



Stingray Marine Solutions AS

Optical Delousing

John A. Breivik

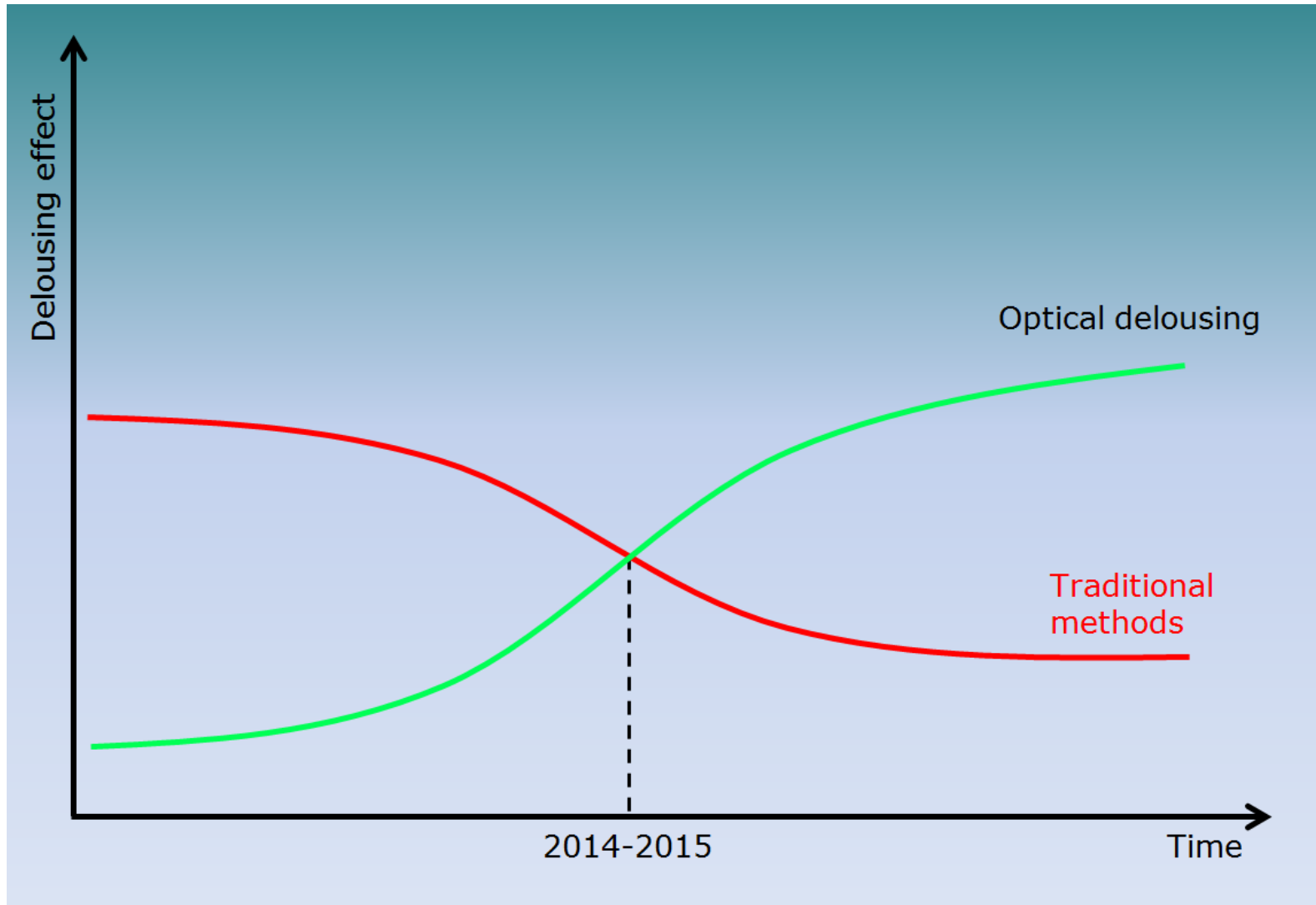
- The Problem:

Salmon farmers biggest problem in many parts of the world is to fight sea lice.

- Our Solution:

To use camera vision, advanced software and laser to gently remove sea lice.

Effect from existing methods vs. Optical Delousing



- 15 years of “problem solving” in Beck Engineering AS. (Oil & Gas, Offshore Technology & Medical Applications)
- A highly skilled team with a proven track record.
- Advanced and patented technology.
- We control design, production in own facilities, R&D, assembly, testing, installation and support.

Advanced technology from our team



Medical Applications



Remote Interventions

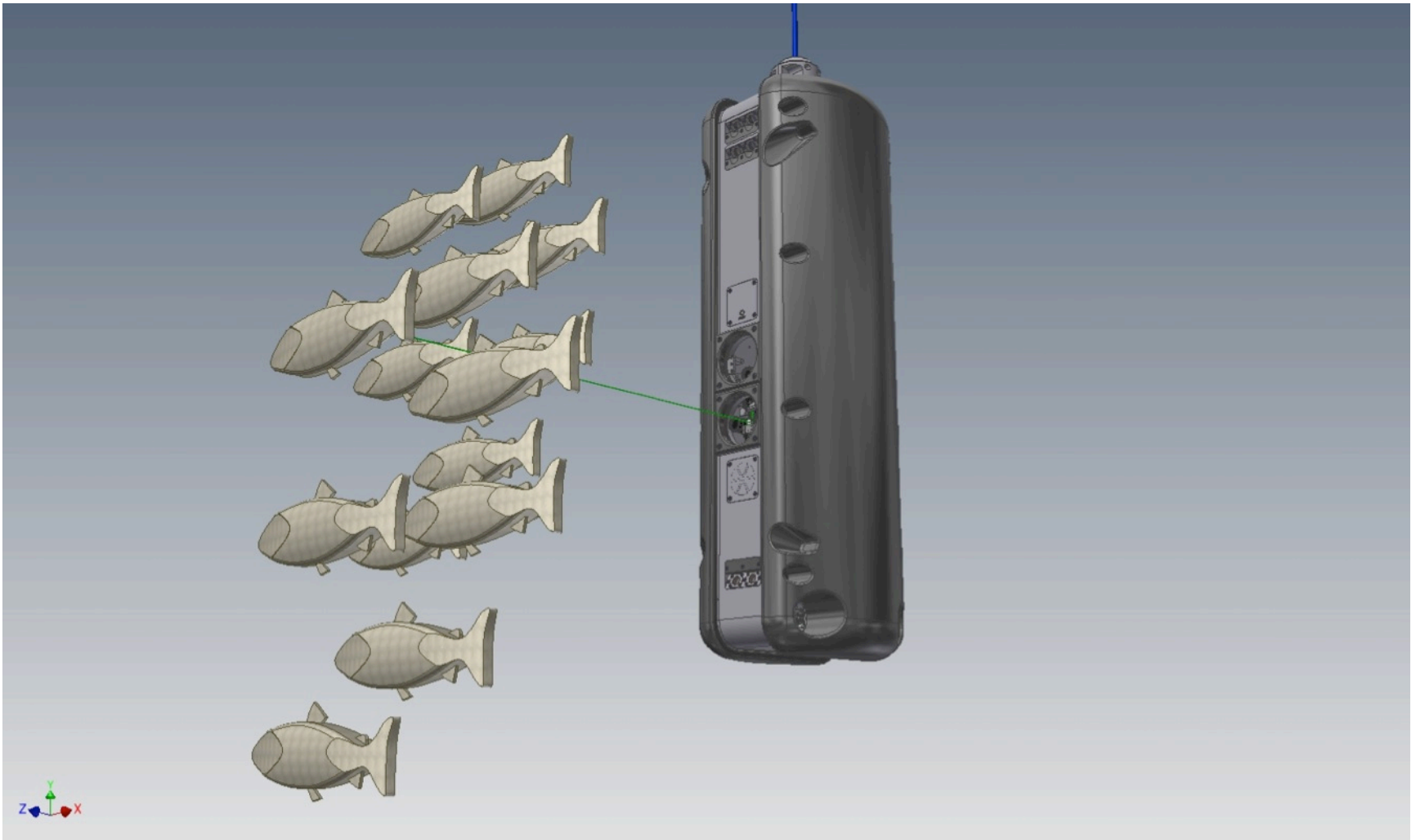


ROV - Technology

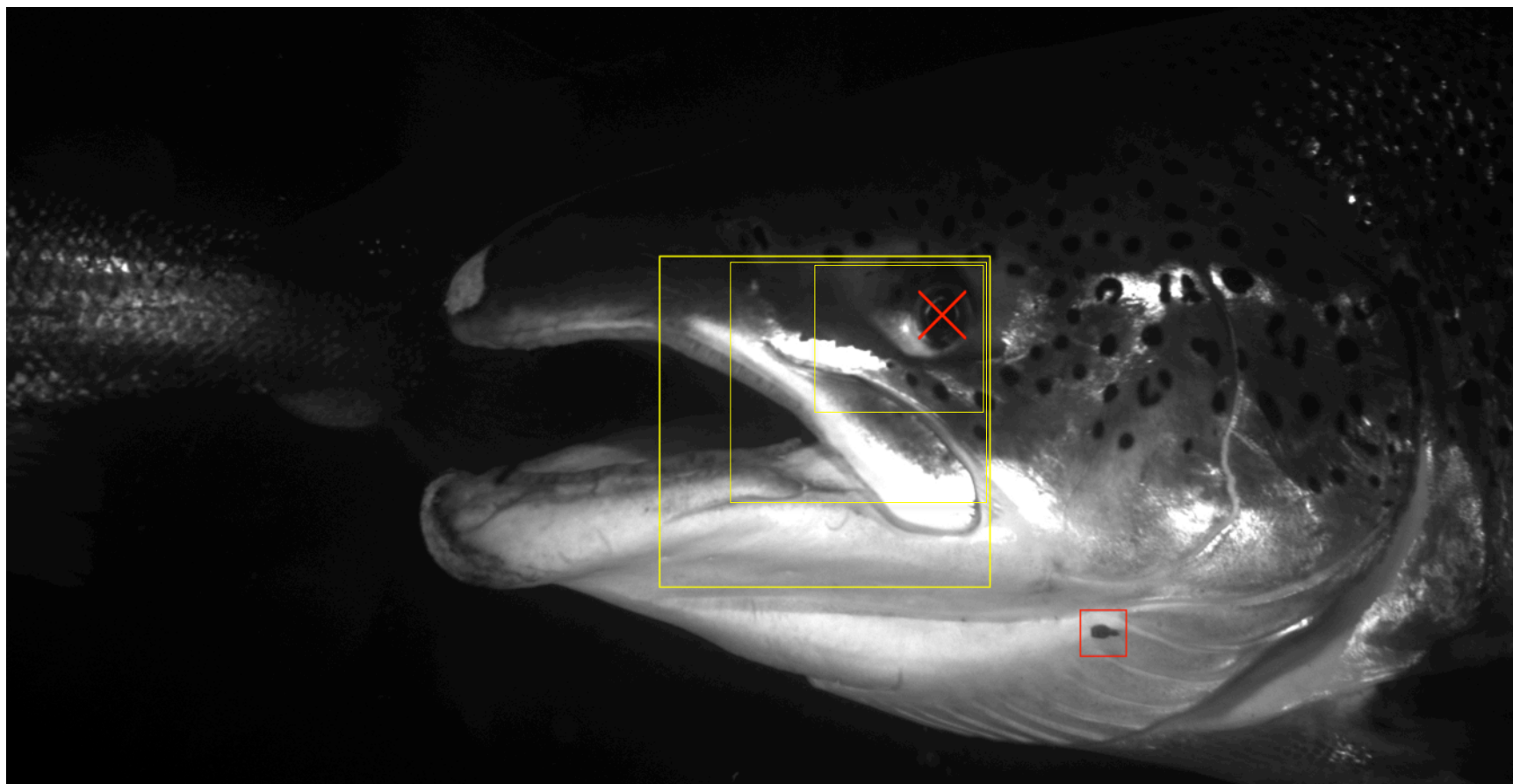
Optical Delousing – Basic Principles



Stingray Main Components



Eye Protection & Precision



A parasite that survives chemicals

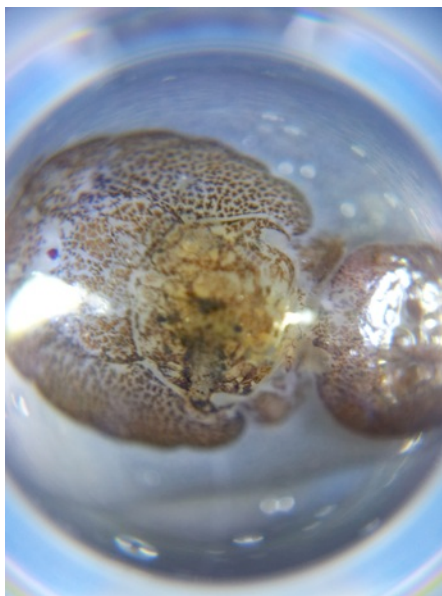


Sea Lice

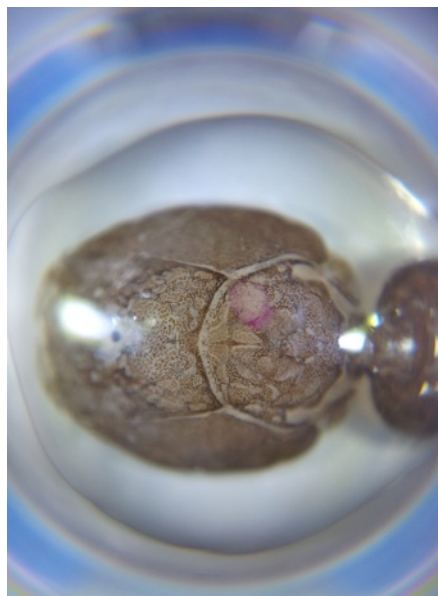
**A health and
environment
issue!**



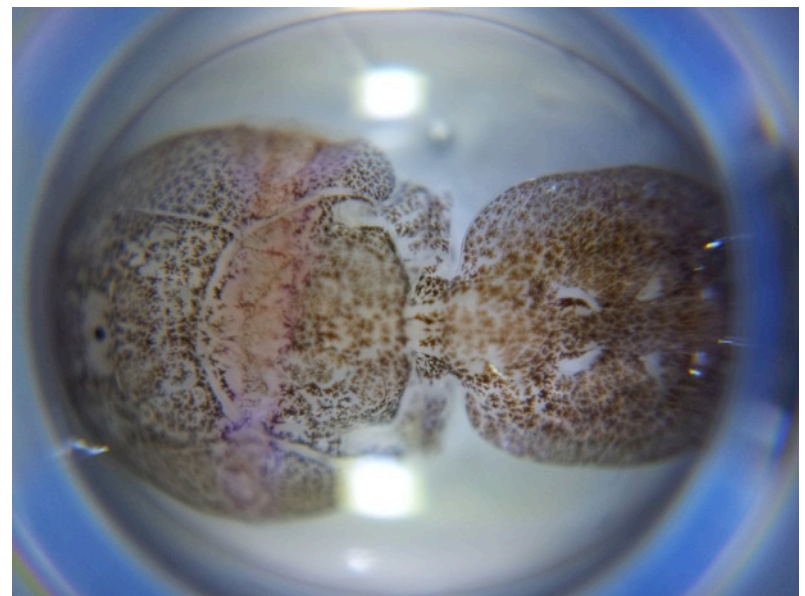
Laser is lethal to Sea Lice



100 ms

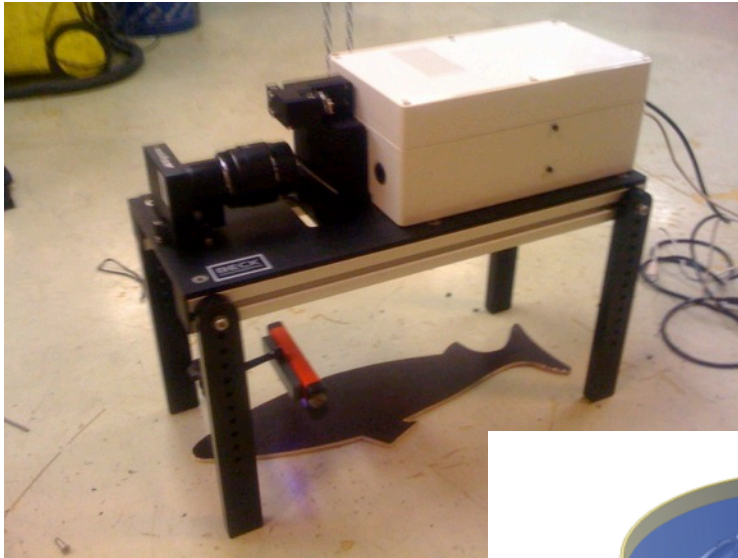


20 ms

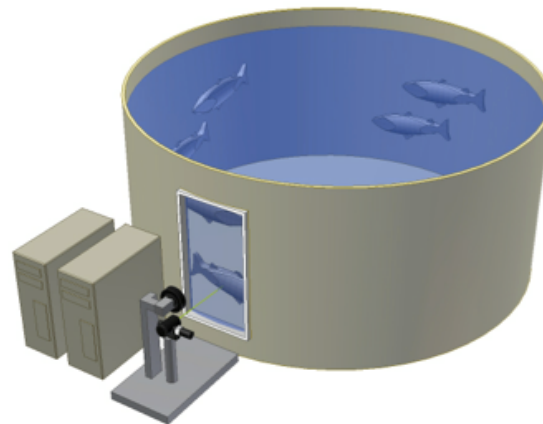


Swipe

Our Journey so far...

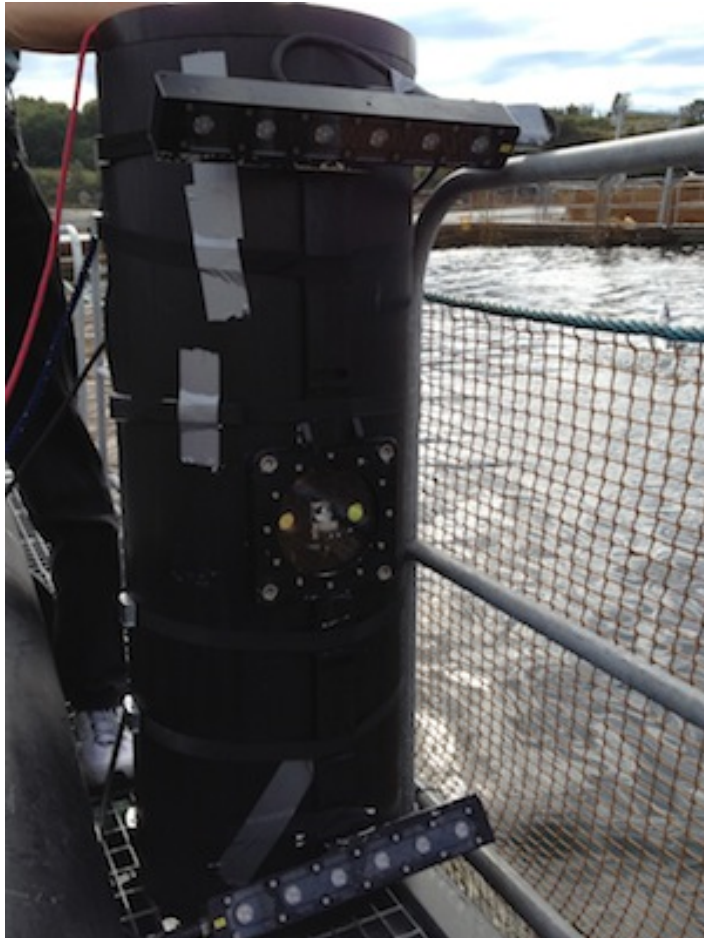


Initial testing of cameras and lasers in lab facilities.



How to wrap a complex technology into a smaller unit.

Stingray Version 1 & 2



Errors, Trials, Knowledge & Hard Work



Test unit with buoy and rack.

3 years of Research & Development



- Phase 1: Successful proof-of-concept in lab (2011)
- Phase 2: Development & production of test units (2012-13)
- Phase 3: Improvements in hardware & software (-> 2014)

PARTNERS:



- Project spending so far (per Jan. 2014): \approx 40 MNOK
- Total man hours in the project: \approx 40,000

- Stingray aim to be 1 of 3 preferred methods for delousing within the next 3-5 years.
- Prototype series during spring 2014, going to market in fall 2014, building capacity for growth and R&D.
- We will dedicate a team to work with other services that emerges from the Stingray platform.
- Bring advanced technology to salmon farmers and help our customers feed the world.

Optical Delousing

- Precise and effective.
- Automated and preventive.
- No stress and in “natural” setting.
- Information collecting 24/7.
- Cost effective and permanent.
- Sustainable and future oriented.

Existing methods

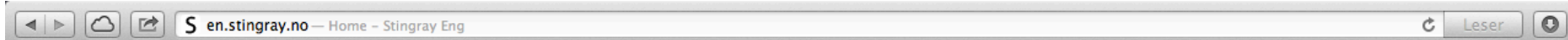
- Sea Lice become multi-resistant.
- Labour intensive and reactive.
- Chemicals create HSE-problems.
- Cleaner fish can't give much info.
- Expensive to “lose” control.
- Harmful to fish welfare.

Why use the Stingray technology



- Farmers will have another tool in the toolbox.
- It has the potential to give farmers a lot of new and important information.
- Stingray will help the salmon farming industry to become more automated and advanced.
- It is a sustainable and environmental friendly method for the future!

For more info visit stingray.no



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A NEW STANDARD IN A GROWING AQUACULTURE INDUSTRY

Optical delousing is a new, gentle and sustainable method for controlling the amount of sea lice in net pens. Using camera vision, software and laser allow for fully automatic louse removal from the fish.

The product is currently going through a test phase, and our goal is to complete and prepare optical delousing for commercialisation in the second half of 2014.





Thank you!

Q & A

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