Concept Review

Hackaday Prize 2020 - Conservation X Labs

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SUPPLYFRAME
DESIGNLAB
HACKADAY PRIZE 2020

CONSERVATION X LABS

Part 1:
Research & Insights

Research & Insights → Our Proposal → Implementation → Discussion

Data source: Ghosts Beneath the Waves - World Animal Protection Project

Photo credit: Dave Bretherton, Olive Ridley

Fisher Pain Points

1. Need to accomplish a lot of tasks, in a harsh environment, quickly
2. Have to re-bait the traps every day
3. Unpredictable fish stocks can vary their income
4. Budgets are limited
5. Having to comply with legislation … “yet another piece of legislation”
6. Don’t want to cause entanglements or loss of gear

Problem Statement

How might we **decrease** marine species entanglements and **ghost gear** creation — while making the commercial fishing process more **data driven**?

Information from Fishers

- They don't look at information before going out fishing
- Decades old industry, doesn't get updated with new tech
- Soak time is dictated by bait
- Specific cause and source of ghost gear is somewhat unknown to the fishers
- Variety of operations, gear types, environments, catches, priorities
- Interested in free beta testing, *with a smile*

Interviews conducted include...

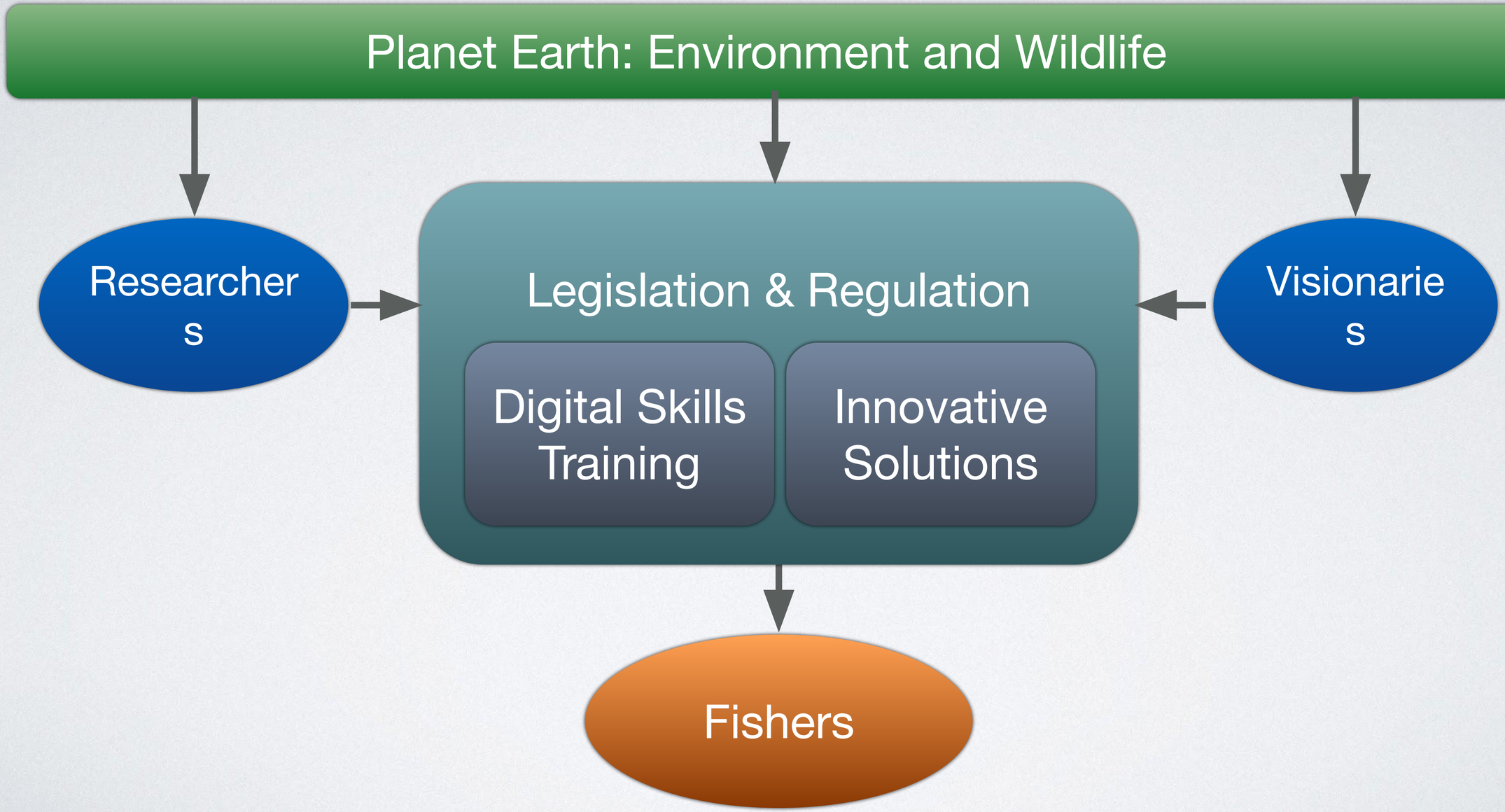
Fishers in Nigeria

Market vendors in Venezuela

Fishing industry entrepreneurs in Canada (east and west coast)

The Deputy Minister of the Department of Fisheries and Oceans in Canada was forwarded our hackaday.io page and research report. Key contacts to come from this soon.

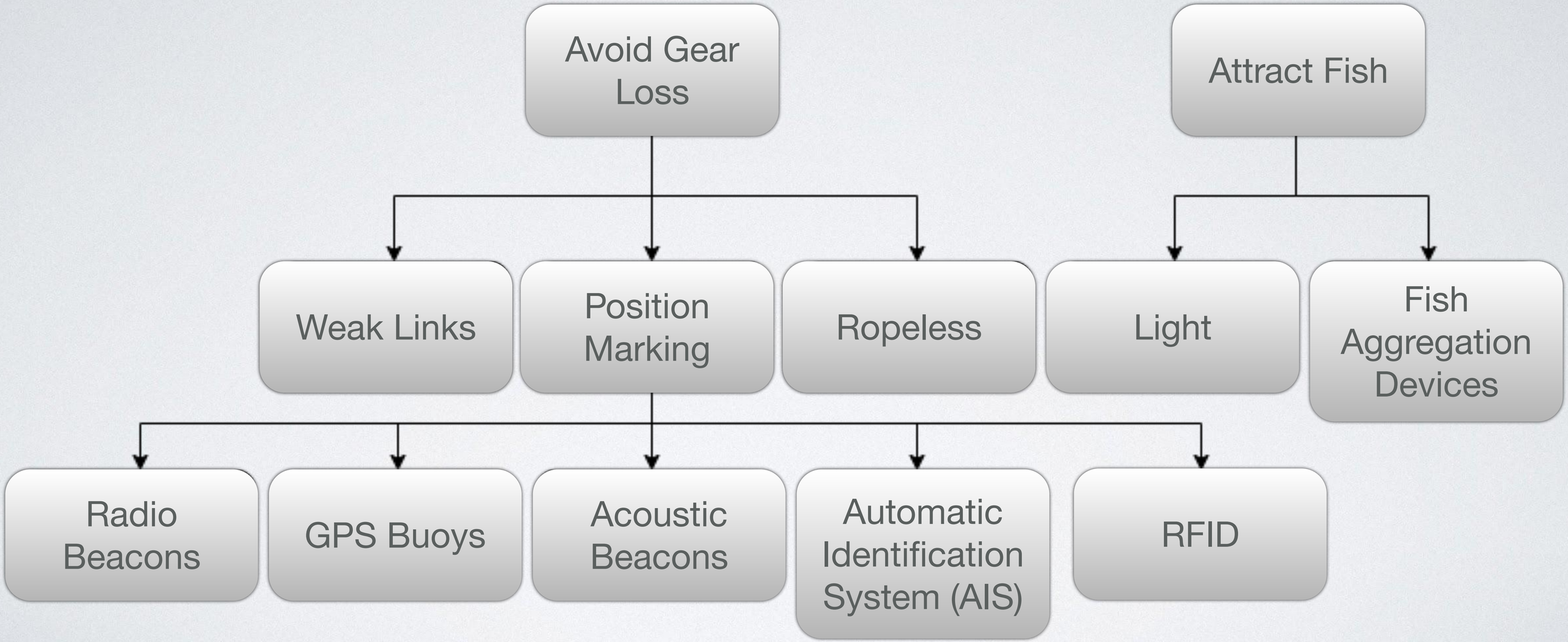
Dialogue Needed for Change



Part 2:
Our Proposal

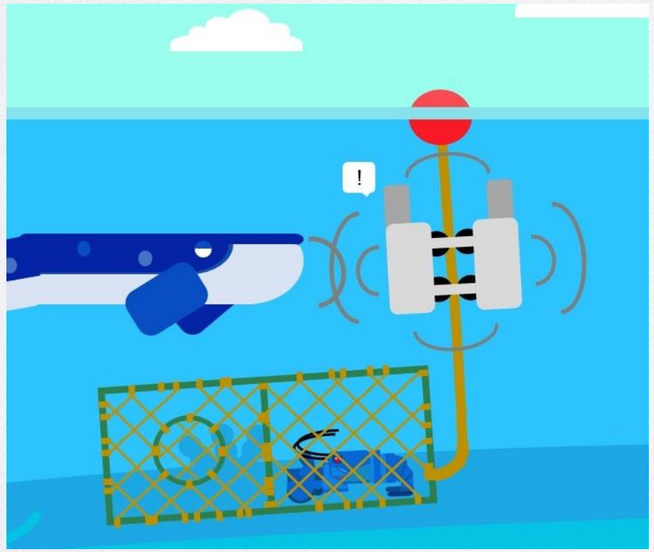
Research & Insights → **Our Proposal** → Implementation → Discussion

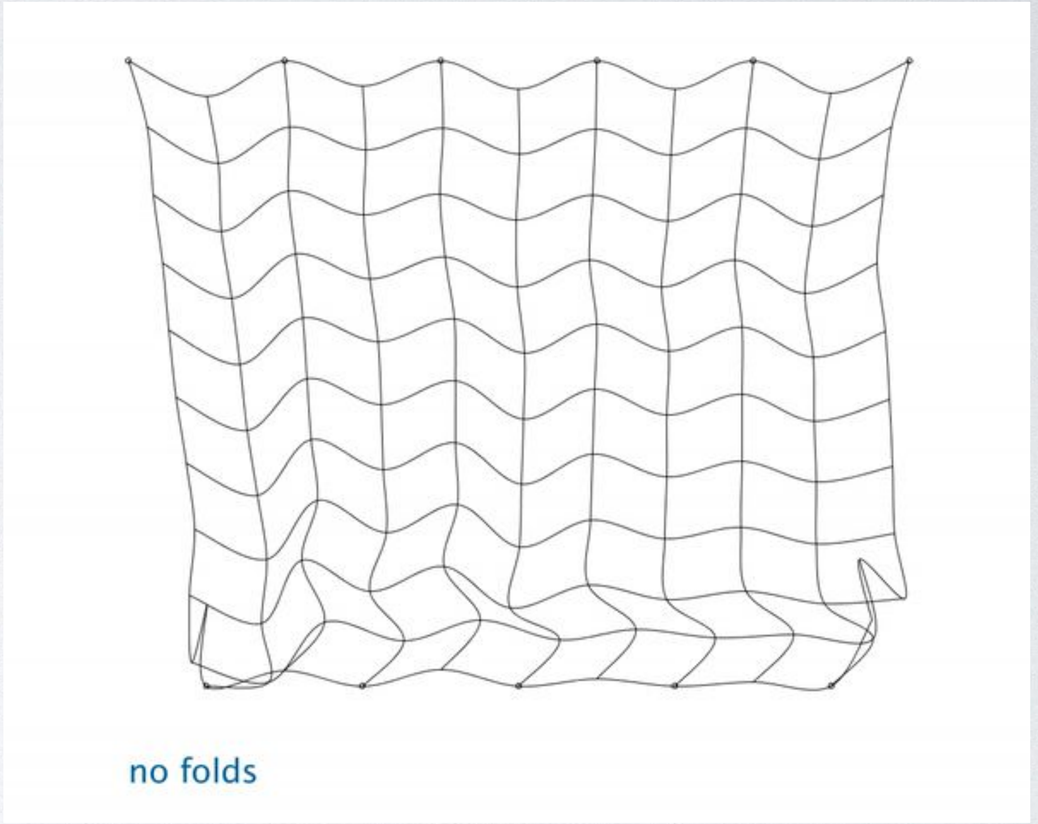
Solutions Map



Outlandish Ideas

- Cyborg lobster
- Barrel roll gear tangler retrieval
- Robo-starfish gear folder
- Rope elevator





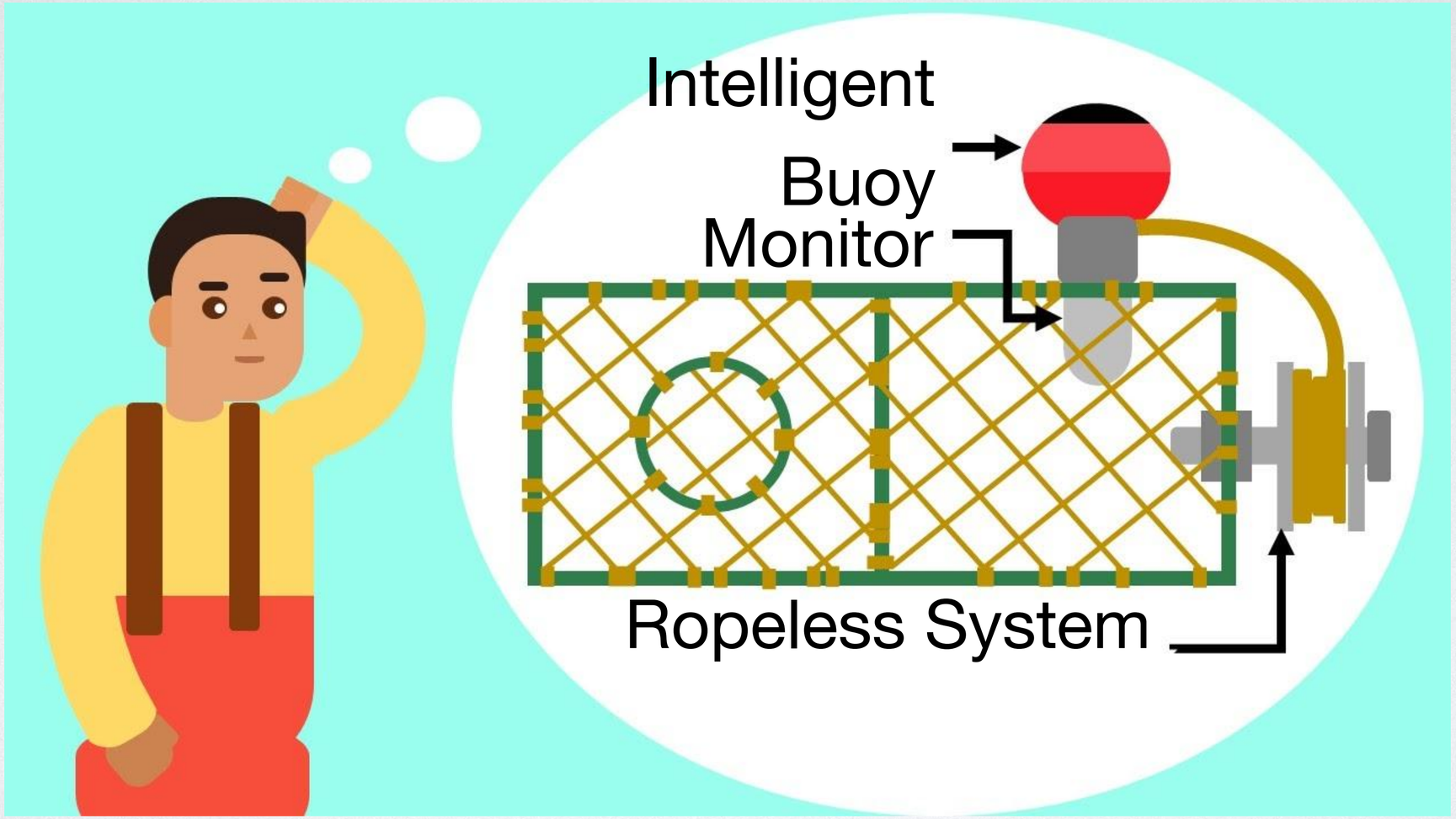
Solution Concept

- **Ropeless system** to avoid vertical lines
- Intelligent buoy with **Position Marking** and **Communication**
- **Modular design** for more **adaptability**
- Monitor of gear capacity
- Compliance with regulations

- **10%** of identified Ghost Gear were ropes from traps and pots
  (Stelfox et al. 2016)
- Traps and Pots have a higher **ghost fishing efficiency**
- Trap placement location is **lacking data**
  (based on interviews with fishers)

Stelfox, Martin & Hudgins, Jillian & Sweet, Michael. (2016). A review of ghost gear entanglement amongst marine mammals, reptiles and elasmobranchs. Marine Pollution Bulletin. 111. 10.1016/j.marpolbul.2016.06.034.

Solution Concept: System

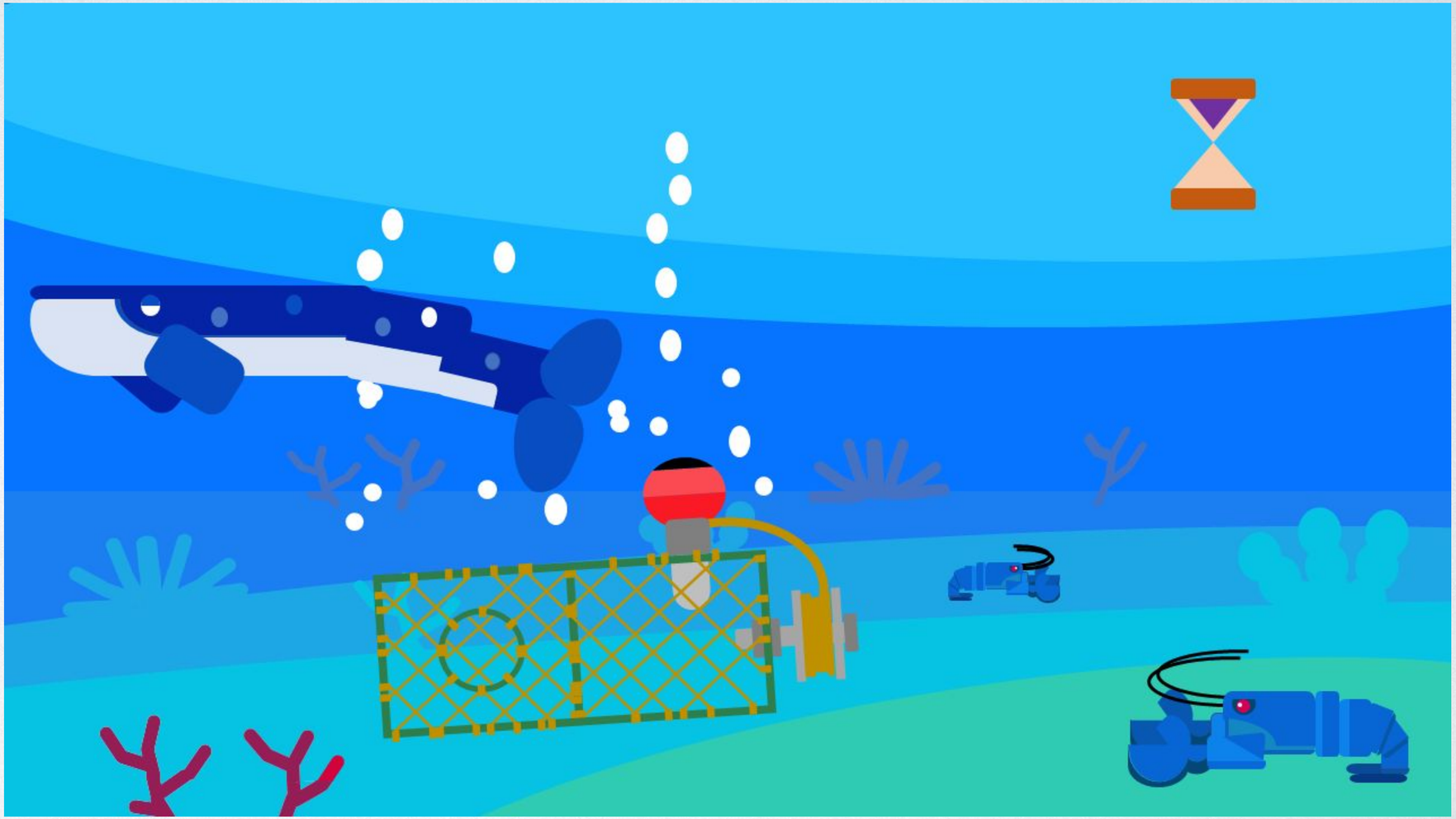


Solution Concept: Deployment

- Position marking
- System integrated onto trap

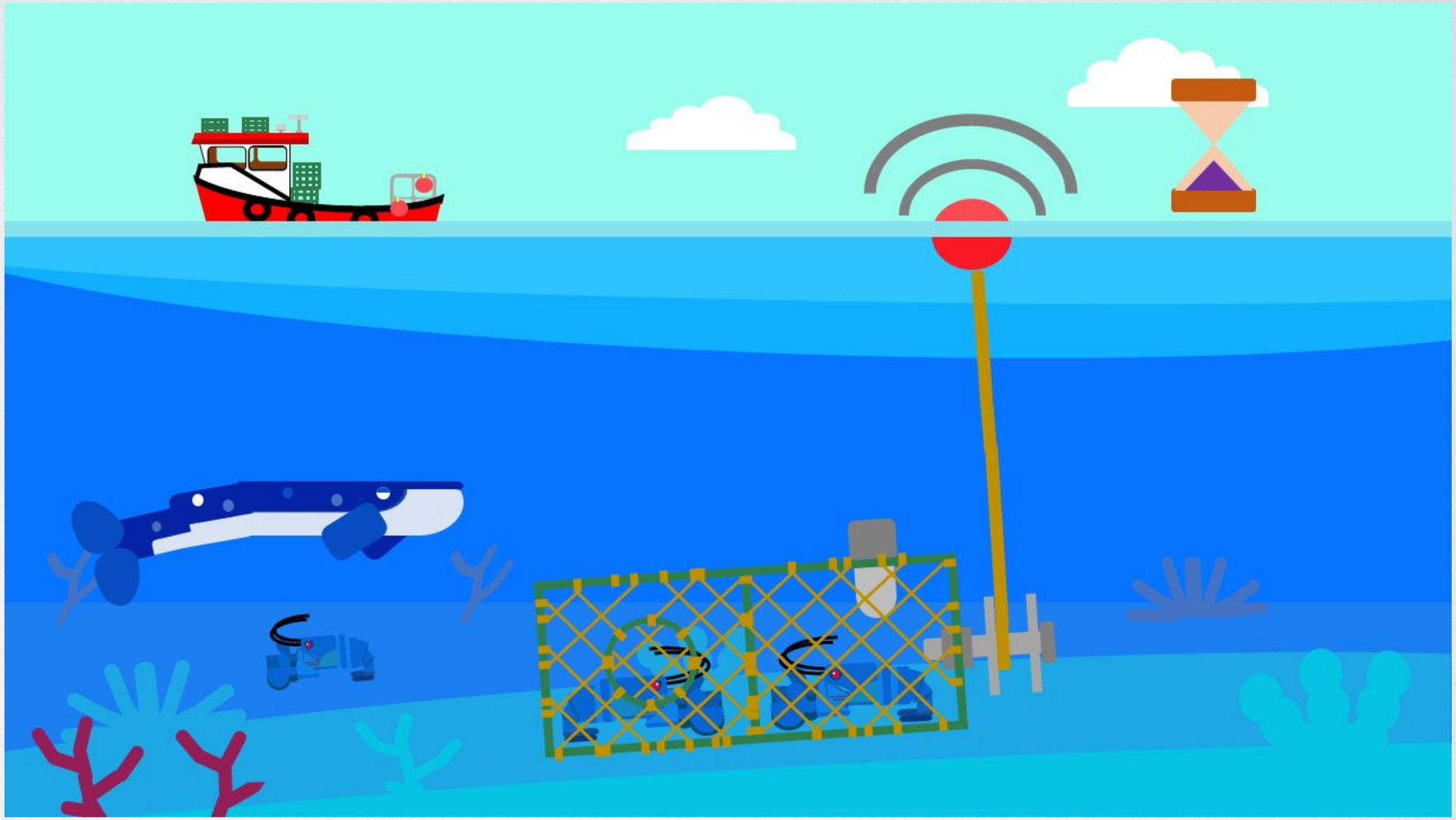
Solution Concept: The Catch

- Ropeless mechanism



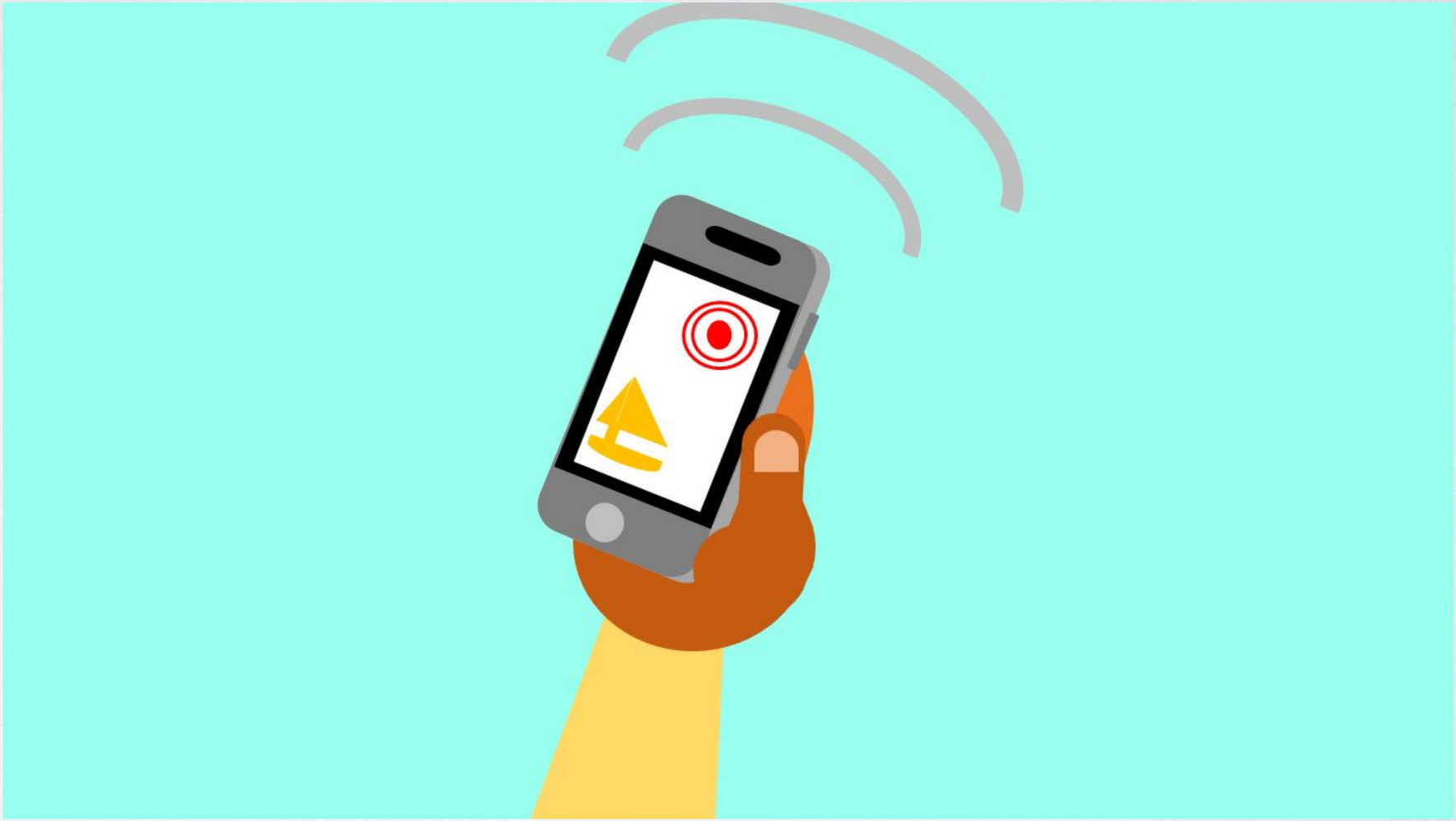
Solution Concept: Retrieval

- Position Marking
- Communication



Solution Concept: Navigation App

- GPS with offline maps
- Navionics
- OpenCPN
- iNavX



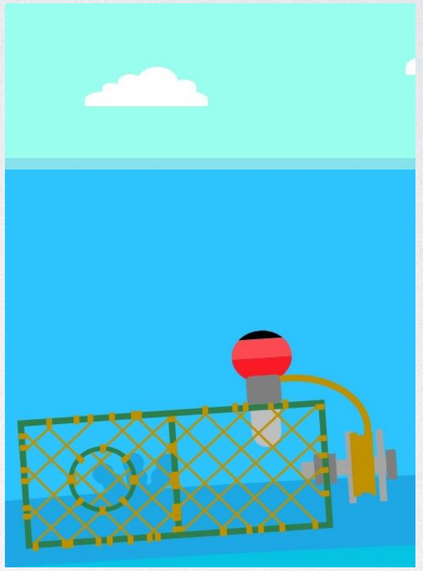
Part 3: Implementation

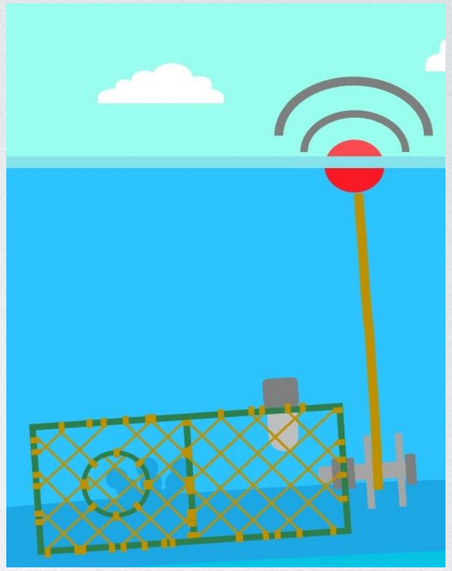
Research & Insights → Our Proposal → **Implementation** → Discussion

Scope of Work

The project comprises three main components working together as a system:

1. Ropeless adaptation
2. Intelligent buoy
3. Monitor of gear capacity



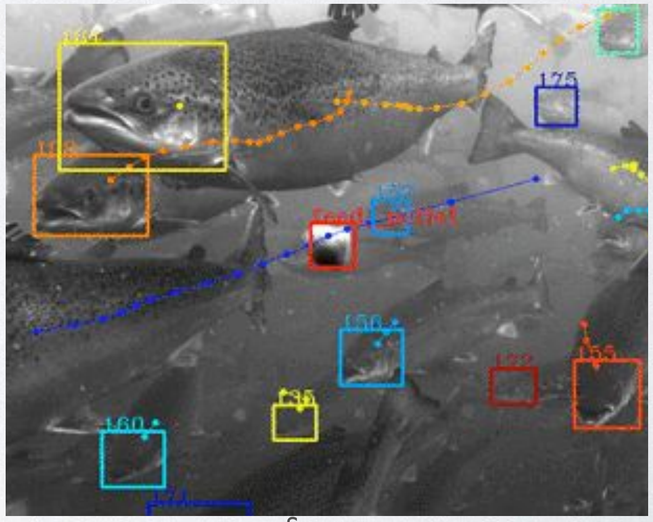


Major Constraints:

- Battery powered (72 hours)
- AC supply on boat
- Mobile phone for data

Monitor

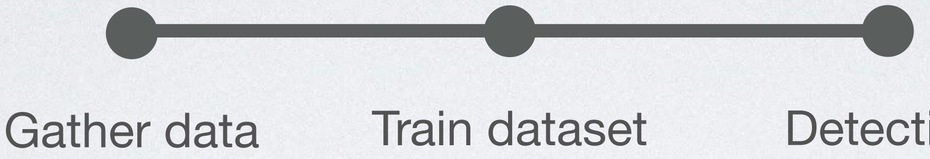
- Presently, fishers evaluate trap location from intuition: bait levels, catch, competition
- Monitor addresses a gap that fishers do not know:
  1. Fish traffic around the trap
  2. When fish enter the trap
- When trap brought to surface for re-baiting, transfer data
  - Lobster and prawn traps re-baited every 1-3 days
- Information displayed on a wearable armband
- Fisher decides if trap needs to be relocated
  - Making the most of short duration fishing seasons — protecting animal migration
- How? Computer vision and sensors approach
- Standalone or integrate into existing systems

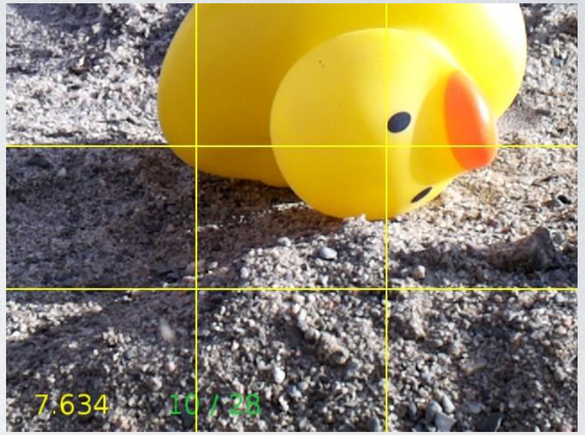


Source:
https://blog.x.company/introducing-tidal-1914257962c3

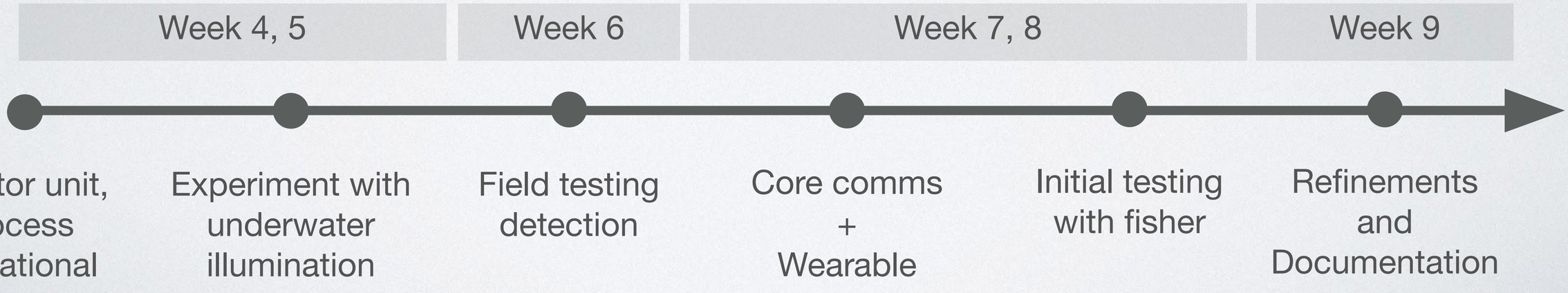
Path to Implementing the Monitor

Monitor process needs to be able to be quickly adapted for use in different locations to detect species





Detecting a rubber duck with Bowie the robot. Source: RobotMissions.org 2018



Part 4: Discussion

Research & Insights → Our Proposal → Implementation → **Discussion**

Additional Information

Research & Insights → Our Proposal → Implementation → Discussion

Design Information

Intelligent Buoy Requirements

1. 72 hours minimum battery life
2. Operate in harsh environment and underwater to depths of 500 metres
3. Measure temperature at bottom and surface
4. Locking & unlocking mechanism
5. The buoy will operate & survive in waves up to 1.5 metres

Assumptions

1. Fishers will have access to 240/120 VAC power
2. Fishers have a phone / mobile device to look at data from the buoy