

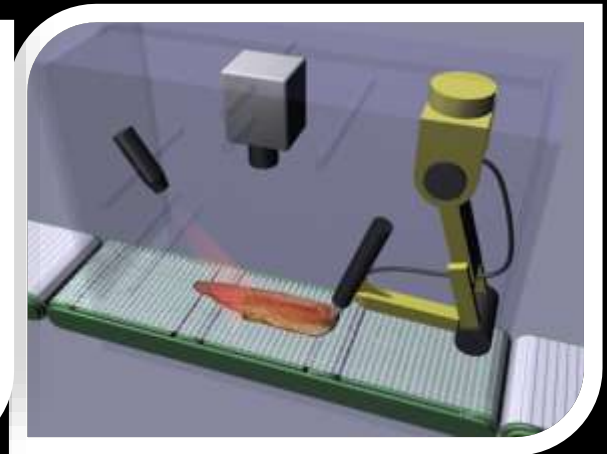
Effective catch handling systems for cod, haddock and Saithe



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Outline

- Background
- Presenting the project "*Automatic on-board catch handling systems of white fish on Danish seiners*" with focus on:
 - Automatic stunning of wild fish
 - Automatic bleeding of wild fish
 - Automatic sorting system (species and weight estimation)
- Automatic trimming of fillets



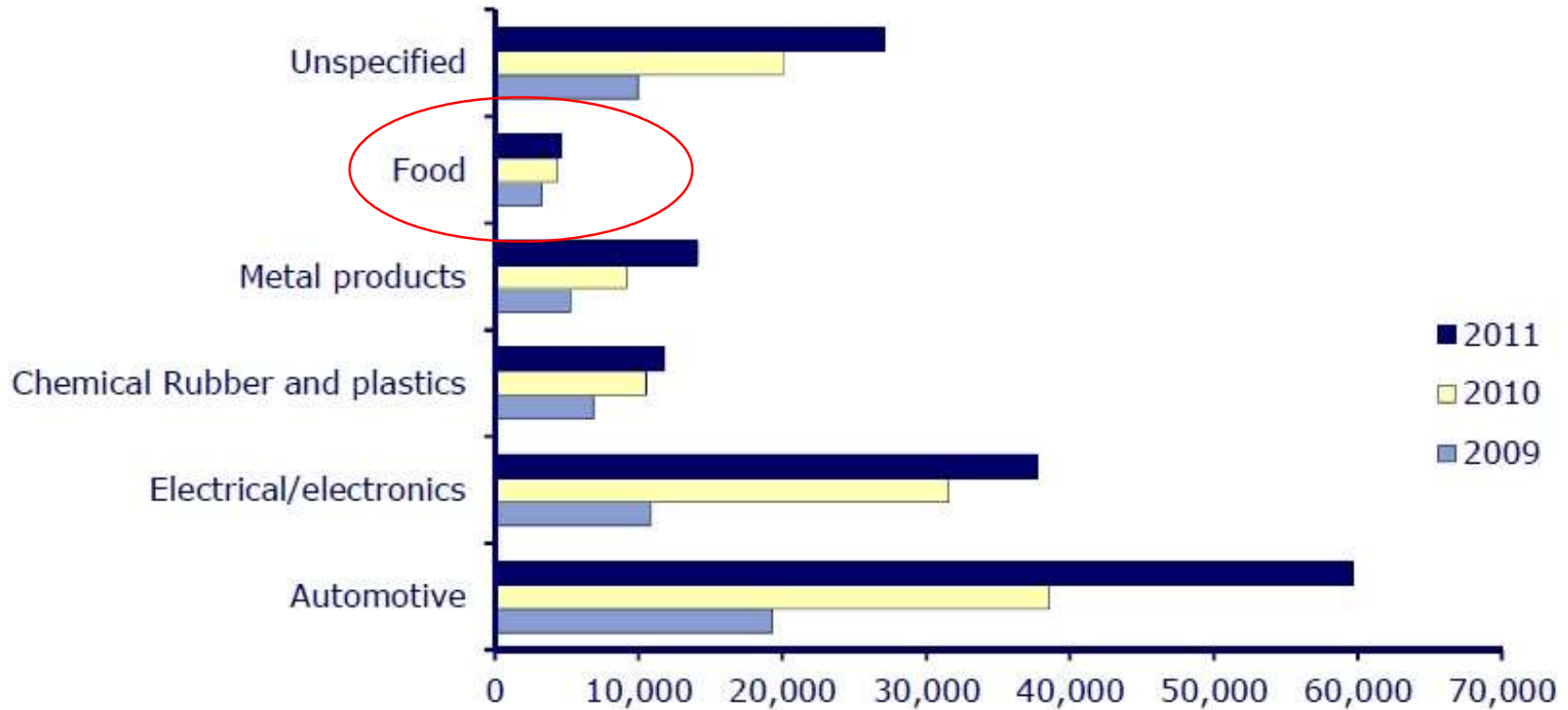
Why automation onboard?



- Improved environment, health and safety for the fishermen
- Remove heavy workloads for the fishermen
- Improved effectiveness – increased kg produced fish per fisherman
- Improved quality of the fish
- Shorter time period from catch to processing
- Greater flexibility in product range
- It may provides a foundation for improved recruitment to the fishery profession
- Strengthen the Norwegian equipment industry in developing and integrating new technology
- Total utilization of by-products

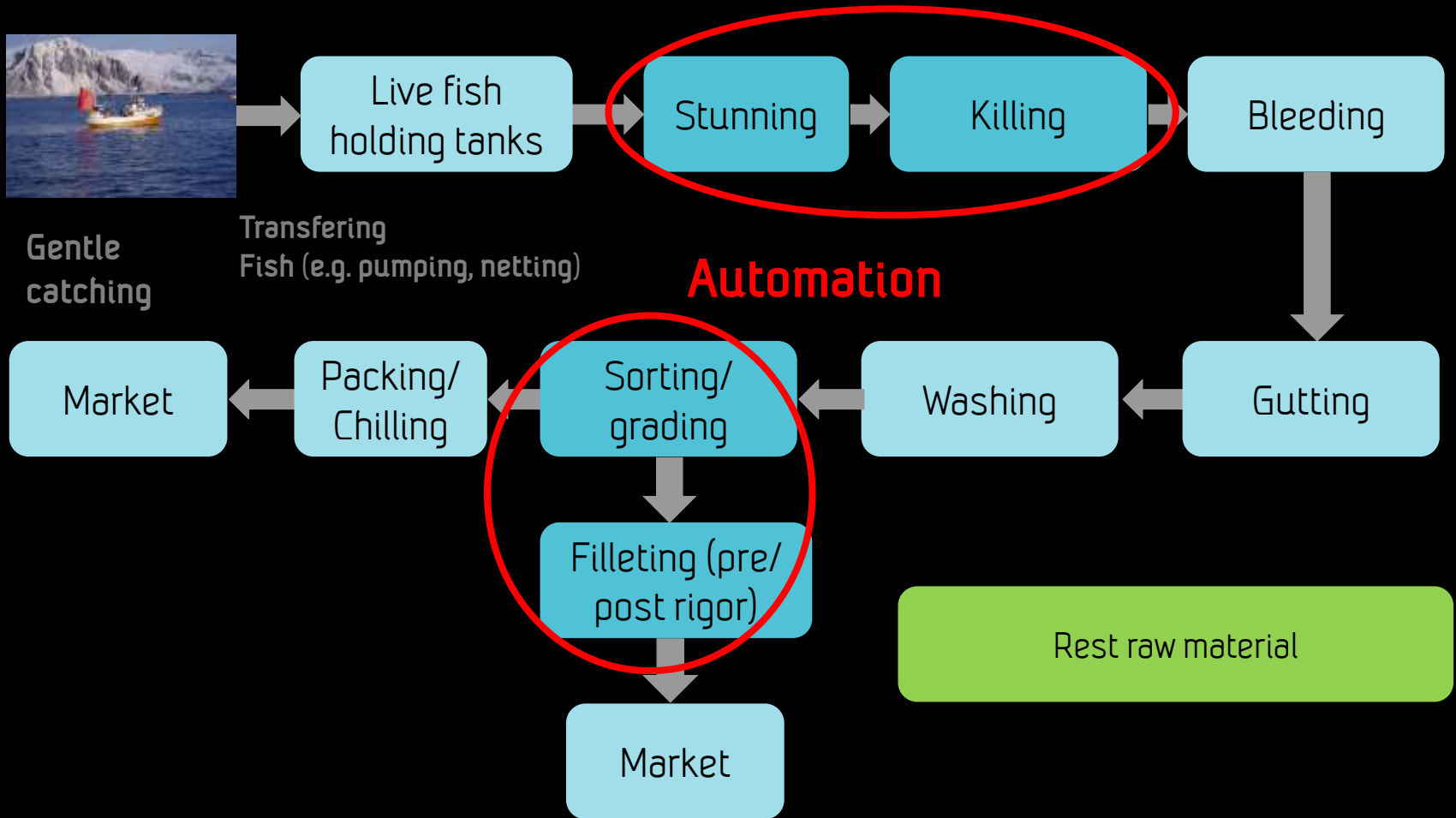
Figure 4

Global robot sales by industry

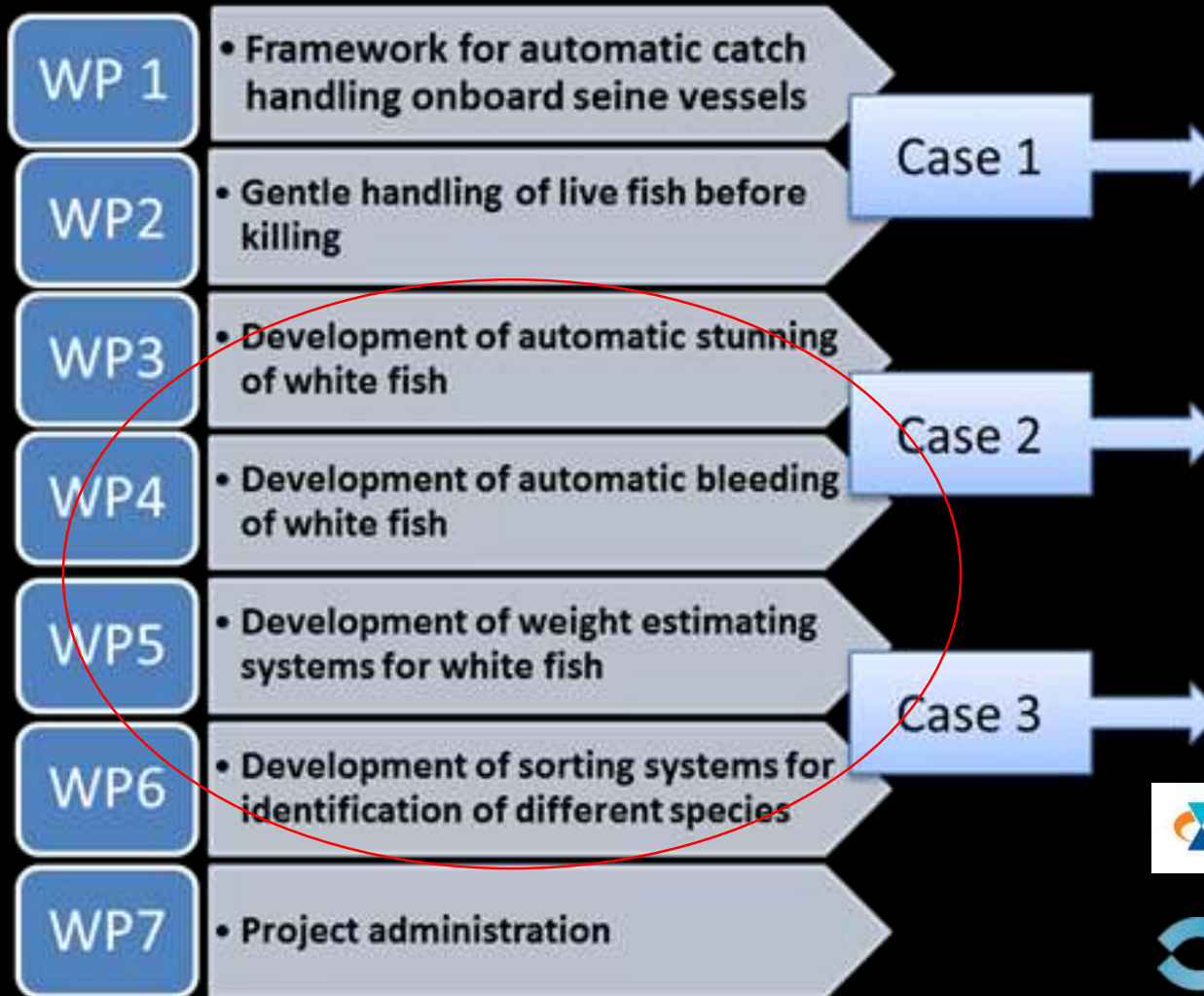


Source: CLSA Asia-Pacific Markets

Future processing line



Automatic catch handling of white fish onboard seine vessels



About the project

- Main objective:
 - To improve the **fish quality** and the **EHS** (environment, health and safety) for the fishermen and to make the fish handling system **more effective**
- Main focus – development of technology for automatic
 - Stunning
 - Bleeding
 - Species sorting
 - Weight estimation
- Financed by the participating industrial partners, the Research Council of Norway, and the Norwegian Seafood Research Fund
- Partners: several vessels, equipment vendors and processing plants
- R&D budget including own effort approx. 25 mill NOK



WP 3 Electrostunning of haddock, cod and saithe



- Several tests are performed onboard and in laboratory
- Electrical stunning makes it possible to immediately further process the fish after it is taken on board.
- Registration of:
 - Voltage (>40 V is recommended)
 - Behaviour (10 min recovery)
 - Handling stress
 - Quality assessments

Electrical stunning - results

- Fast and efficient method → easy fish handling
- > 40 v is sufficient for properly stunning of cod, haddock and saithe
- Induced by an electrical current
- Important factors :
 - Duration
 - Voltage
 - Fish species
- Two different electrostunners has been tested
 - Flaps +/-
 - Conveyor belt negative charged/flaps positive charged
- Quality assessments:
 - No damages or quality changes for haddock and cod
 - Saithe: between 10-45 % of the fish had broken vertebrae and ruptured blood vessels in saithe



WP 4: Automatic bleeding of wild fish

Focus area: Improving bleeding routines

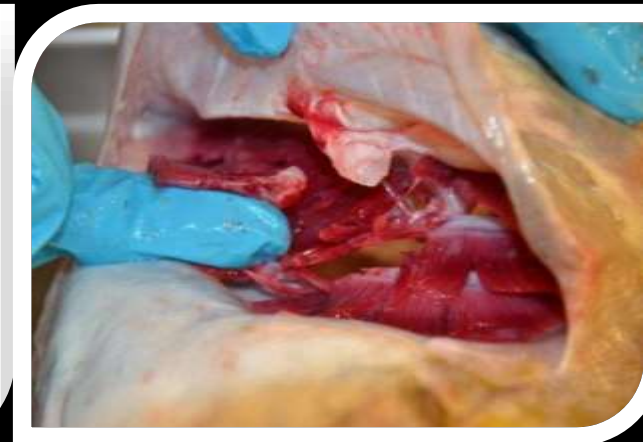


Problem: Inadequate bleeding, blood spots in the filets

Solution: Immediate bleeding of live fish (or no later than 30 min post mortem)

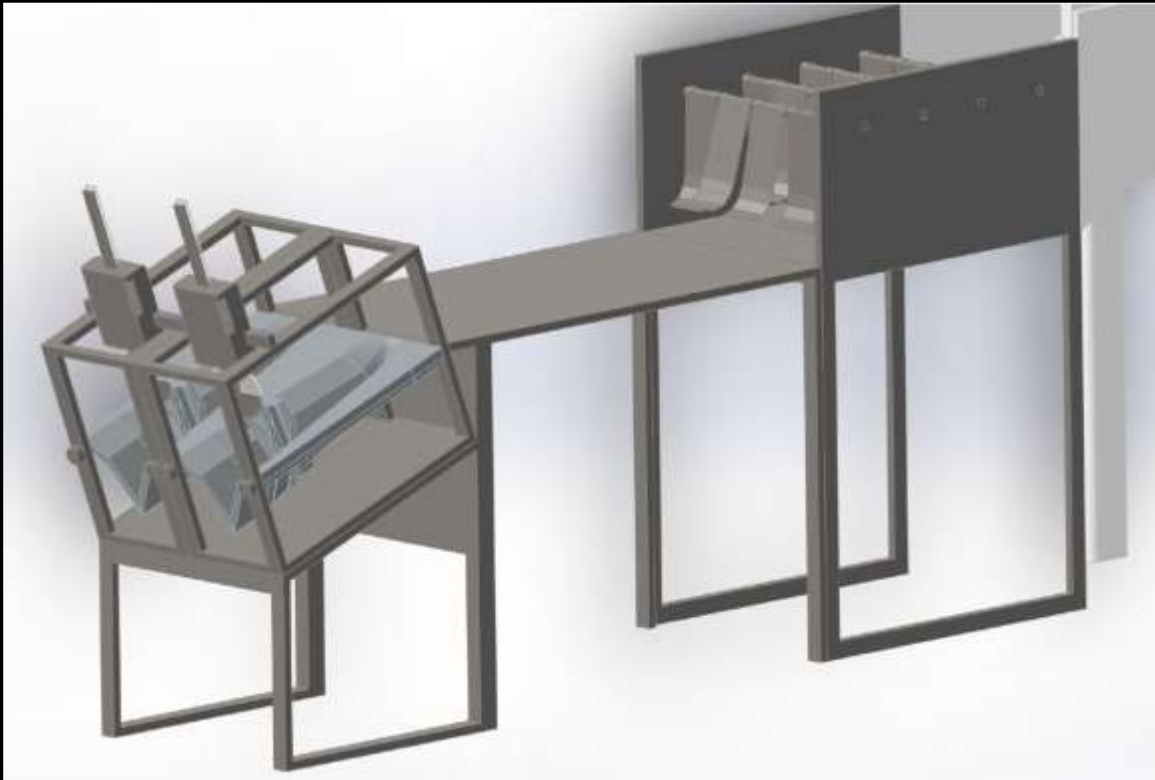
Four different concepts for automatic bleeding

1. One-mans bleeding machine (small vessels)
2. Automated machine vision processing line (big vessels)
3. Partly automated mechanical processing line (big vessels)
4. Manual processing line (big vessels)



1. Bleeding machine for small vessels

- Developed for small vessels, manual singular/orientation and batch input

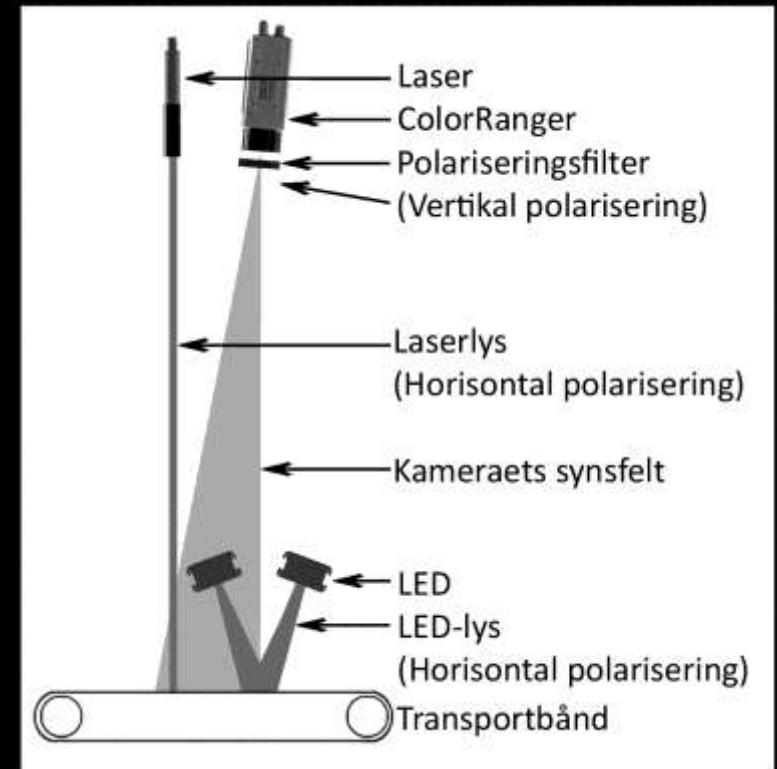
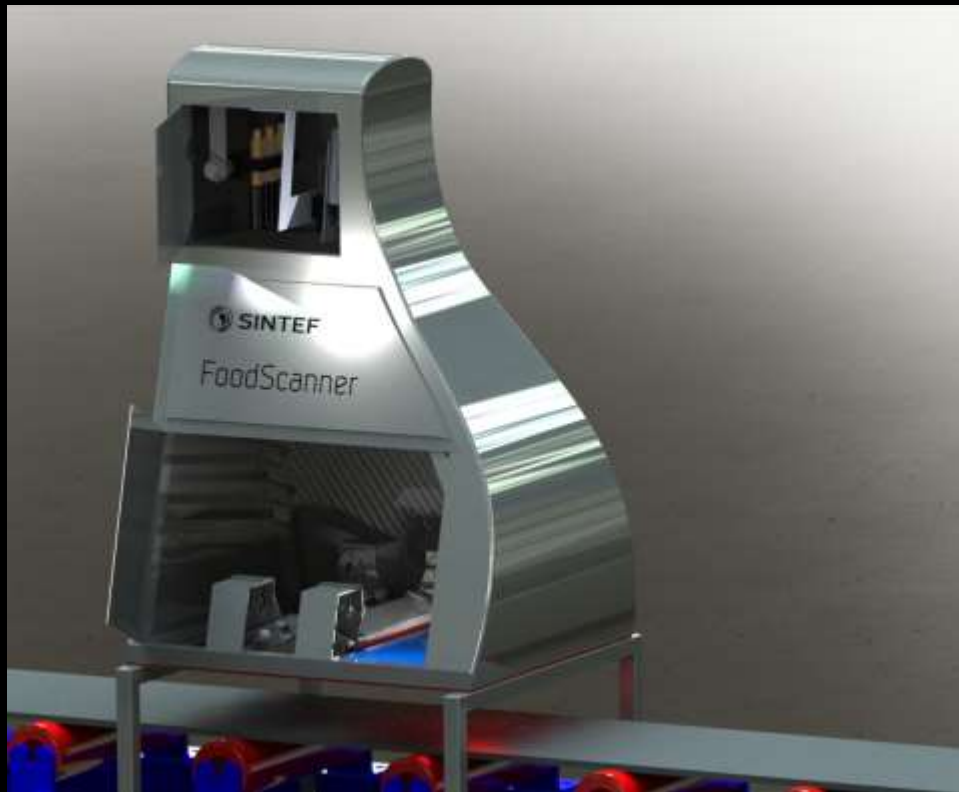


Seaside AS and SINTEF

Building & testing the machine in the laboratory

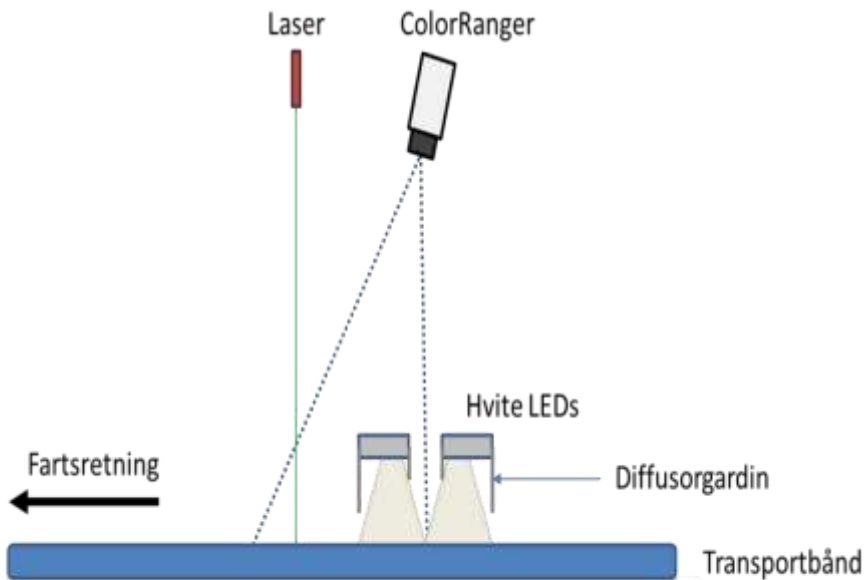


WP 5/6 Development of weight estimating and species sorting systems for wild fish



FoodScanner Mini – sorting (species, weight, quality)

Machine vision system for bleeding, species sorting and weight estimation.



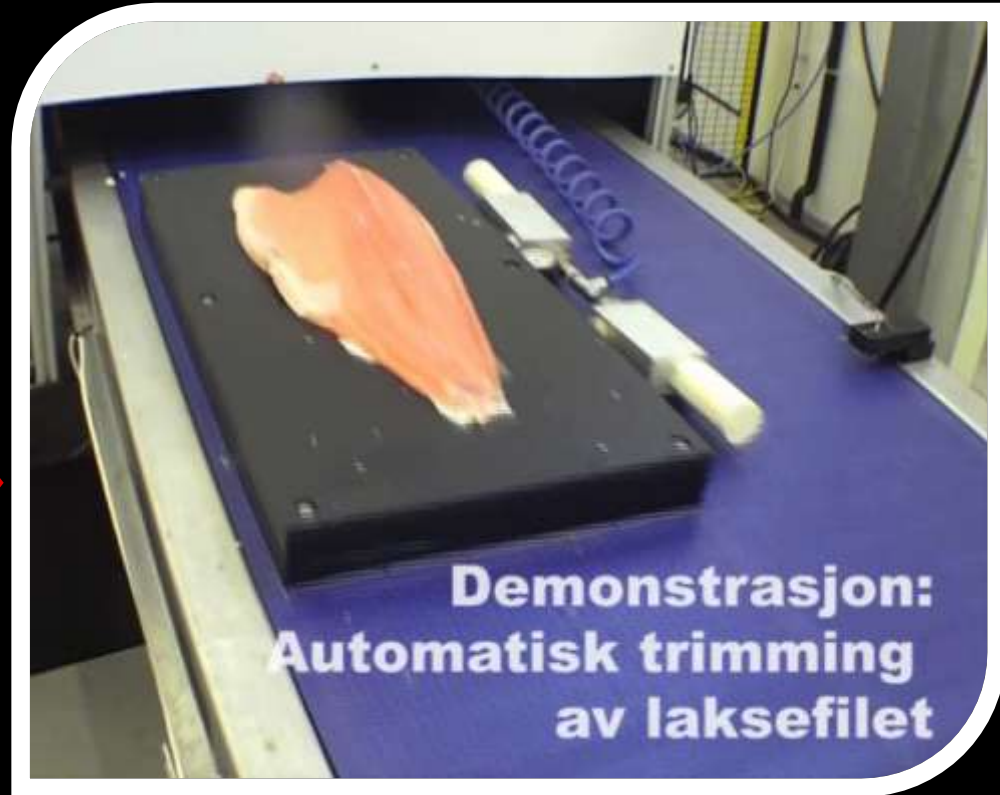
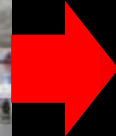
a) Bilde tatt uten polariseringsfilter

b) Polariseringsfilter på kamera

c) Polariseringsfilm på LED-lys og polariseringsfilter på kamera

Imaging in 2D and 3D color with a resolution of 1 mm and a conveyor speed of 50 cm / s.

Automatic trimming of fillets



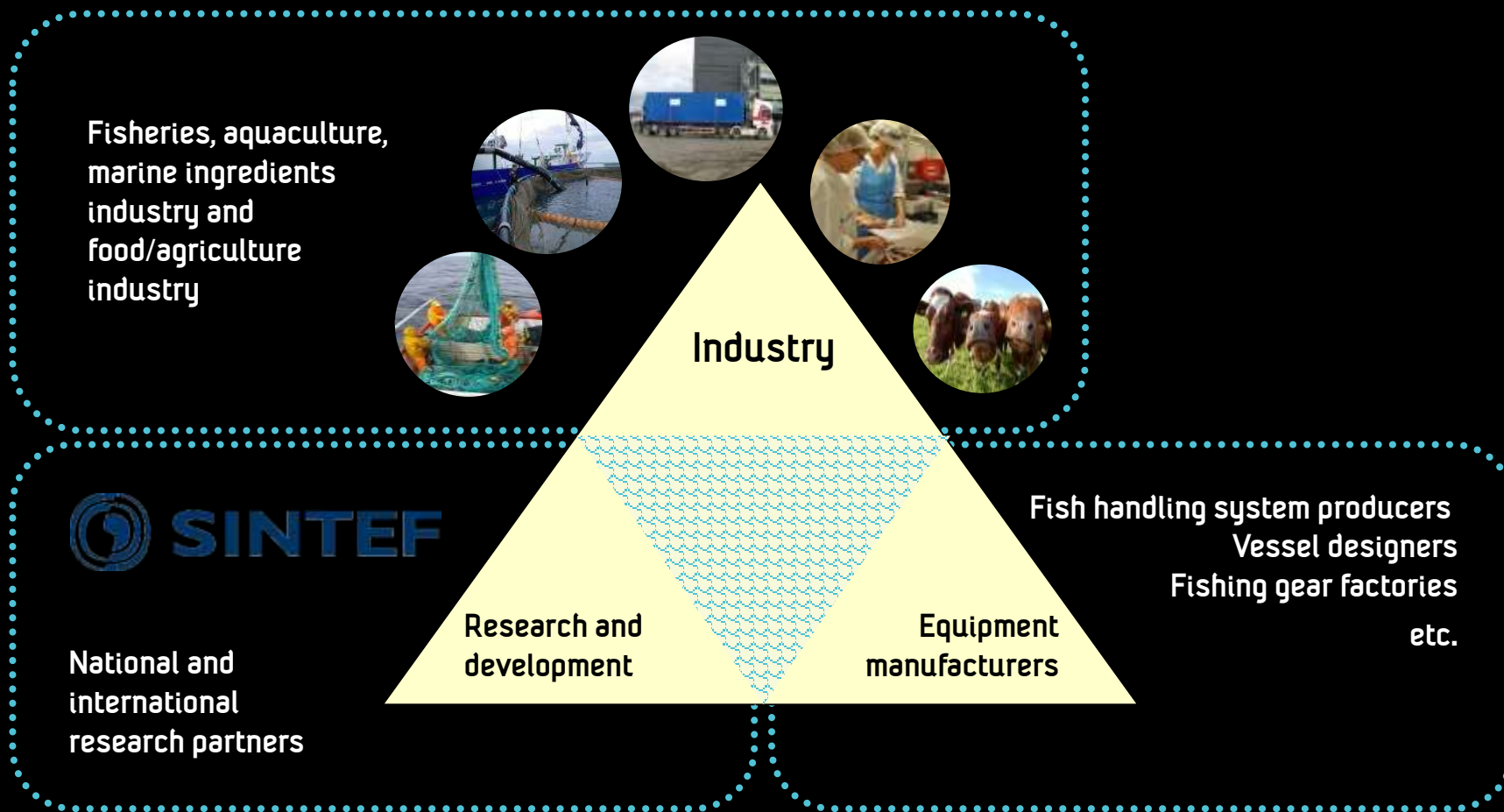
From manual trimming



To automatic trimming,
RoboTrimNo 1 – First generation
of a robot for trimming salmon fillets

Close collaboration

is the basis for innovation and high scientific quality





Thanks to:

- The Research Council of Norway, (MAROFF, BIA, Matprogrammet)
- The Norwegian Seafood Research Fund (FHF)
- SEASIDE, Melbu Systems, MMC, C-Flow, "Gunnar K", "Hardhaug", Helmer Hansen, among others.

**Thanks for Your
attention!**



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