Advantages of underwater wireless sensors for real-time monitoring applications

Real-time Water Quality Monitoring Workshop 2018

Matthew Holland

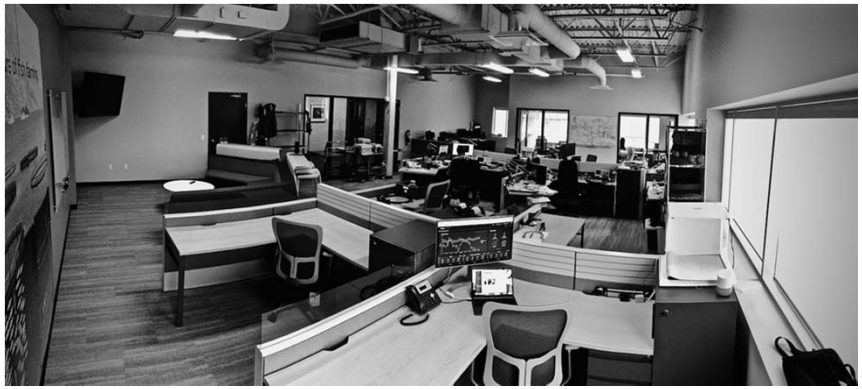
About Us

Who we are

- Office in Halifax, NS, Canada
  - Modern, 50,000ft^2 facility
- 30 years of wild fish telemetry technology

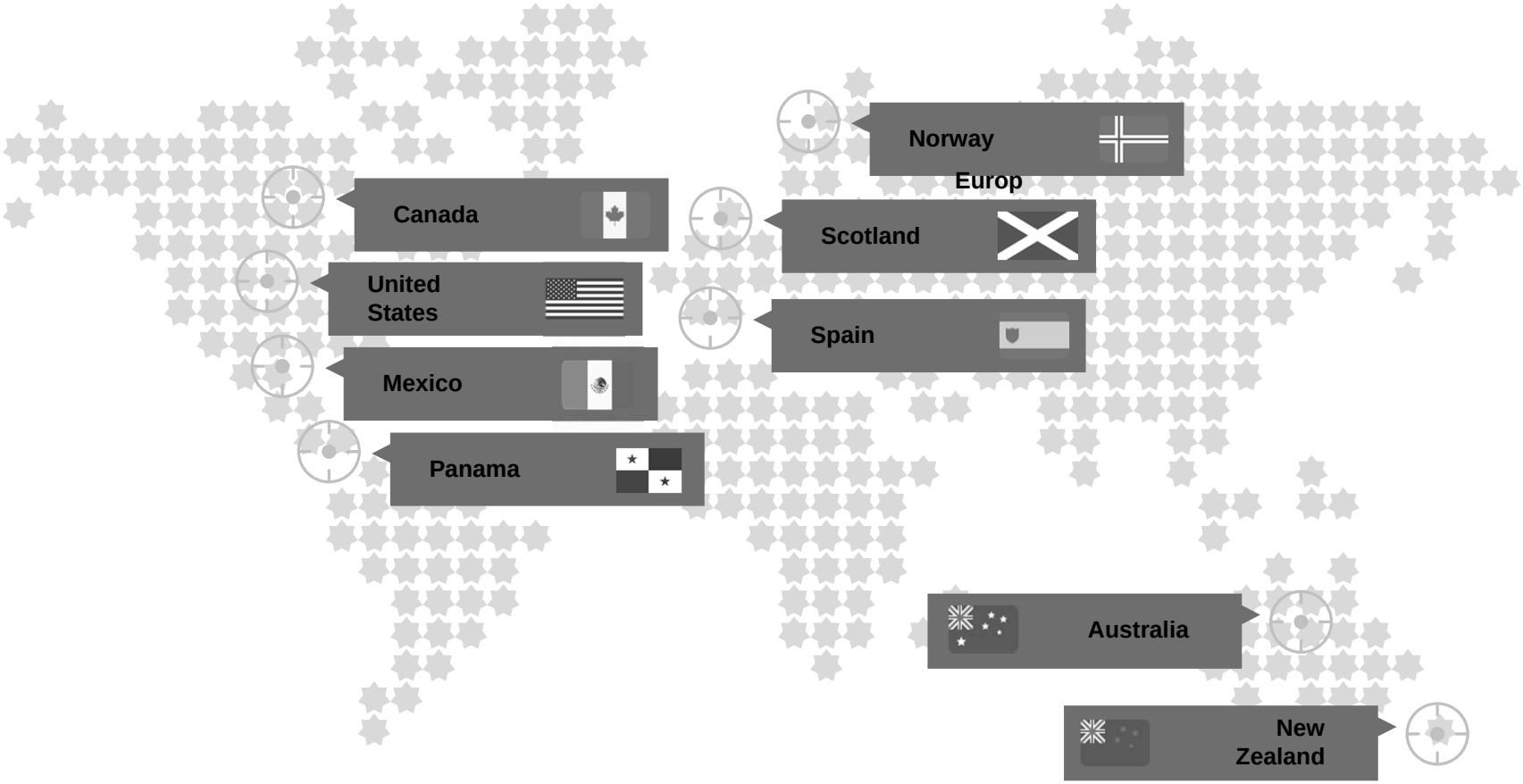
About Us

- 100+ staff in Halifax, NS, Canada
  - Electro-Mechanical Engineering
  - Computer Science
  - Data Analysis
- Team of Marine Biologists
- Modern 12,000 Ft2 Lean manufacturing area
  - 30 production staff
  - 10 Production Engineers & QA
- Realtime Aquaculture, 1,500 ft2
  - Aquaculture instrumentation
  - Sensor technologies and cloud software



Our Customers

Where is our tech deployed?



Current Technology Solution

What technology is currently used?

Handheld Instruments

Not continuous, Not scalable.

Data Loggers

Not real-time.

Continuous Sensors

Real-time capable

Cables Don’t Scale

Expensive and unreliable.

Expensive

$1,178 for a cable

Description	Qty	Unit Price
WATERTIGHT PLUG, (10PP) SS, UNASSEMBLED	1	$369.00
CABLE, CONNECTING (10 PIN PLUG SS TO FREE END), LENGTH - 20 METER, 1000M DEPTH RATING	1	$809.00

QUOTE

Unreliable

Prone to failure

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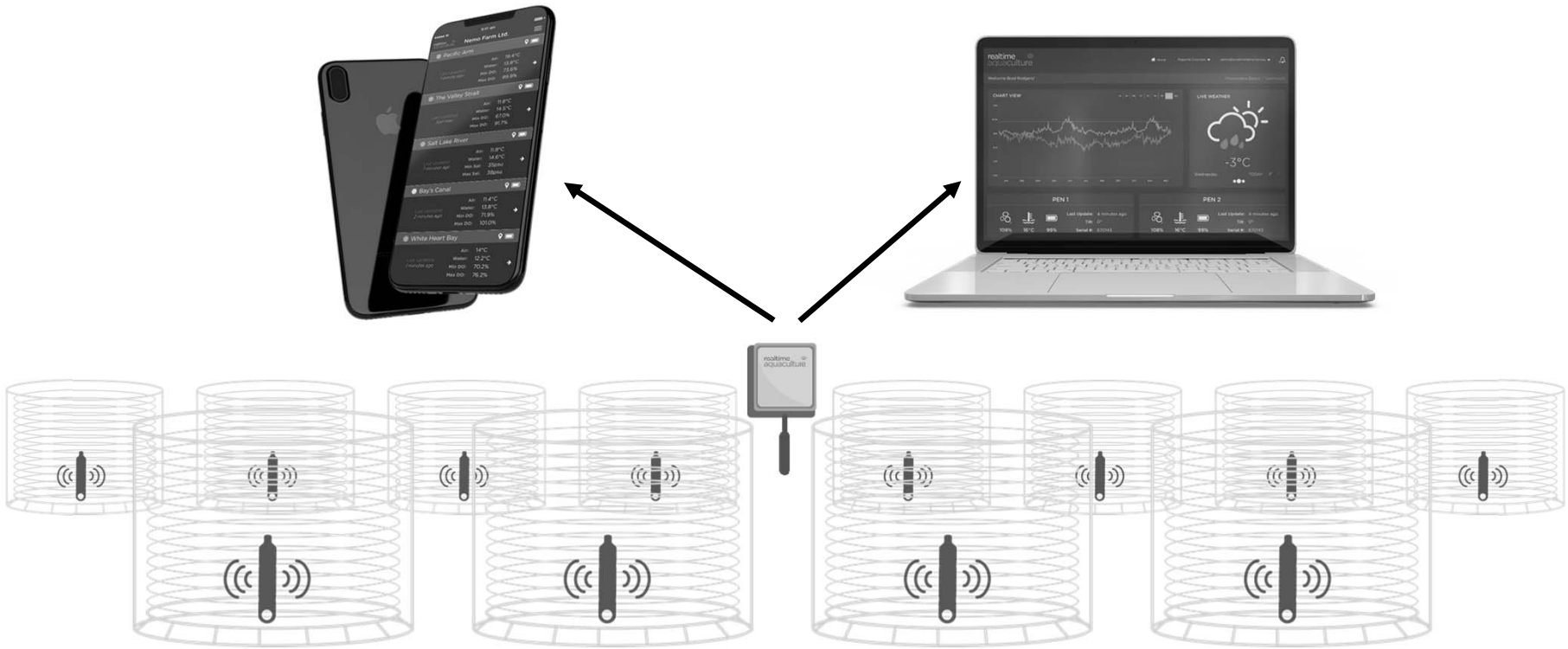
The Realtime Approach

Changing the way the ocean environment is monitored.



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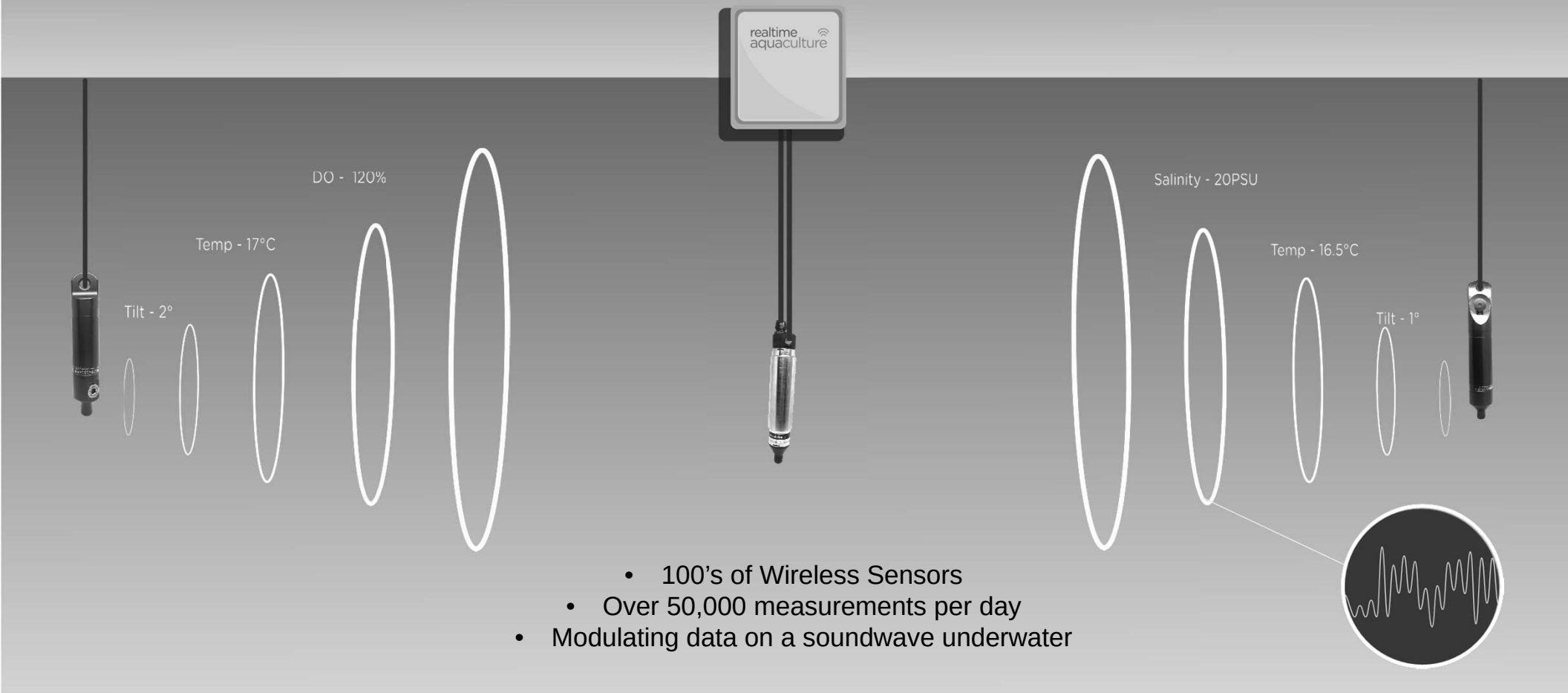
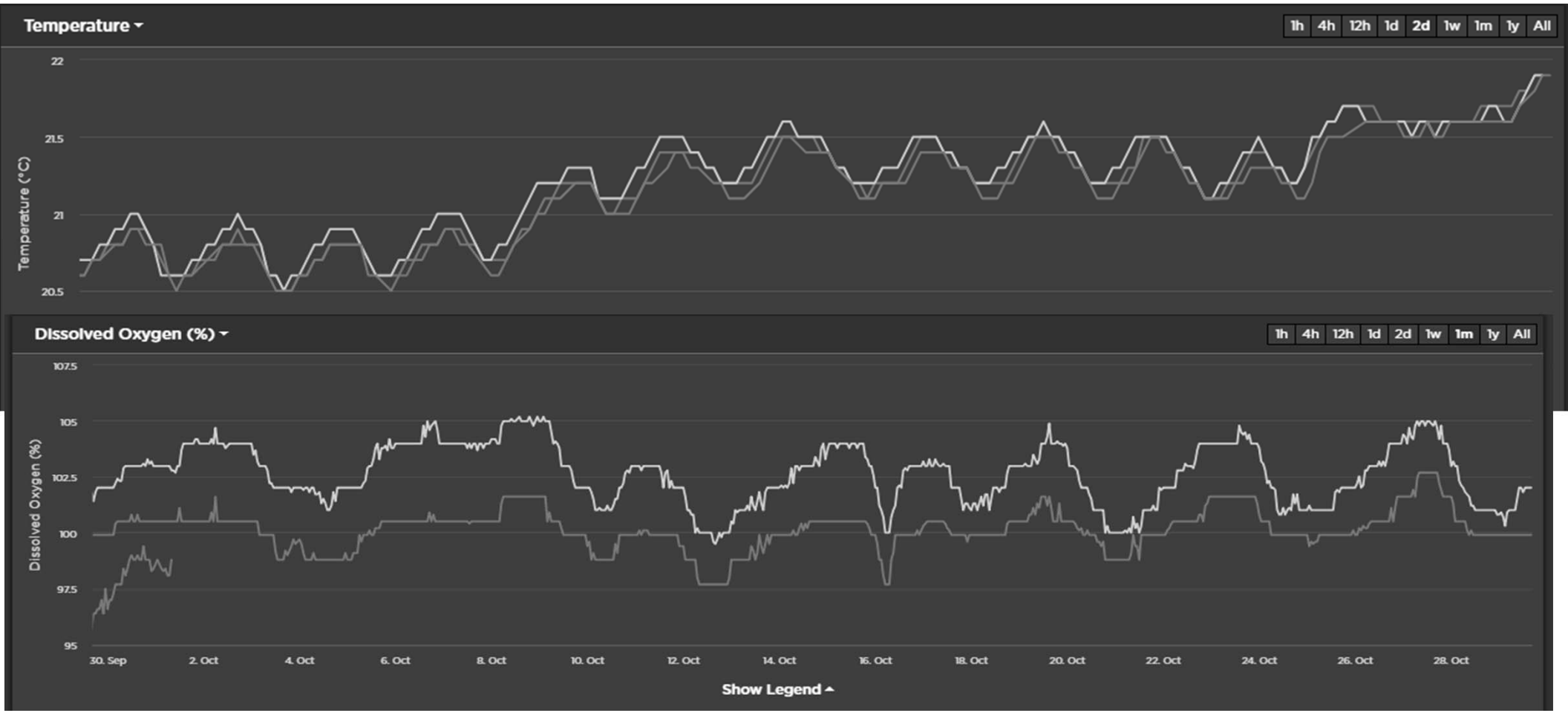
Monitor Live Data

Access Data from Anywhere in the World

IoT Underwater



- 100’s of Wireless Sensors
- Over 50,000 measurements per day
- Modulating data on a soundwave underwater



Why Monitor Continuously?

- Parameters can vary significantly over a short period time
- Trending parameters are easily visualized

Our Products

Wireless Underwater Environmental Monitoring

aquaMeasure

aquaHub

aquaCurrent

aquaHub

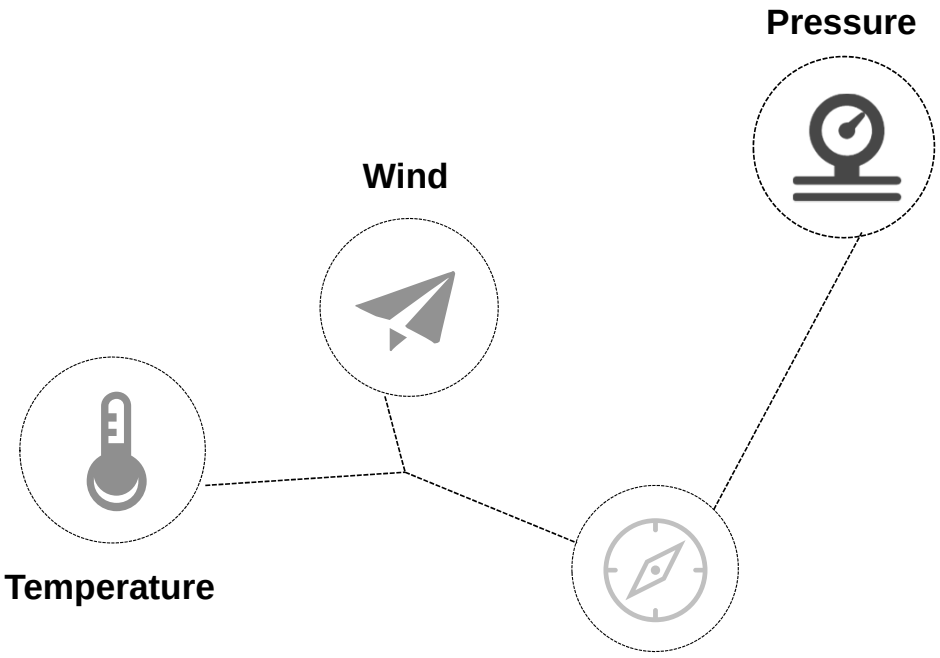
Communications Modem and Digital Receiver

KEY FEATURES

- Easy to Deploy
- Reliable
- Smart Blanking Technology
- Custom Configuration
- Remote Configuration
- Multi Frequency
- Optional Solar Panel
- Optional Weather Station

Weather Station (aquaHub)

Airmar 110WX Ultrasonic Weather Station Instrument



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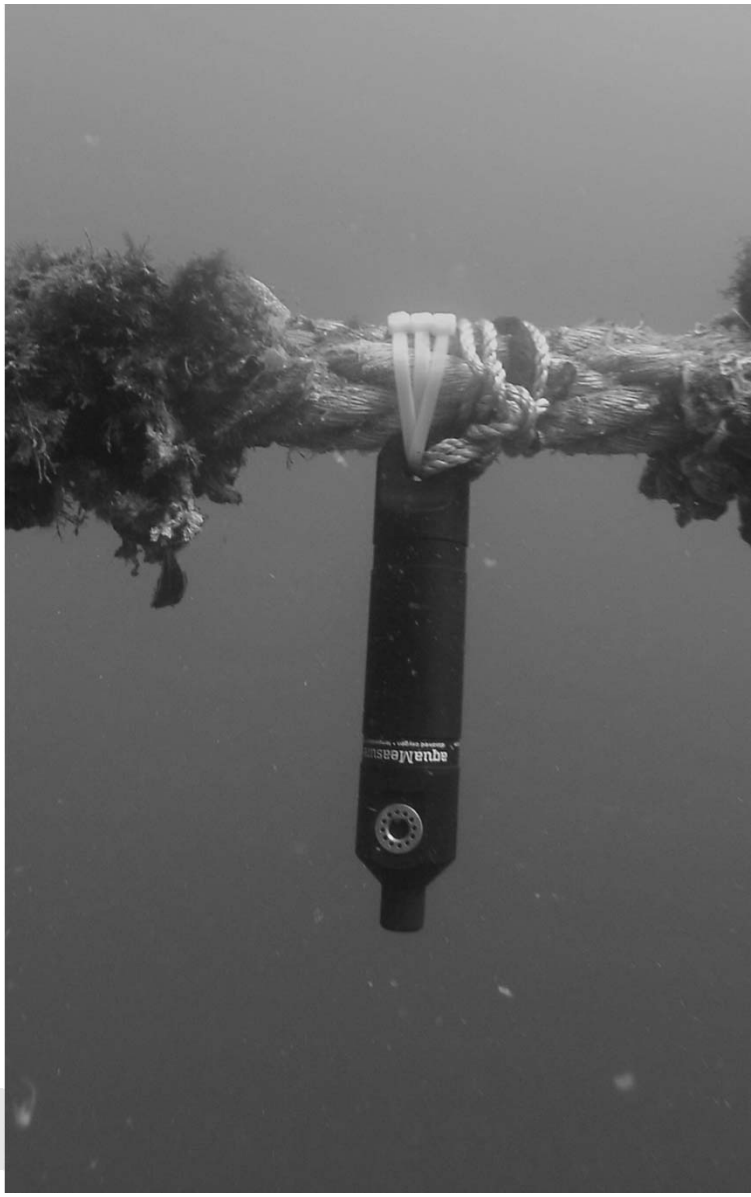
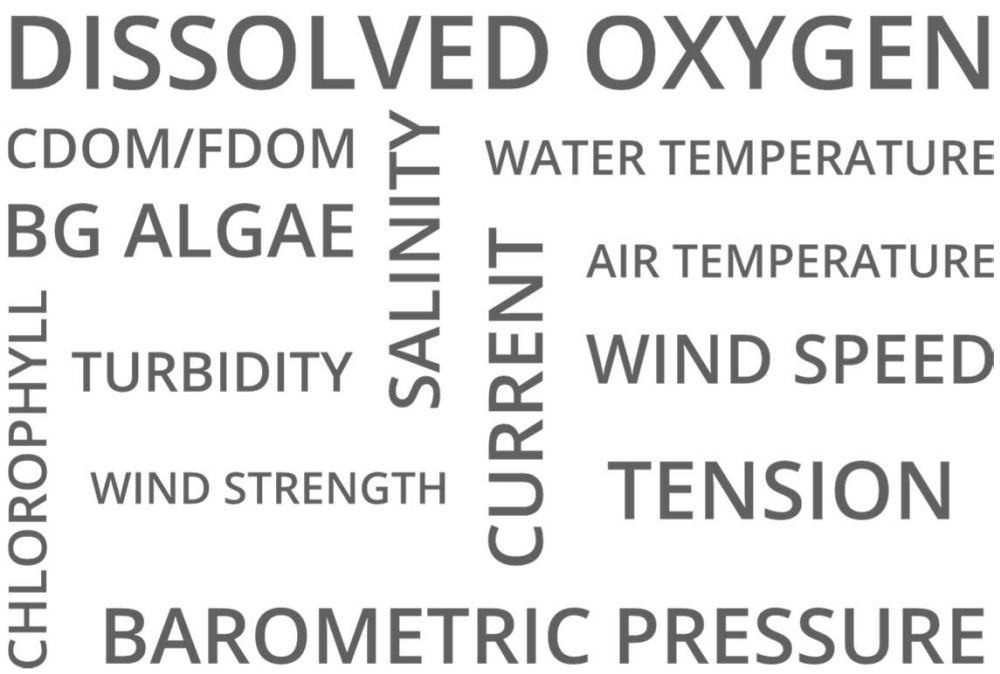
Easy to Deploy

Especially Offshore



aquaMeasure

What parameters “DO” we measure?



Wireless Sensors

aquaMeasure POD
Turbidity
Chlorophyll
BG Algae

aquaMeasure SAL
Salinity
Temperature

aquaMeasure DO
Dissolved Oxygen
Temperature

aquaMeasure

Easy to Deploy

KEY FEATURES

- Underwater Communications
- Easy to Deploy
- Cloud-Sync Technology
- Mobile Configuration
- Bluetooth Connectivity

INTERNAL MEMORY

IOS & ANDROID APPLICATIONS

TILT LOGGING

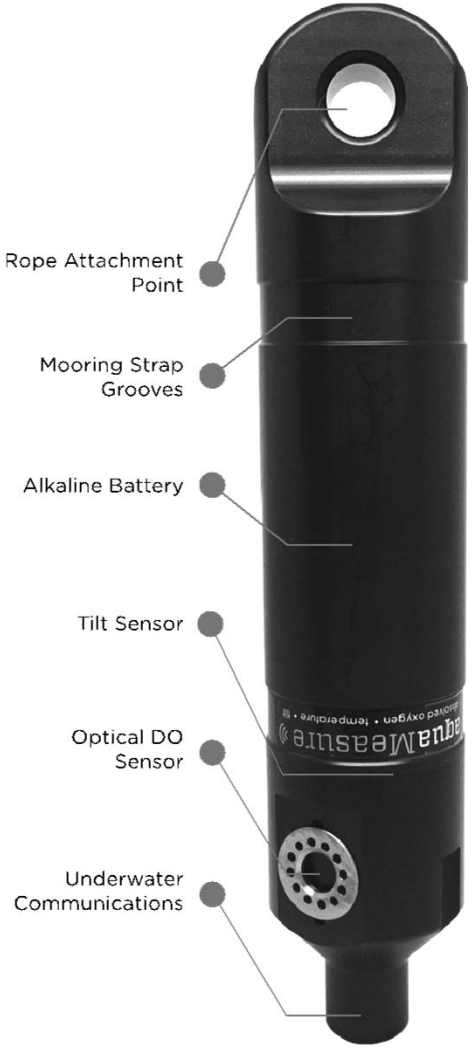
EASY DEPLOYMENT FEATURES

UNDERWATER COMMUNICATIONS

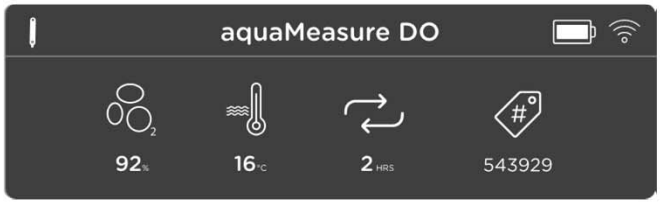
REALTIME HEALTH REPORTING

CLOUD-SYNCED DATA MANAGMENT

COMPATIBLE WITH VEMCO RECEIVERS



Dissolved Oxygen



DISSOLVED OXYGEN

Optical Based Measurement

0-140% Saturation (±2%)

TEMPERATURE

-5°C to 35°C (±0.1°C)

TILT

0 - 180°

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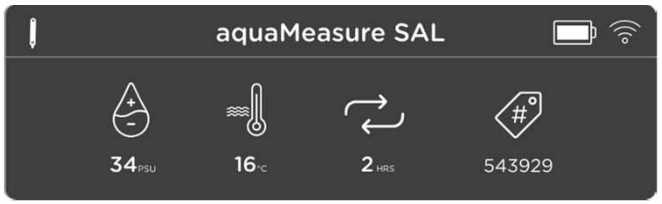
Salinity



SALINITY

Conductivity Based Measurement

0-42PSU (±0.5PSU)

TEMPERATURE

-5°C to 35°C (±0.1°C)

TILT

0 - 180°

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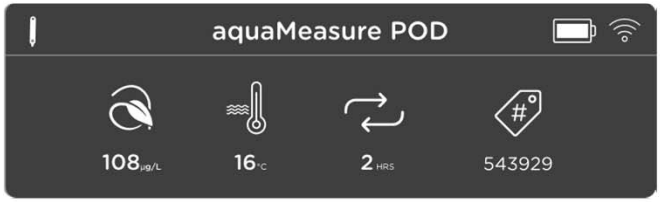
Third Party Sensors



TURNER DESIGNS

Cyclops-7F Family

- Blue-Green Algae
- CDOM / FDOM
- Chlorophyll
- Turbidity

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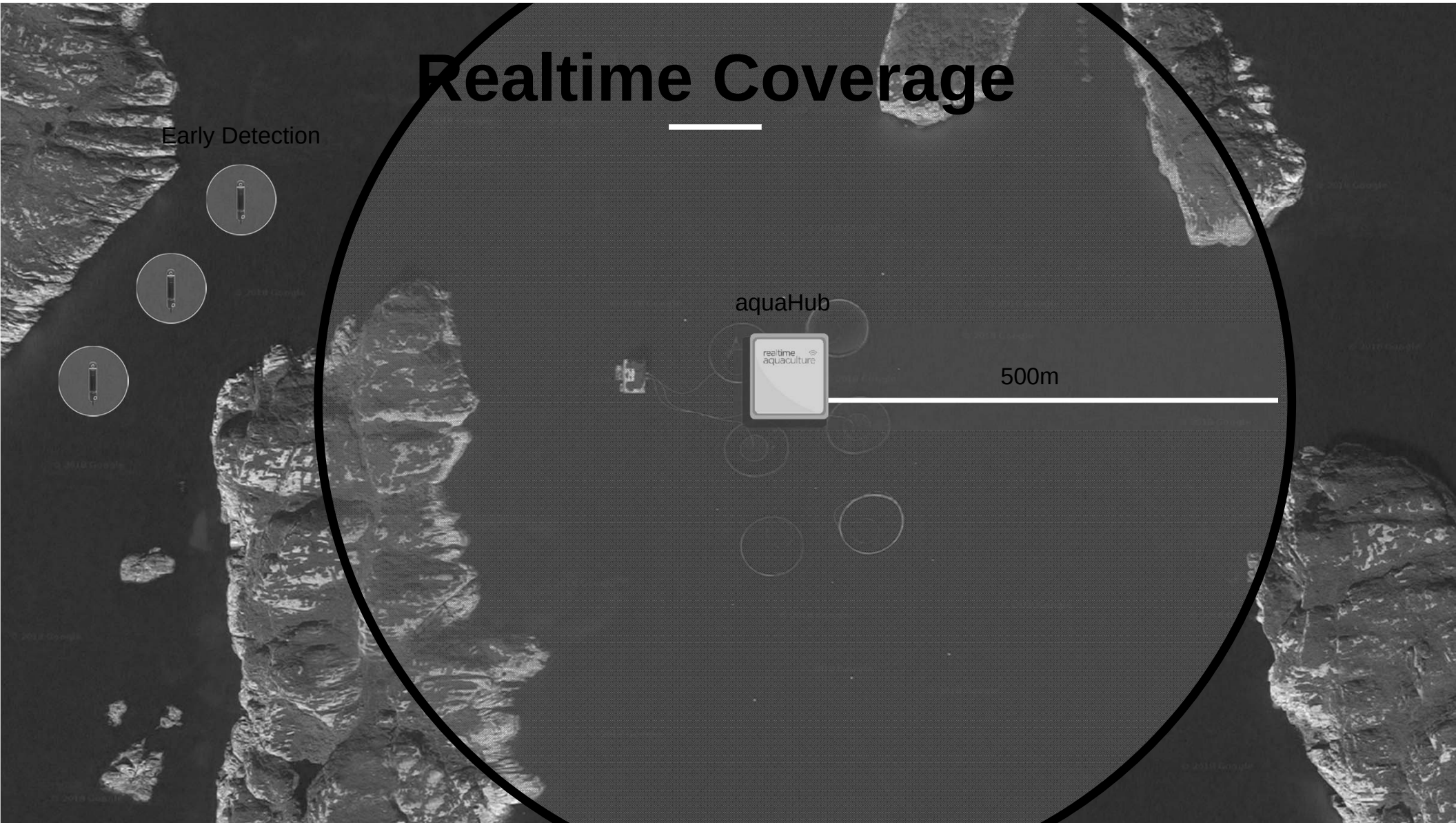
Realtime Coverage



aquaCurrent

Cloud-based Data Management Platform

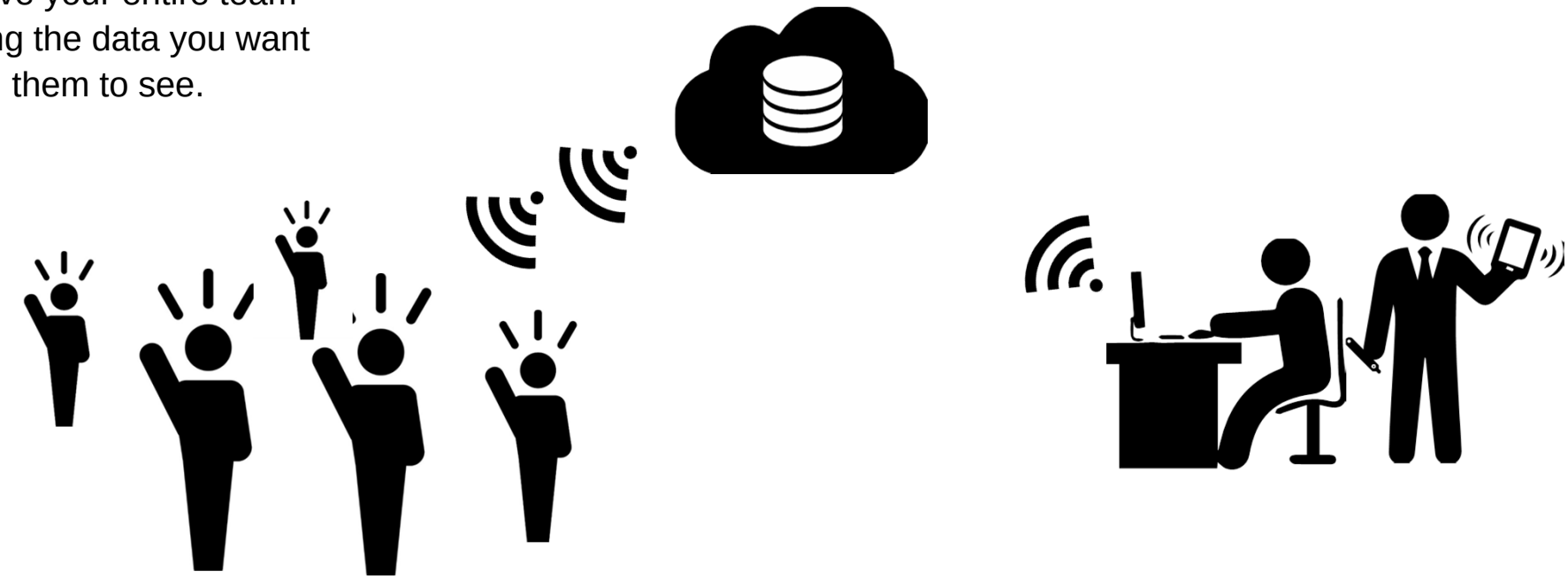
KEY FEATURES

- Cloud Data Management
- Realtime Updates
- Responsive Design
- iOS/Android Application
- Configurable Notifications
- .CSV, JSON FishTalk data formats
- Weekly Reports

aquaCurrent

Easy to Share Information

Simple and straight forward to have your entire team viewing the data you want them to see.



Visualizations

Continuous Insights

Analytics at Your Fingertips

Enjoy a set of continuously evolving analytical tools that give you the ability to easily view data.

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Notifications

System and Sensor monitoring 24/7

How Notification System Works

Users select which notifications parameters they want to receive with breach and recovery thresholds.

IFTTT

Uses IFTTT webhooks. Users can set a general trigger link for all notifications and/or individual trigger links for breach and recovery of each notification type.

SMS

Users can select a list a phone numbers for delivery.

Email

Users can select a list of email addresses for delivery.

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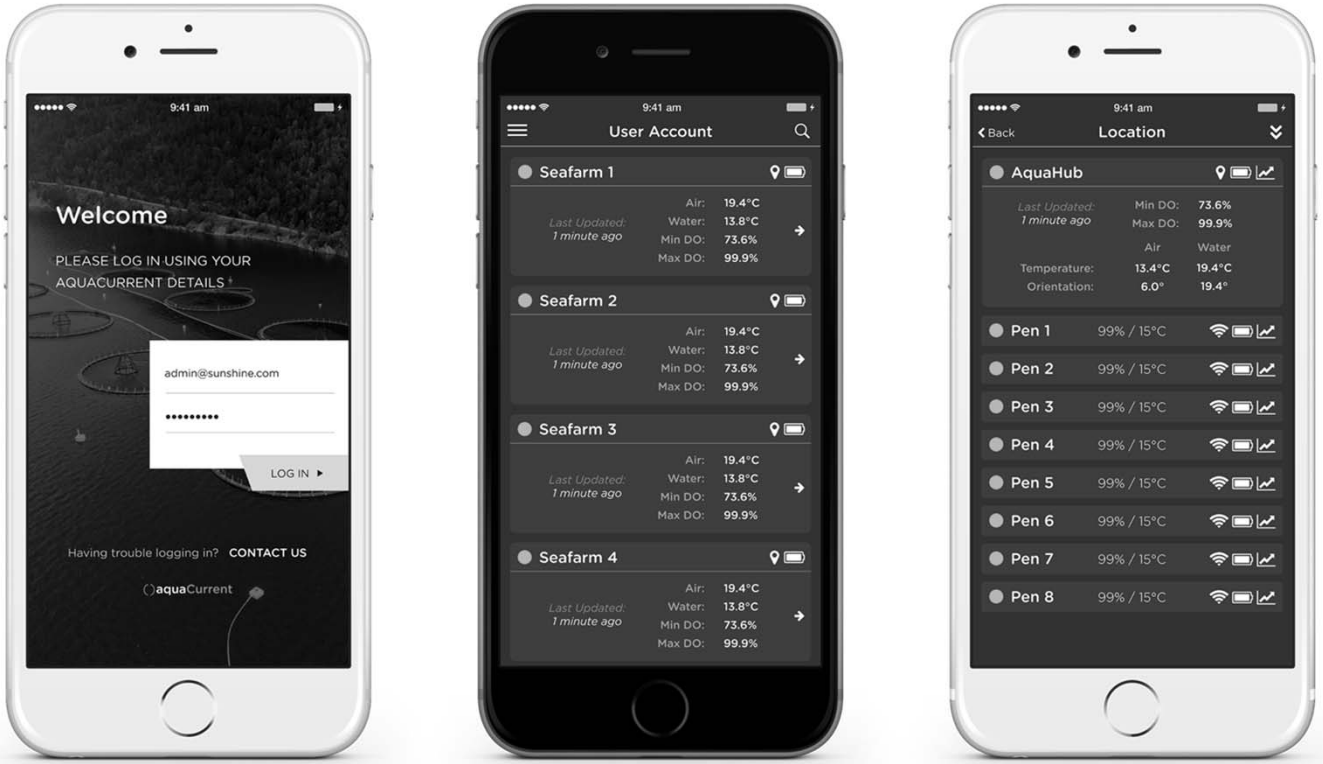
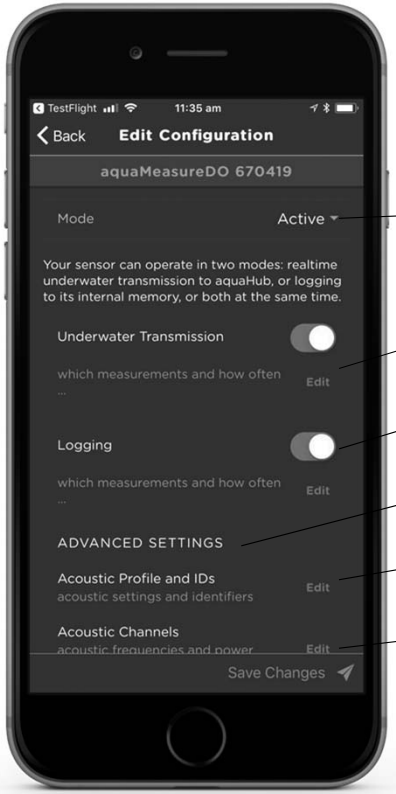
aquaMeasure App

Data on the move



aquaMeasure App

Remotely Edit Configuration Settings



Change sensor mode (Realtime, Logger, Both)

Edit Transmission Settings (Turn on or Off)

Edit Logging Settings (Turn on or off)

Advanced Settings (Only seen by RTA)

Acoustic Profiles and ID settings (Only seen by RTA)

Acoustic Channels and power settings (Only seen by RTA)

System Architecture

Overview

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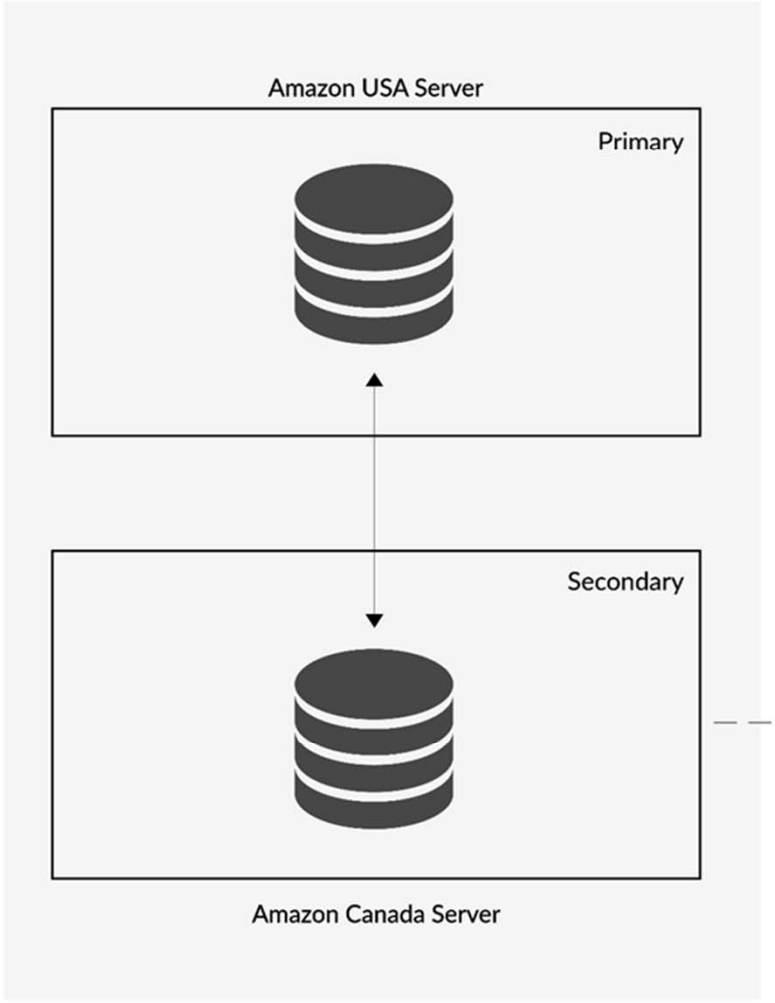
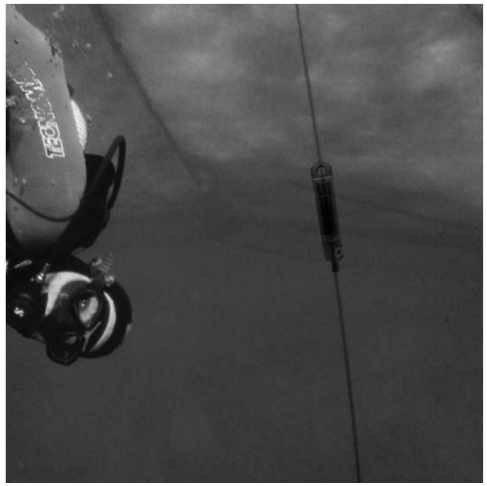
Database Redundancy



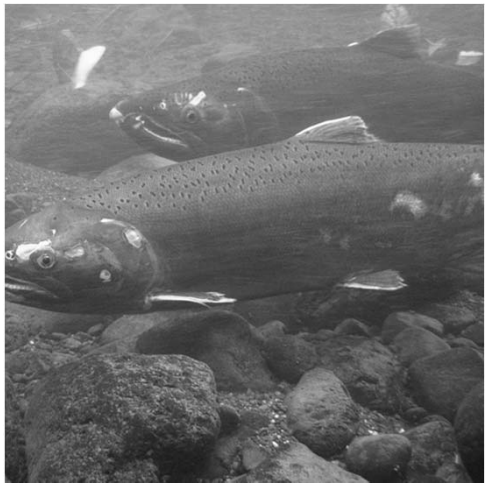
Information is important. That's why all data is password protected and stored in the cloud.

Applications

Different Sensors for Different Studies



Aquaculture



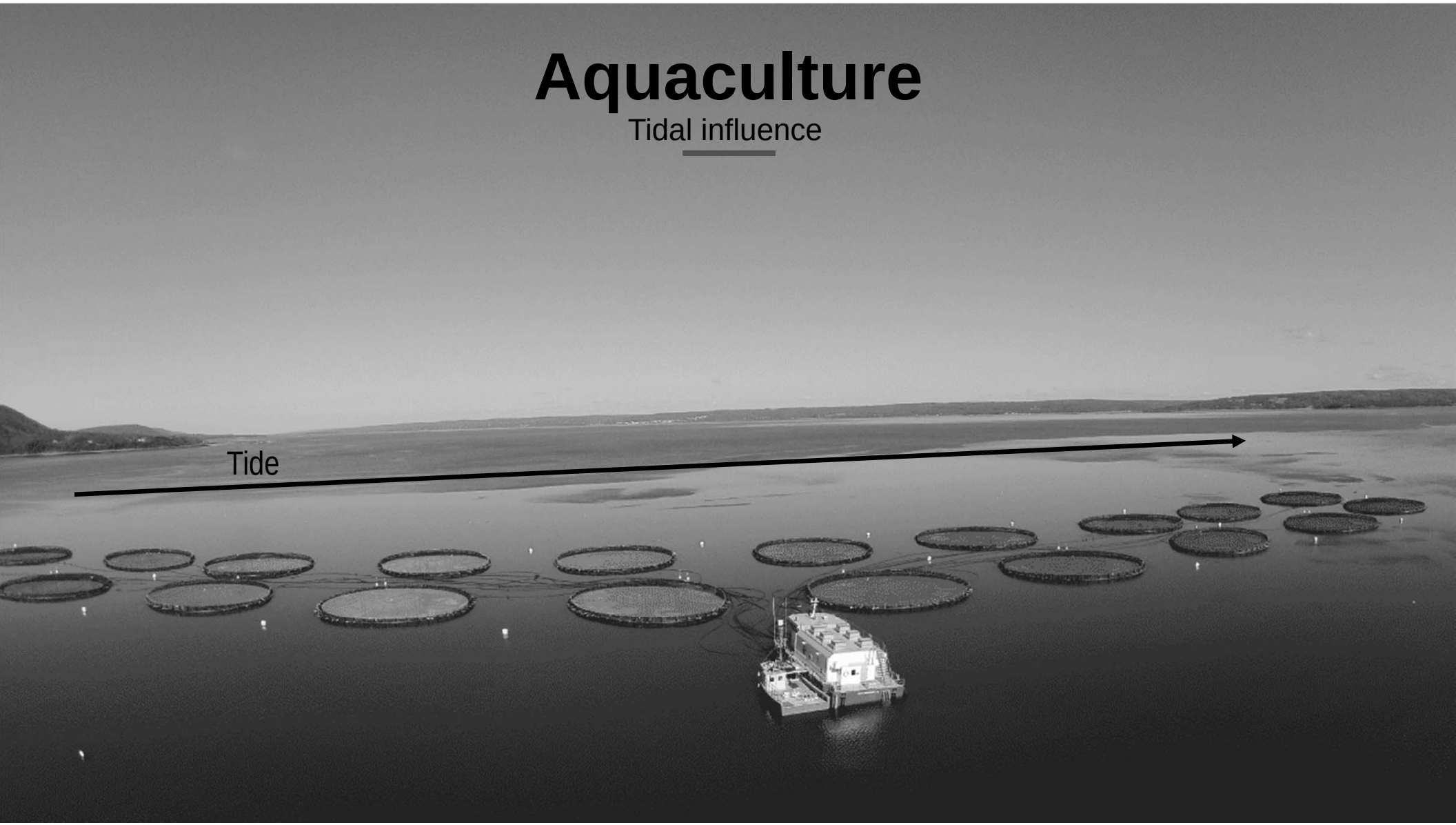
Fish Habitat Studies

Vertical Profiles

Environmental Monitoring

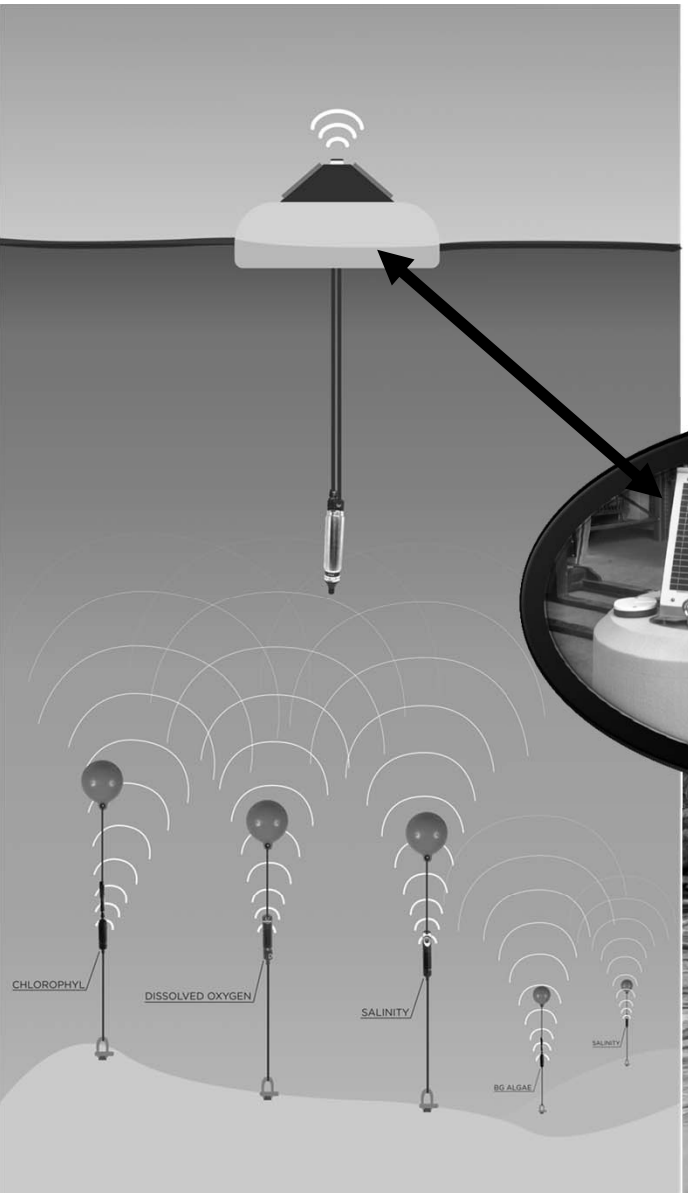
Aquaculture

Tidal influence



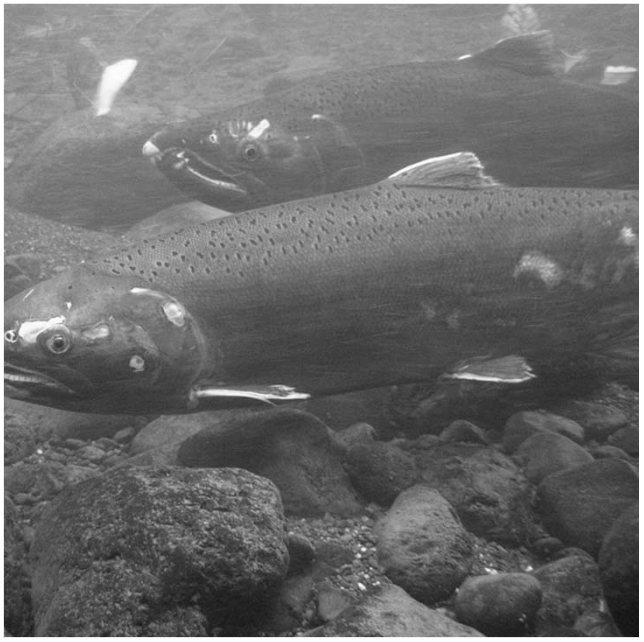
Environmental Monitoring

Be the Master of your data



Turnover Event

Fish Habitat Studies



- Water Quality Measurements
- Pollution Impacts
- Impacts of Eutrophication
- Anthropogenic Impacts
- Climate Change Impacts


While we've been talking!
4,191
measurements
20
minutes


Questions ??
Thank you