



iFarm, AI and health records for fish

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[BIOSORT.NO](https://www.biosort.no)

Salmon farming suffers from group-based operations



Group based treatments is carried out at the expense of healthy individuals

- Compromising growth
- Injuries from lice treatment is the No. 1 source of mortality
- Stress increase risk of disease outbreaks

Sick and injured fish remain in the pen and spread disease

- Compromising welfare
- Increasing disease transmission
- Feed is used on fish that are likely to die

Dependency on small sampling sizes and poor data collection hinder operational improvement

- Important decisions based on protocols or sampling
- Feeding operators have limited information about actual population growth
- Suboptimal harvest planning reduces achieved market price

Key challenges are sea lice, disease and mortality

News

Salmon lice costing Norway NOK 5 billion a year

By Vince McDonagh - 28th October 2019



Lerøy Seafood farm

THE task of tackling salmon lice cost Norway's aquaculture industry more than five billion kroner, or some £440 million last year, a leading researcher has calculated.

Sea lice direct cost is over NOK 5 billion per year in Norway alone

My Alerts



Eksempel på vintersår. Photo: MSD Animal Health Norge

Winter sores cost Norwegian salmon farmers \$750 million a year; what can be done to prevent them?

In 2022 winter sores were detected at 433 of around 878 sites.

10 July 2023 3:00 GMT UPDATED 10 July 2023 7:25 GMT

By Ann Eileen D Nygård and John Evans

Disease challenges a welfare challenge and result in decreased superior share as well as early slaughter

Logg inn



I 2020 døde et høyt antall laks for slakt. Foto: Anders Furuset (arkiv)

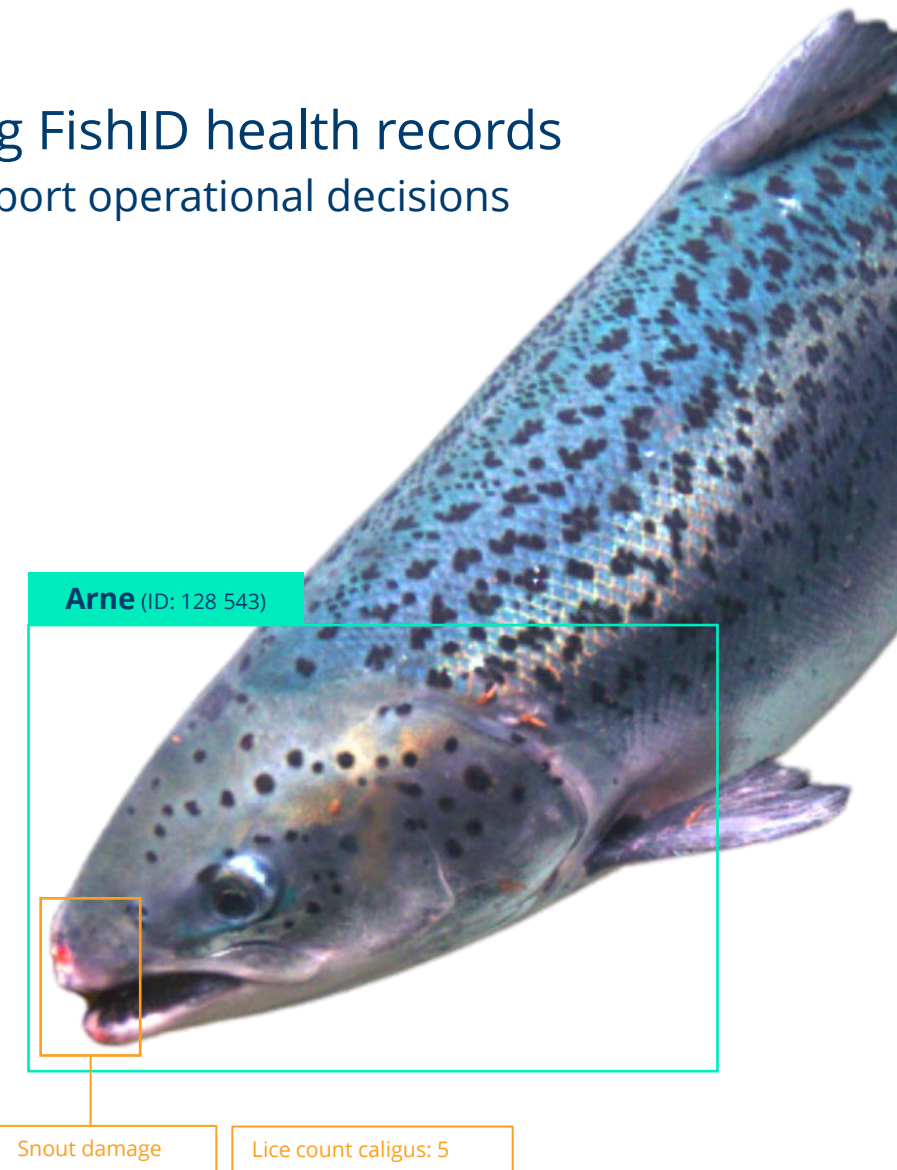
Laksedødelighet med høy prislapp: koster trolig næringen 5-6 milliarder kroner

- Når dødeligheten for stor fisk øker blir det veldig dyrt, sier Nofima-forsker.

- 63 million dead salmon in Norway 2023, average weight of dead fish over 2 kg
- Sustainability challenge that a large amount of feed goes to fish that die
- Welfare challenge since fish that die often has been sick or injured

iFarm value creation highlights

- Unique insight by monitoring the whole population and using FishID health records
 - Understanding fish health development, document fish welfare and support operational decisions
- Continuous, gentle, lice removal, only for fish with lice
 - Eliminate need for boat treatments
 - Remove lice before reproduction
- Reduced mortality and higher superior share
 - Take out fish that can transmit disease, e.g. fish with winter ulcers
 - Remove loser and deformed fish – generally more robust fish in pen
- Optimize feeding by knowing the actual growth response



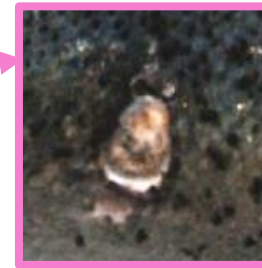
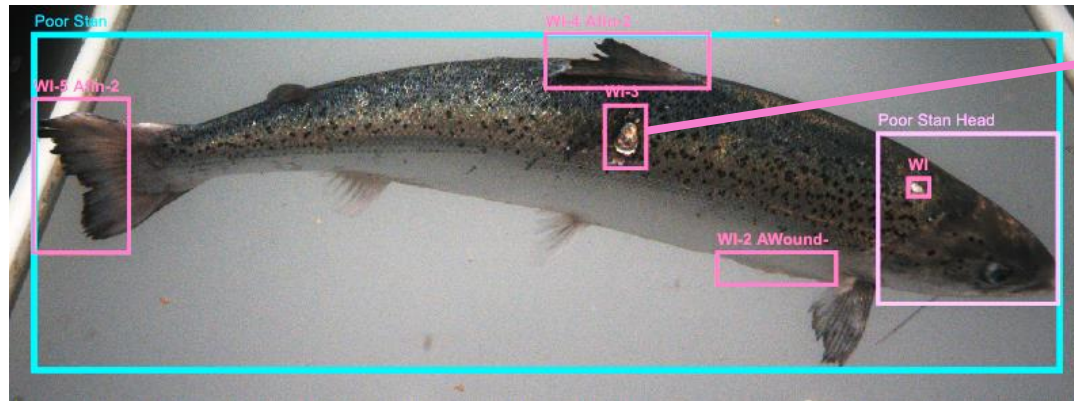




Subset of face recognition dataset

Follow development of wounds with FishID

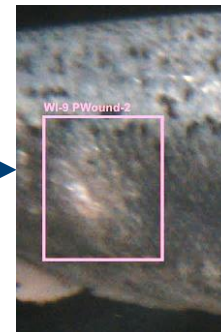
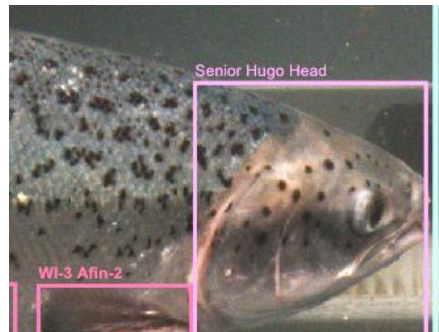
Fish A
Poor Stan



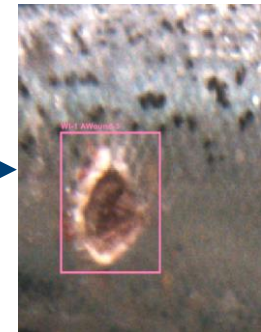
5 days later - wound is starting to heal



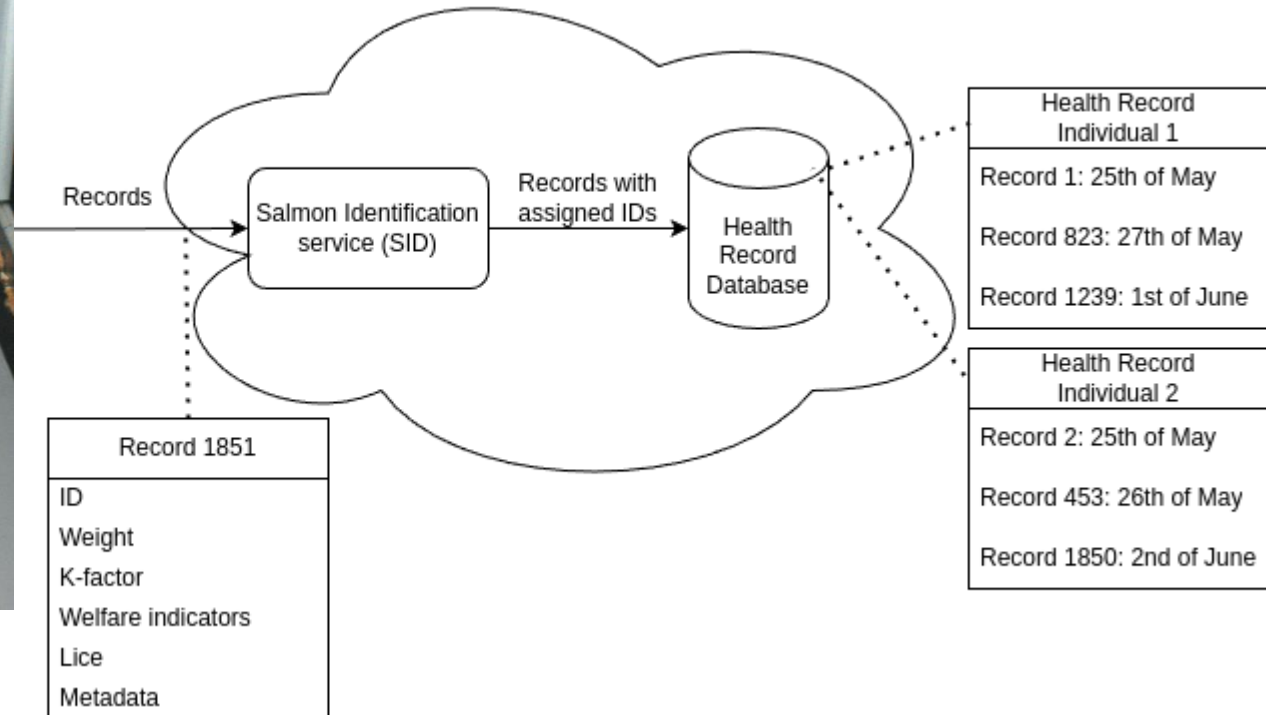
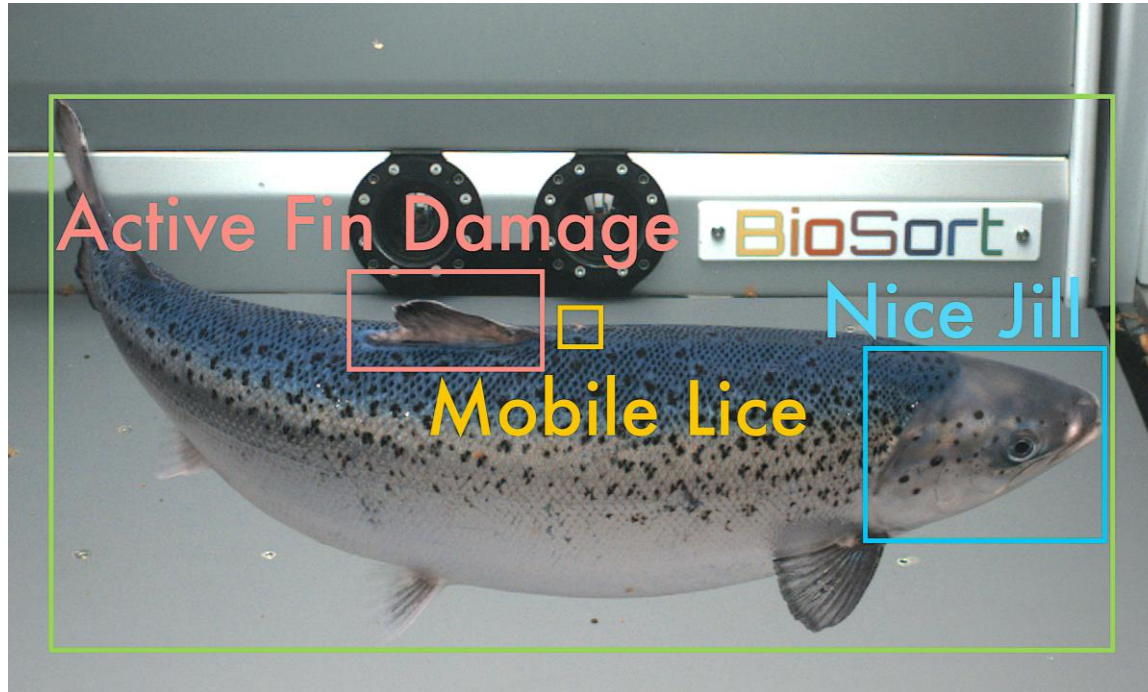
Fish B
Senior Hugo



2 days later - bacteria based wound below skin, developed to wound



Individual Salmon Health Records will unlock unique insights

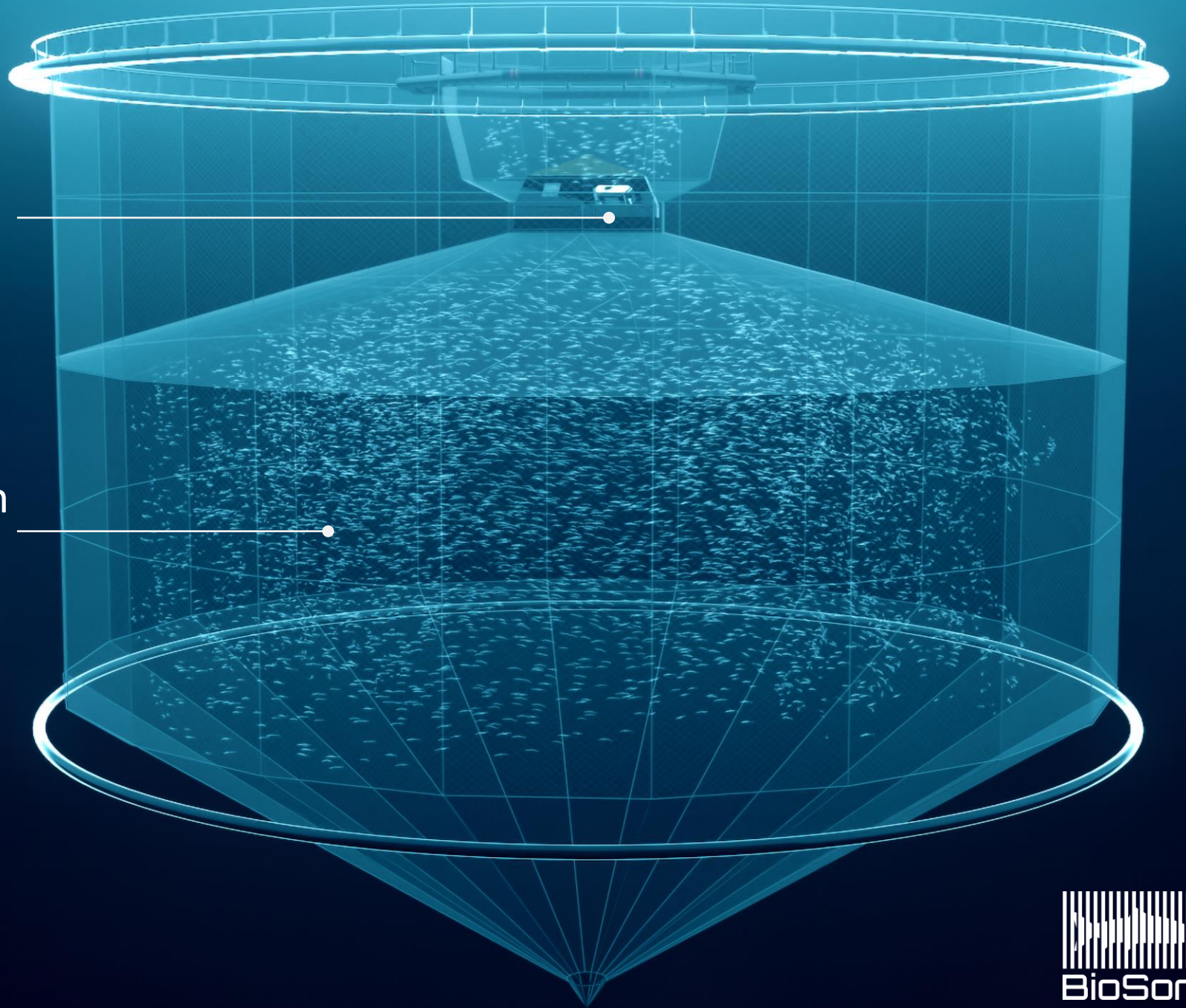


How to access all individuals in a cage?



Accessing the complete population in the cage, when fish passes through the iFarm sensor two times for every trip to the surface

Fish primary stays deep with less exposure to sea lice



iFarm[®]

Precision images and ability to sort fish for treatment or removal



Unique illumination and optics yields unmatched precision in fish evaluation



Sorting unlocks an ocean of opportunities

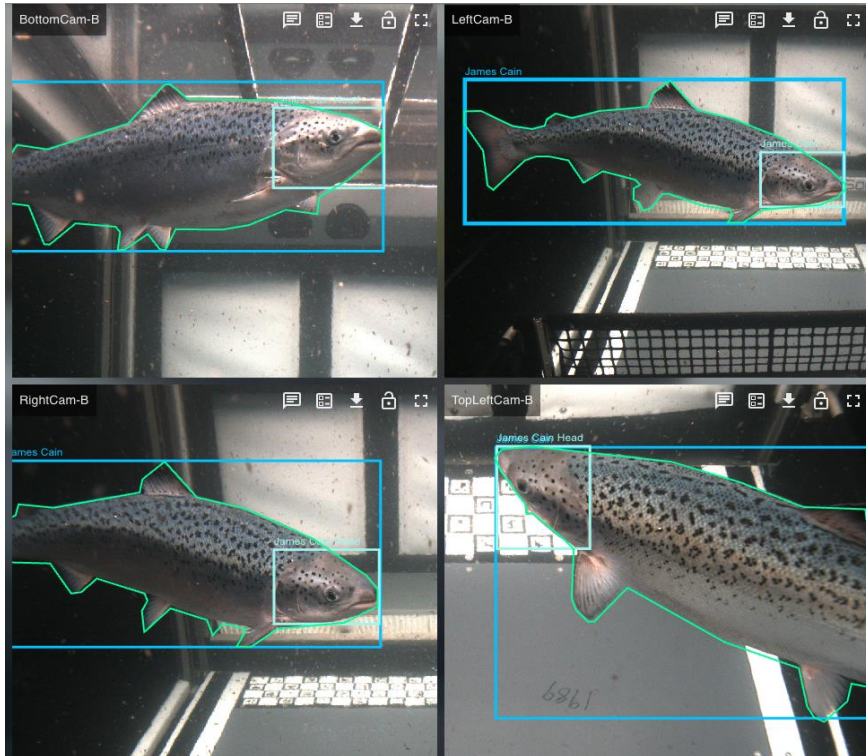


BioSort technology in 4th Generation Sensor

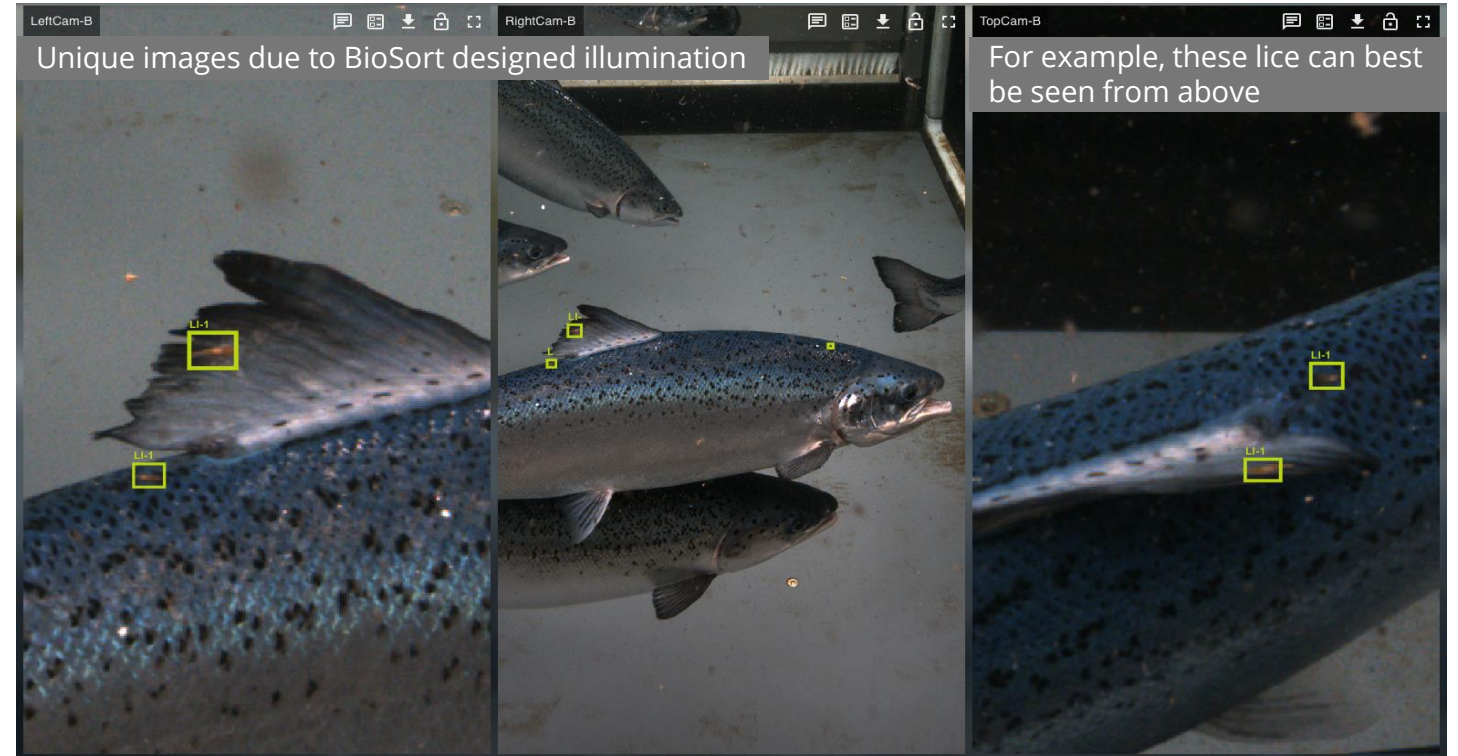
- Camera optics for sharpness and light
- Illumination for maximum contrast
- High performance vision (<85 milliseconds)
- Autonomous cleaning



Precision farming



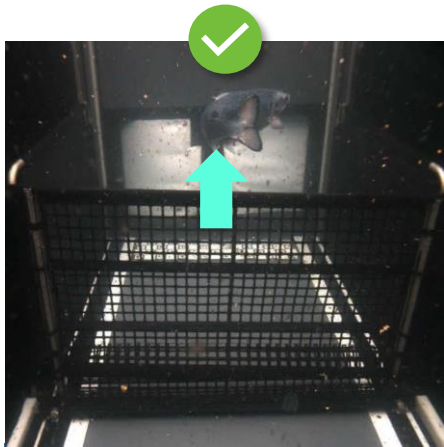
Seeing the same fish from different angles



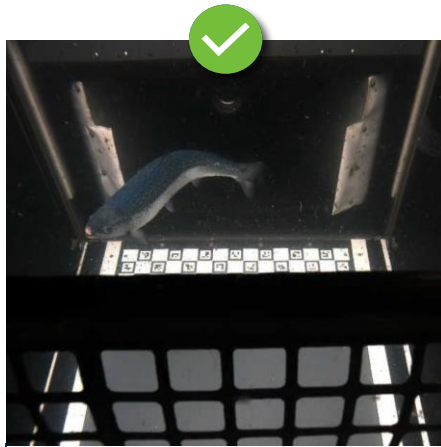
Tracking features on the fish 11 times per second yield precision

Sorting and treating individual fish

Status on technology



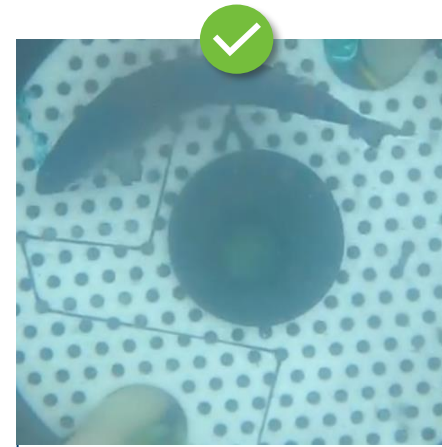
Catching fish



Gently guiding fish into suction



Moving fish to the surface



Suction tank in surface

Third-generation sorter, will be installed in cage spring 2024 for autonomous sorting

Developed in close collaboration with Cermaq and ScaleAQ

2020

2024

PRODUCT DEVELOPMENT & TESTING



2020/21 Martnesvika

- 2 different housing geometries for fish behavior tests
- Fish exhibits the desired behavior
- 1st gen. sensor tested



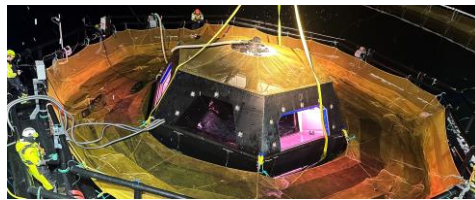
2021/22 Langøyhovden

- 6 different housing geometries for fish behavior tests
- 2nd gen. sensor tested
- 1st gen. sorter proven to work successfully with fish



2022/23 Hellarvika

- 3rd gen. sensor
- 2nd gen. sorter with suction
- Computer Vision algorithms go live with all supporting edge and cloud software



2023/24 Langøyhovden

- Performance computer vision with reliable outputs
- 3rd gen. sorter
- Integrated feeding system





Better Fish Welfare, One Fish at a Time