

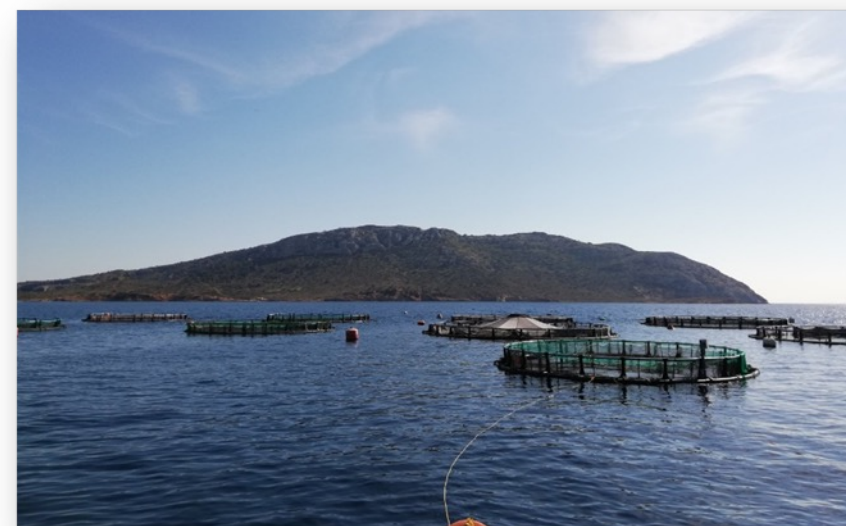
# **MONITORING TECH: Monitoring close to shore vs offshore and utilization of AQUAWINGS data platform**

**THEME: Technology Roadshow**

# Greek pilot

## *Pilot Description*

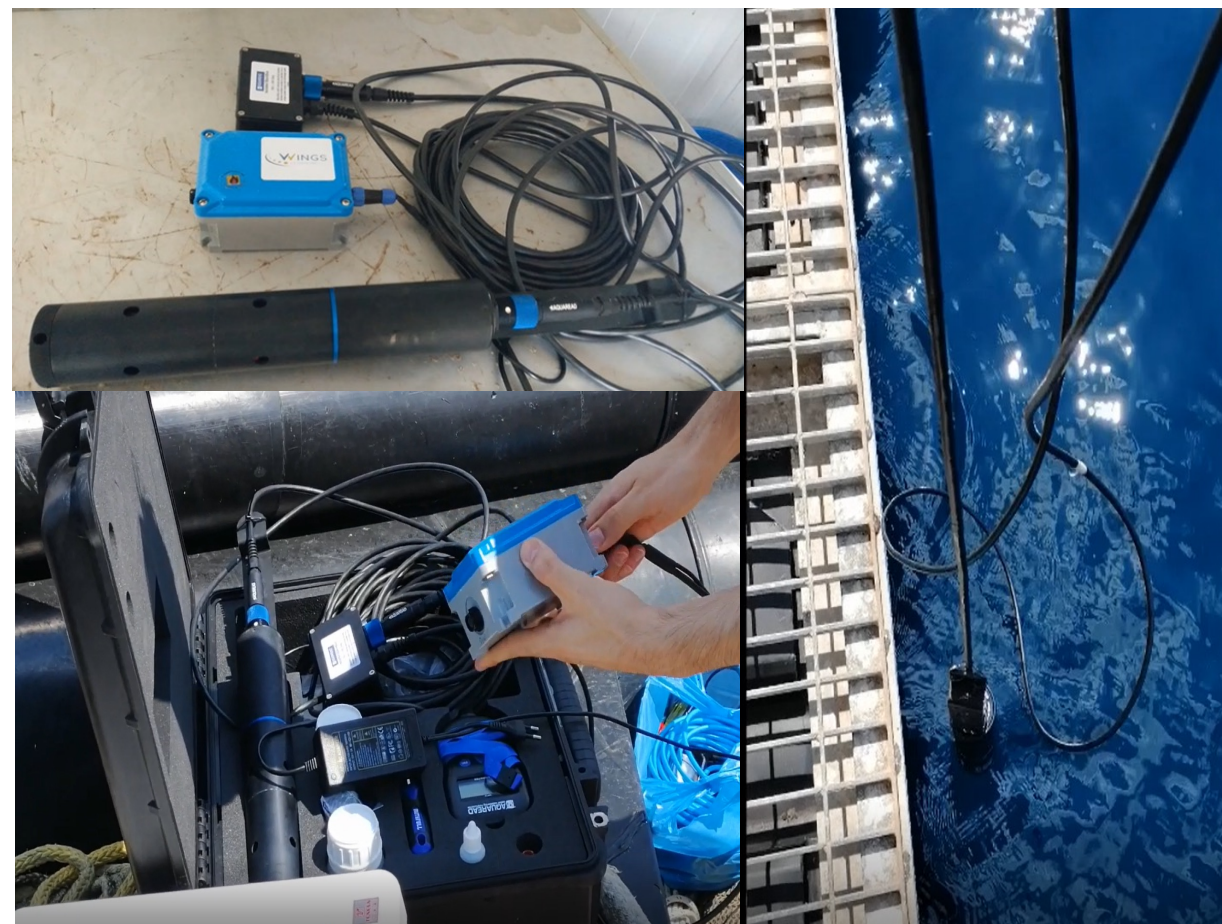
- The Greek Pilot (PATROKLOS Pilot site) is situated in the 59th km of Athens-Sounio Ave., Palaia Fokaia, Attiki, Greece, in the wider area of Cape Sounio.
- **KASTELORIZO AQUACULTURE SA operates a fish-farming unit** on floating facilities. KASTELORIZO provides the aquaculture unit and Planet Blue utilizes this marine space for its touristic diving activities.
- **Co-existence scenarios** are facilitated with the use of WINGS' monitoring and management platform, **AQUAWINGS**, that is deployed to ensure:
  - best multi-use of aquaculture and tourist activities
  - minimization of environmental impact



# Greek pilot

## Sensors

- 2 different types of Sensors:
  - ✓ Temperature & Oxygen
  - ✓ Multisensor (temperature, oxygen, ammonia, turbidity, nitrates, redox, electrical conductivity, salinity, dissolved solids)
- Data transmission unit “Wings Smart Gateway”





# Greek pilot

## *Underwater cameras*

- Camera attached to plastic tube inside the cage or the camera stabilized by means of ropes
- Data Transmission Unit mounted on cage
- System autonomy with the use of solar panel



# Greek pilot

## *Underwater cameras*

**Average weight estimation:** Real-time average weight-biomass estimation achieves:

- Feeding optimization
- Fish health
- Keeping track of production indicators (FCR, SFR, SGR)

**Fish Behavior:** the camera recognizes through image processing the behavioral characteristics of fish based on speed, direction and swimming patterns.

Behavioral analysis significantly enhances:

- Feeding optimization



# Greek pilot

## WINGS Smart Gateway



- The WINGS Smart Gateway is a smart data transmission unit that:
- Retrieves and sends data from sensors, cameras over any available network (NB-IoT, 3G/4G/5G, WiFi, GPRS, LoRa)
- Provides remote configuration, management and adjustment of measurement and transmission profiles



# Greek pilot

## Technological achievements

Advanced monitoring of environmental parameters responsible for the farm's productivity and sustainability. Monitored data are processed for the development of Predictive Analytics for:

- Disease prevention
- Water quality analytics

The dashboard displays the following metrics:

- Total Feed/Month:** 0 kg
- Weather:** Triantafylla | Partly Cloudy | 21 °C | 65% humidity | 0.32mm precipitation
- Total Fish:** 114640
- Total Mortalities:** 3873
- Chlorophyll:** 4.95 µg/L
- Dissolved Oxygen:** -100.00 mg/L
- Temperature:** 15.20 Cel
- Stocks:** STOCK: Oct2020\_1 (AVERAGE WEIGHT: 653.000), STOCK: A 1/6/2020 KPHTH (AVERAGE WEIGHT: 653.000)
- MESSAGES OVERVIEW:** KASTELLORIZO MOVED KASTELLORIZO\_CAMERA\_1 FROM ET14 TO ET18
- SITE MAP:** Satellite view of the farm location.

Sensors

Sensor Data

Parameters Name	Sensor Name	Last Measurement	Units	Status
Ammonia	sensor 1	0	mg/L	●
Chlorophyll	sensor 1	0	mg/L	●
Dissolved Oxygen	sensor 1	0	mg/L	●
DO Saturation	sensor 1	0	%	●
EC	sensor 1	0	mS/cm	●
Nitrate	sensor 1	0	mg/L	●
ORP	sensor 1	0	mV	●
PH	sensor 1	0	PH	●
Salinity	sensor 1	0	PSU	●

Sensor Information

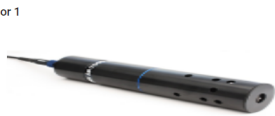
sensor 1

- Location: Cage 1
- Status: Online
- Installation Date: 2020-08-01 12:00:00
- Last Calibration: 2021-03-01 12:00:00
- Next Calibration: 2021-05-01 12:00:00
- Depth: 4 m

Sensor Details

Parameters Name: Chlorophyll

The graph shows Chlorophyll levels (mg/L) on the y-axis (0 to 150) and Date on the x-axis (7 Feb to 16 May). The data points are clustered near zero, with a notable spike to approximately 140 mg/L around April 18th.

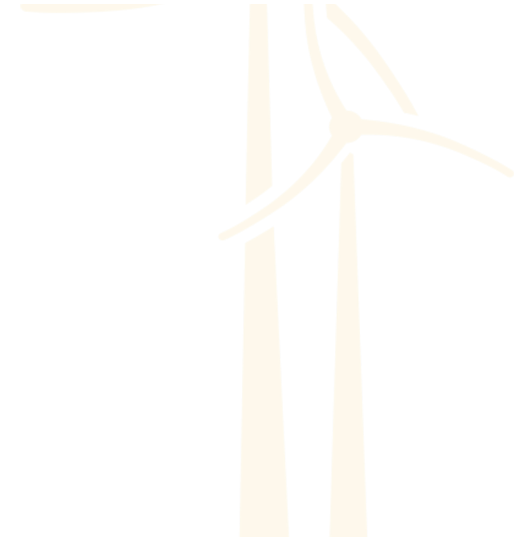
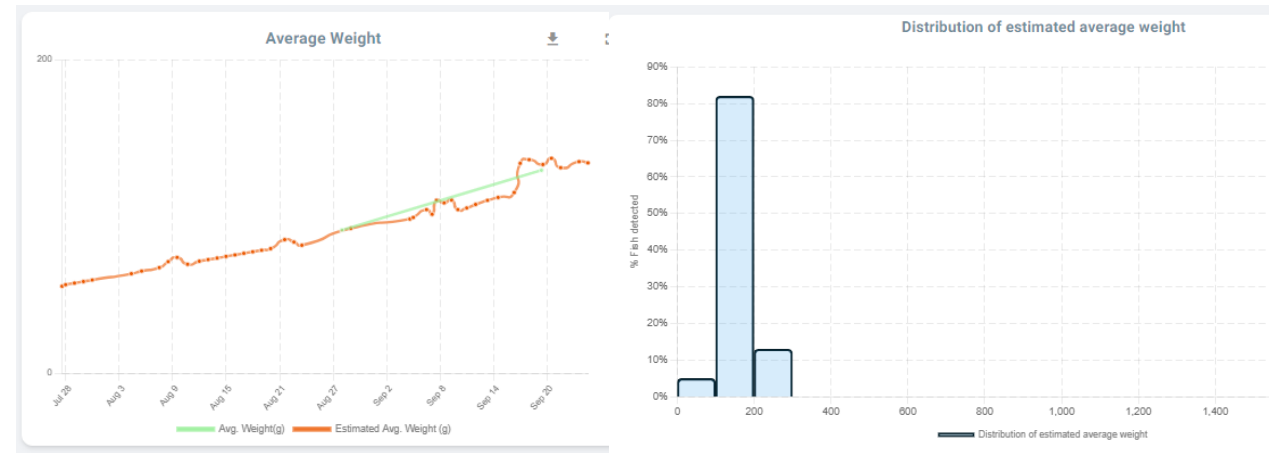


# Greek pilot

## *Fish performance monitoring*

A page for taking a closer look inside a specific unit (cage). This overview gives a more data-related image to the operator:

- A graph of **Real time average weight estimation** through **WINGS AI**.
- A graph of **Distribution of estimated average weight**
- A graph showing **Feeding Suggestion** through **WINGS AI**.
- A graph showing **main KPI's** (FCR, SFR)





# Greek pilot

## Technological achievements

Decision Support System, producing early warnings/alerts, and suggestions for:

- Optimal Feeding (temperature, average weight)
- Optimal Harvesting (weather)
- Disease Prevention and Mitigation
- Planning

**AQUAWINGS Sustainable Aquaculture**

KASTELLORIZO

- Overview
- Cages
- Environmental Monitoring
- Cameras
- Storage
- Planning
- Management
- Upload Data
- Historical Data
- Logout

**MESSAGES OVERVIEW**

- ⚠️ **FEED AS PLANNED**  
7/28/22, 1:53 PM
- ⚠️ **REDUCE STOCK DENSITY**  
7/28/22, 1:54 PM
- ⚠️ **REDUCE STOCK DENSITY**  
7/28/22, 1:54 PM
- ⚠️ **OXYGEN CRITICALLY LOW, DON'T FEED!**  
7/28/22, 1:47 PM

**CAGE MAP**

Google

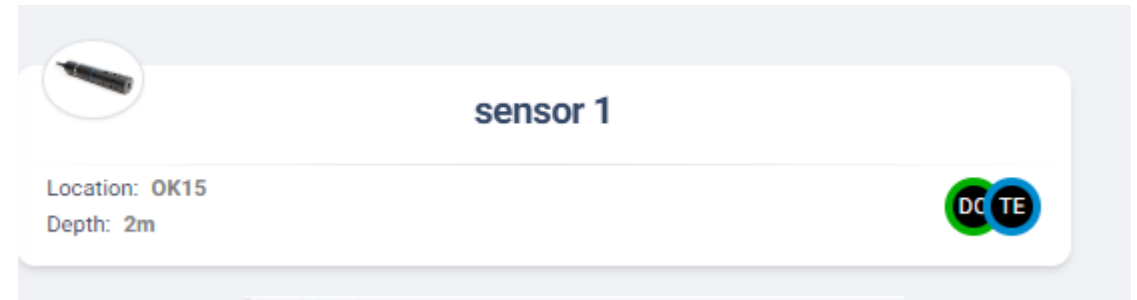
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

# Greek pilot

## *Environmental monitoring*

A page for taking a closer look inside a specific sensor. Additional information about the sensor can be found here:

- **Real time Monitoring** of water quality parameters
- Sensor **Location**
- Sensor **Depth**
- Environmental parameters **traceability**
- **Export Data**



**sensor 1**

Location: OK15  
Depth: 2m

DC TE



# Greek pilot

## *Environmental achievements*

- Less stress because of the use of camera. Calculation of average weight instead of manual sampling that can cause physical damage.
- Early detection of disease → quick prevention of outbreak
- Optimal feeding time depending on the fish behavior







WWW.H2020UNITED.EU   



**Evangelia Lamprakopoulou**

elabrakopoulou@wings-ict-solutions.eu