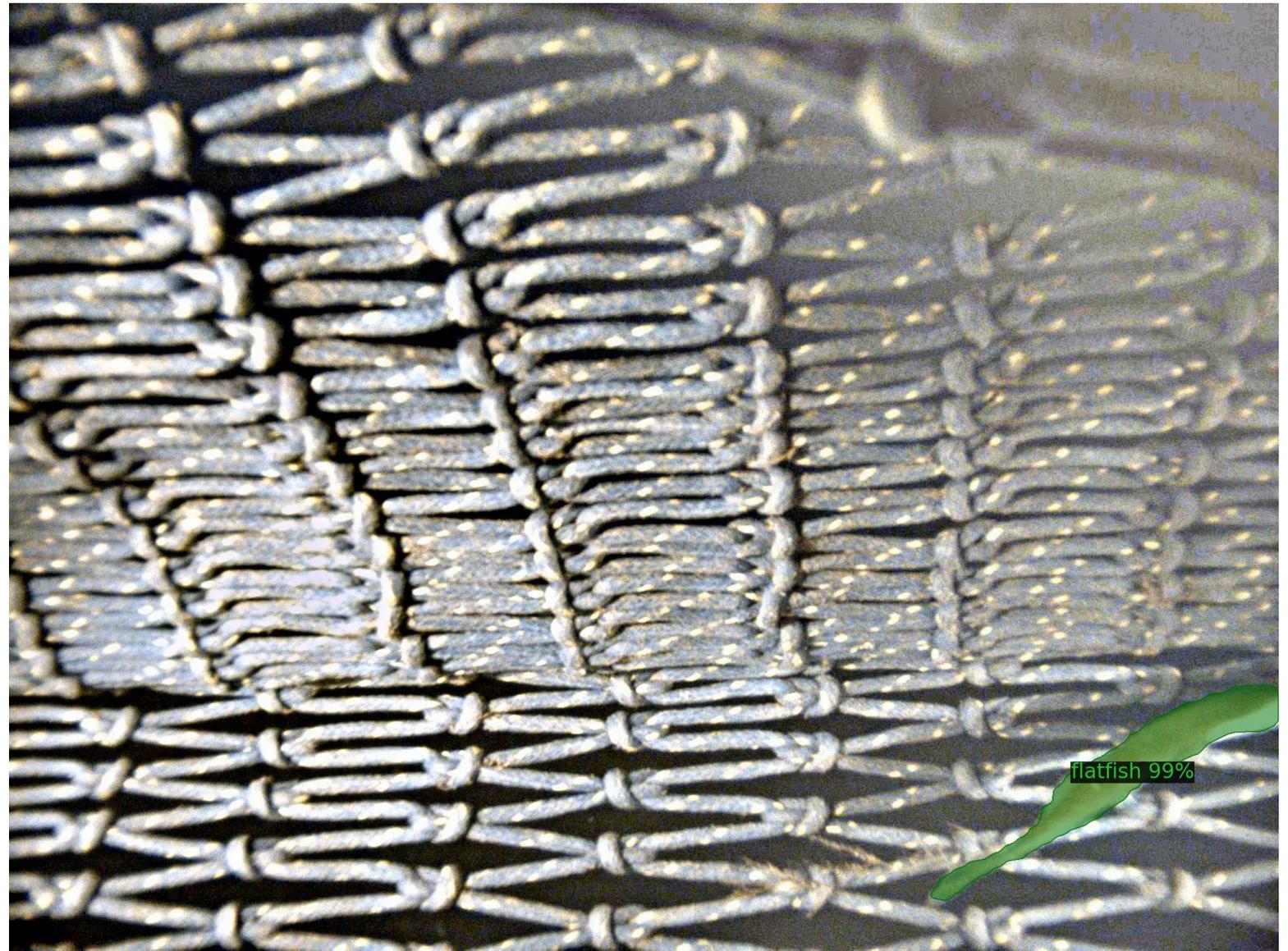


Dr. Dewei Yi

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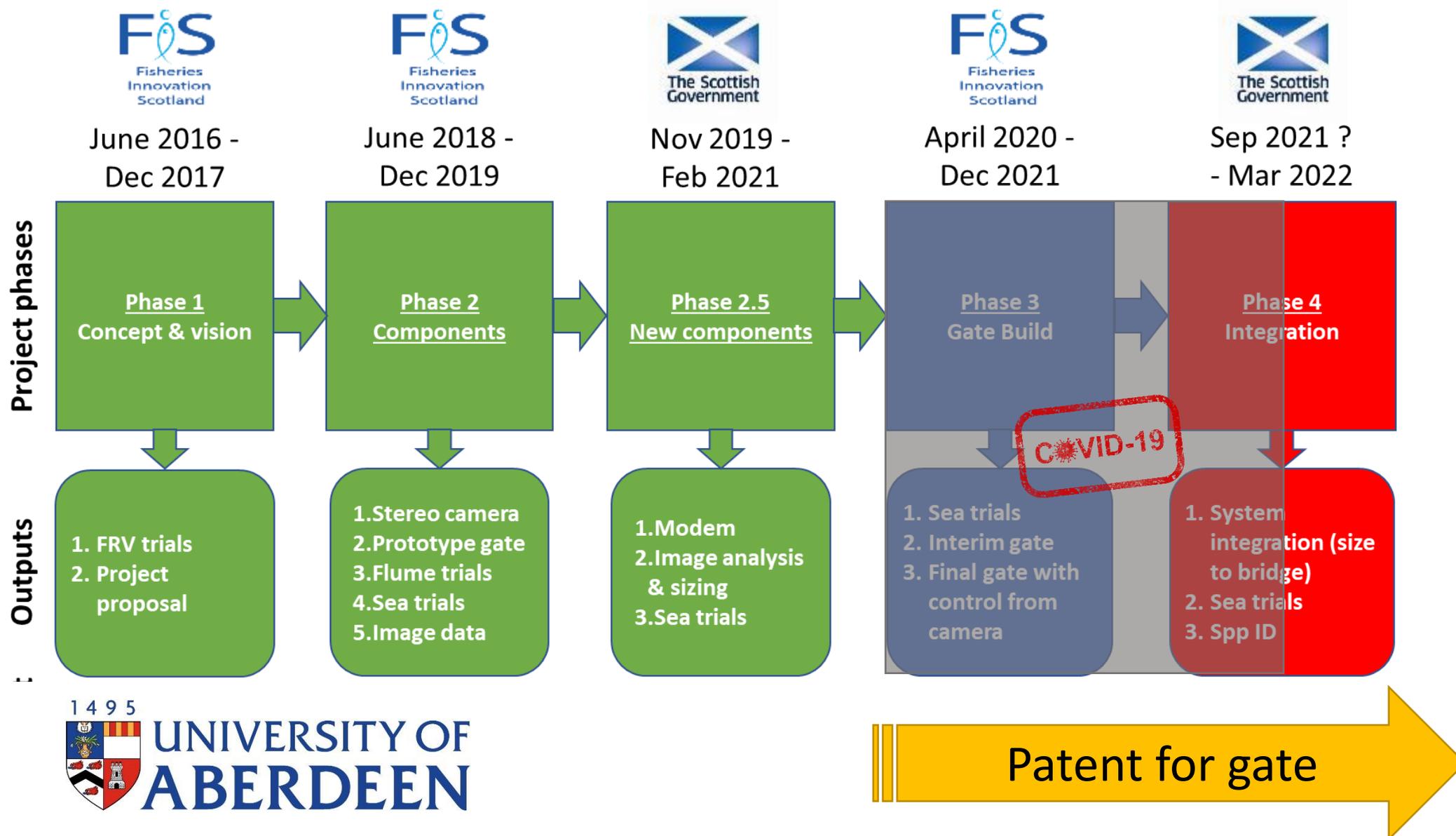
fish detection and species identification



Dr. Dewei Yi



Smartrawl Roadmap

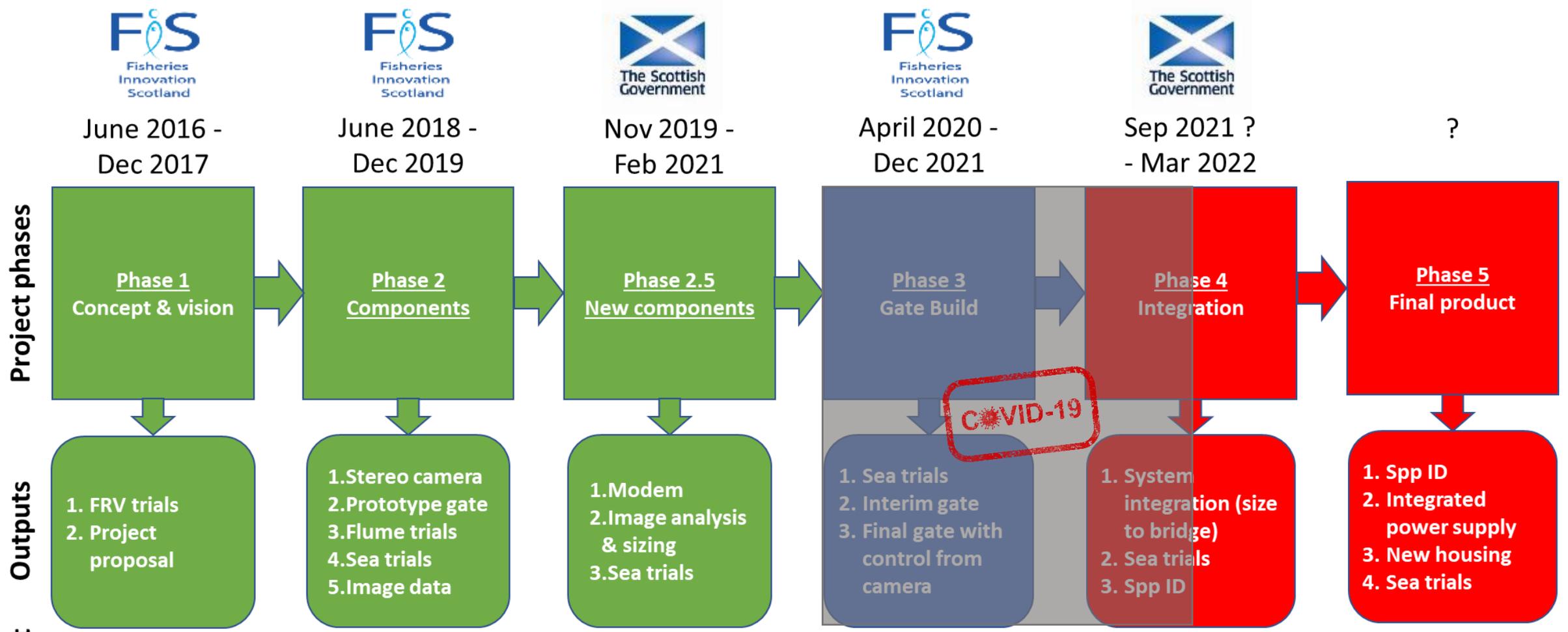


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Publication
3rd Aug 2022

Smartrawl Roadmap



Smartrawl: what next?

Technology Readiness Level TRL

TRL 1-2 ✓

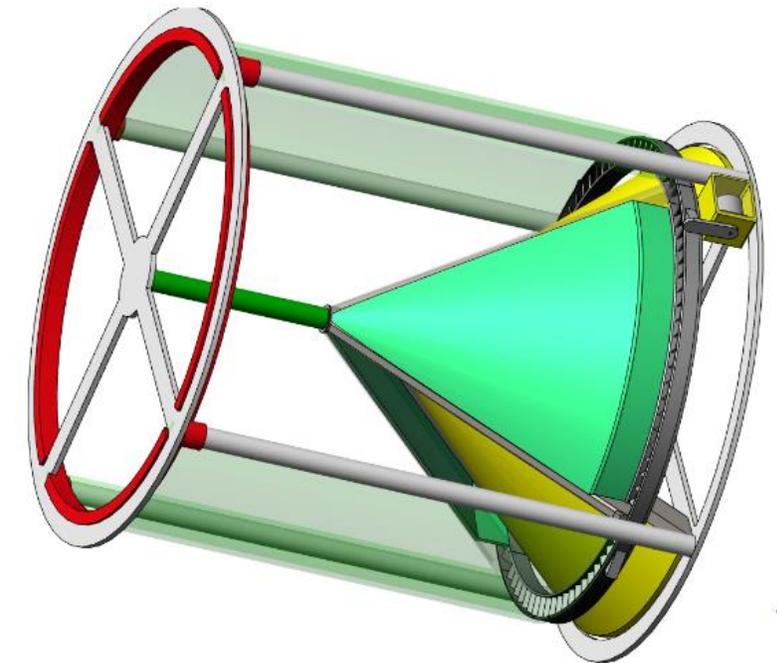
TRL 3 Smartrawl technical phase 5
Integrate systems for proof of concept = 1 year

TRL 4-6 Refining system for regular use in industry = 1-2 years
Could also be part of Phase 5

TRL 7+ Needs business track with industrial partner/investor



Successful mission operations





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