

The logo for TAL TECH, featuring the words 'TAL' and 'TECH' stacked vertically in a bold, white, sans-serif font. The background of the slide is a vibrant, abstract graphic with flowing, wavy lines in shades of blue, purple, and yellow.

# SMART TRAP FOR OPTIMISING COSTAL FISHER'S FISHING PROCESS

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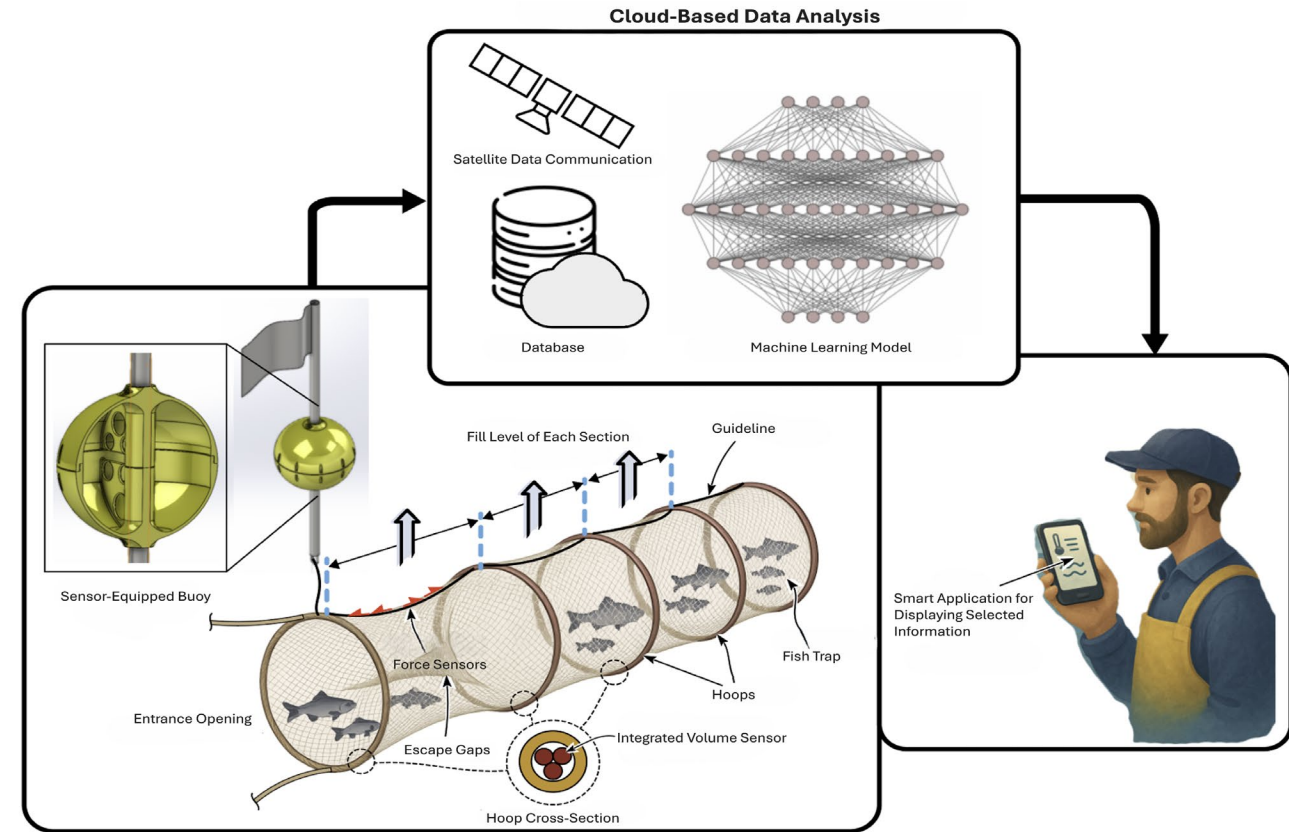
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# Motivation & Background

- Small scale fishing is resource restricted, time consuming, and resource critical.
- **Gap:** practical and economical solutions to monitor the fulfillment of trap
- **Proposed solution:** smart trap for monitoring and optimization of fishing processes

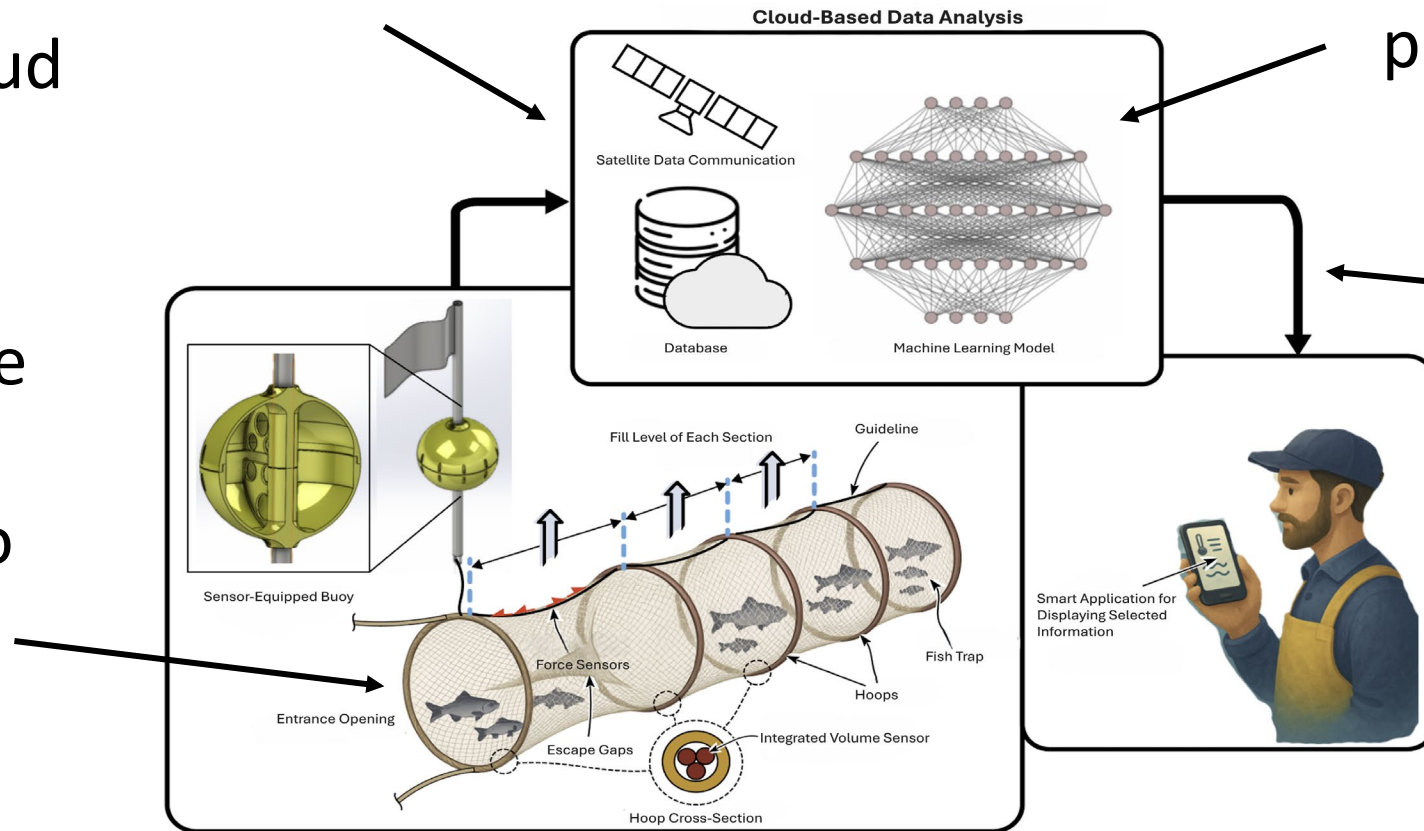


# Project phases

**Step 2:** Data transmission to cloud

**Step 3:** ML model for data fusion, pattern recognition, net fill level estimation, predictive time of fill

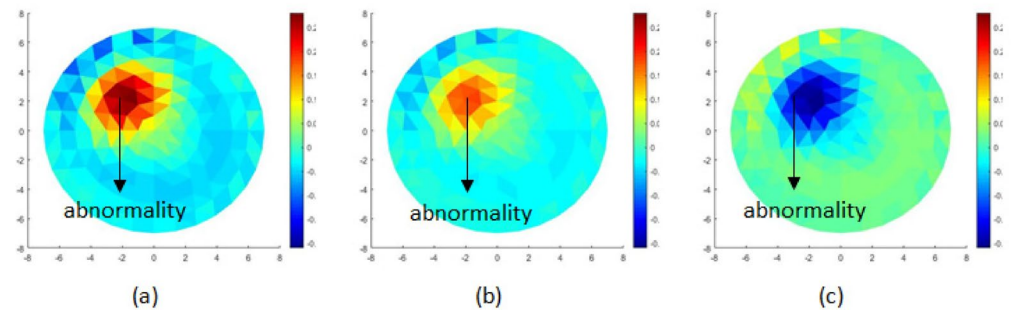
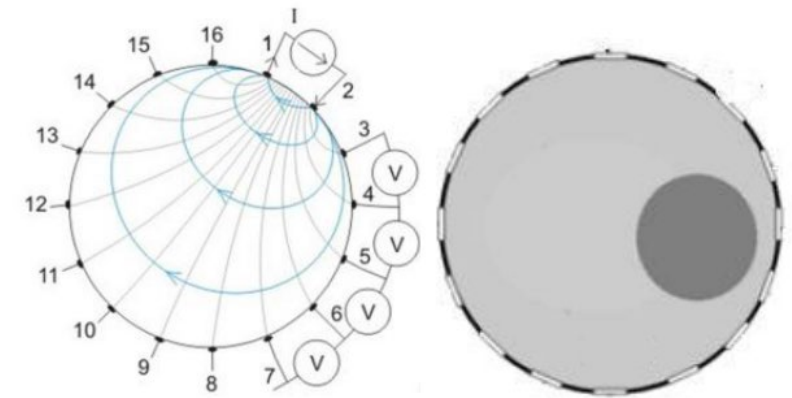
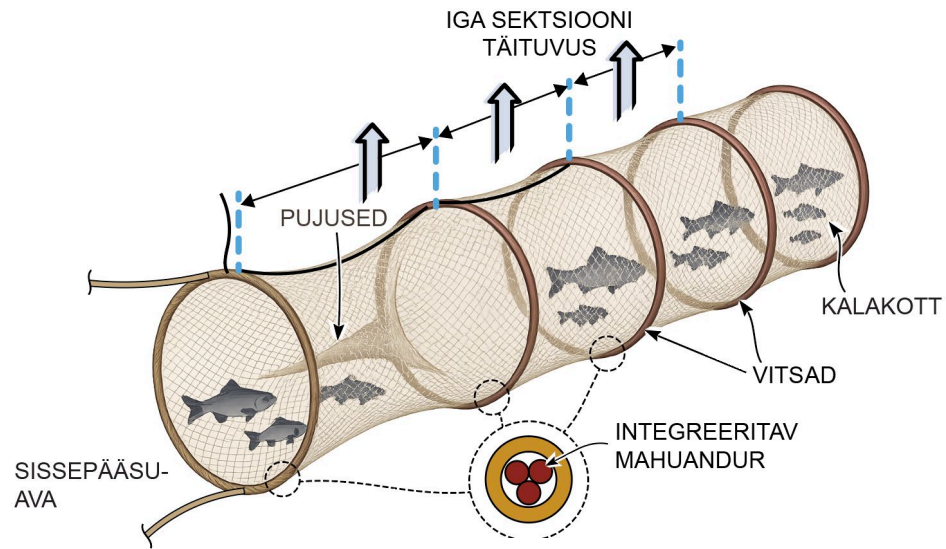
**Step 1:** Volume sensor integrated into trap beam



**Step 4:** Useful data to local fisherman via mobile application

# Phase 1 (ongoing): Scientific challenge

- Volume sensor integrated into trap beam
- Challenge
  - Cost efficiency
  - Accuracy
- Research (2-phase)
  - Validation in lab
  - Real world testing



# Comparative Technology Assessment for Real-Time Underwater Fish Detection and Counting

Technology	Turbid Water Performance	3D Localization	Real-Time Counting	Species Discrimination	Cost / Complexity	Net Compatibility
<b>Acoustic Sonar</b>	Excellent	Limited (2.5D)	Good	Poor–Moderate	High (>\$15K)	Moderate
<b>CHIRP Echosounder</b>	Excellent	No (1D)	Moderate	Poor	Moderate (\$2–8K)	Limited
<b>Optical Camera (HD/Stereo)</b>	Poor-Moderate	Yes (stereo)	Good (AI-assisted)	Excellent	Moderate–High	Good
<b>Computer Vision + Deep Learning</b>	Poor (light-dependent)	Yes (stereo)	Excellent (75 fps)	Excellent	Moderate (GPU cost)	Good
<b>PIT Tagging</b>	Excellent	Passage only	Excellent	Excellent (individual)	Low–Moderate (tagging)	Limited
<b>eDNA Sampling</b>	Excellent	None	None (hours latency)	Excellent (species)	Low–Moderate	N/A
<b>Single-axis EIS (1D)</b>	Excellent	No (axis only)	Good (>90% accuracy)	Moderate	Low	Good
<b>EIT Ring (Proposed)</b>	Excellent	Yes (3D tomographic)	Target: real-time	Moderate–High	Low–Moderate	Excellent

# Key Performance Indicators (Tulemusnäitajad)

## 1. Sustainable and efficient use of resources

- The proposed solution reduces the need for constant trap checking and potential useless commutes to net location saving both time and fuel

## 2. Reducing climate impact and protecting the environment

- By avoiding unnecessary trips to sea, coastal fishers achieve significant savings in fuel and maintenance costs

## 3. Increasing the impact of research and development activities

- Increased capacity to develop, calibrate, and test different sensors. Increased capacity to develop and deploy machine learning models in real world conditions strengthening and broadening our core skills in the field of marine technology.

## 4. Economic viability and entrepreneurial capacity

- Developed cloud-based ML platform could be adopted and extended for commercial fishing needs. Gathered data describing fish behavior and stock contains valuable information

## 5. Promoting regional development

- Reduced cost and administrative burden of coastal fishers using automated data transmission and collection

# Tulemusnäitajad

## 1. Ressursside jätkusuutlik ja tõhus kasutamine

- Pakutav lahendus vähendab vajadust püügivahendeid pidevalt kontrollida ning aitab vältida tarbetuid sõite püügivahendi asukohta, säästes nii aega kui ka kütust.

## 2. Kliimamõju vähendamine ja keskkonna kaitse

- Tarbetute meresõitude vältimise kaudu võimaldab lahendus rannakaluritel saavutada märkimisväärset kokkuhoidu kütuse- ja hoolduskuludelt ning vähendada CO<sub>2</sub> heidet ja muud keskkonnamõju.

## 3. Teadus- ja arendustegevuse mõju suurendamine

- Projekt suurendab võimekust erinevate andurite arendamiseks, kalibreerimiseks ja testimiseks. Samuti suurendab see võimekust masinõppemudelite arendamiseks ja rakendamiseks reaalses tingimustes, tugevdades ja laiendades meie põhioskusi meretehnoloogia valdkonnas.

## 4. Majanduslik elujõulisus ja ettevõtlusvõimekus

- Arendatav pilvepõhine masinõppeplatvorm on kasutatav ja edasiarendatav ka kutselise kalapüügi vajadusteks. Projekti käigus kogutavad kalade käitumist ja varu kirjeldavad andmed omavad iseseisvat väärtust ning loovad täiendavat potentsiaali uute teenuste ja lahenduste arendamiseks.

## 5. Regionaalse arengu edendamine

- Automatiseeritud andmeedastuse ja andmekogumise abil vähendab lahendus rannakalurite kulusid ning halduskoormust, toetades seeläbi piirkondliku ettevõtluse kestlikkust ja konkurentsivõimet.