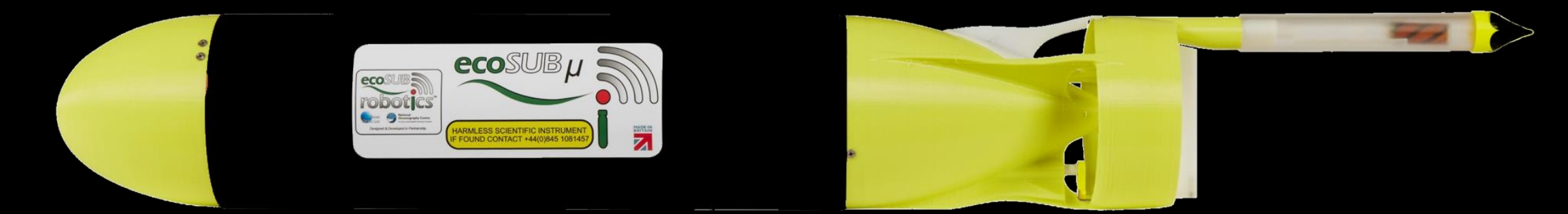


Micro AUV Oil Detection



Employer Info

The CERC Ocean lab intends to create an automated underwater vehicle (AUV), which allows the user to have:

- A multipurpose scalable network of AUVs
- AUVs will be sensor agnostic

This is intended to help improve the ability to conduct research underwater

Project Breakdown

We focused the code developed into an oil detection algorithm and navigation interrupt. To accomplish this, our team had to:

- Create the trigger for the oil searching program initialization.
- Develop intercommunication between Python, and C.
- Develop the trigger parameters of Conductivity and Turbidity for oil searching. This works as a demo for the fluorescence sensor which will be used in the final version for oil search.
- Create 2 new coordinates for the AUV for oil searching

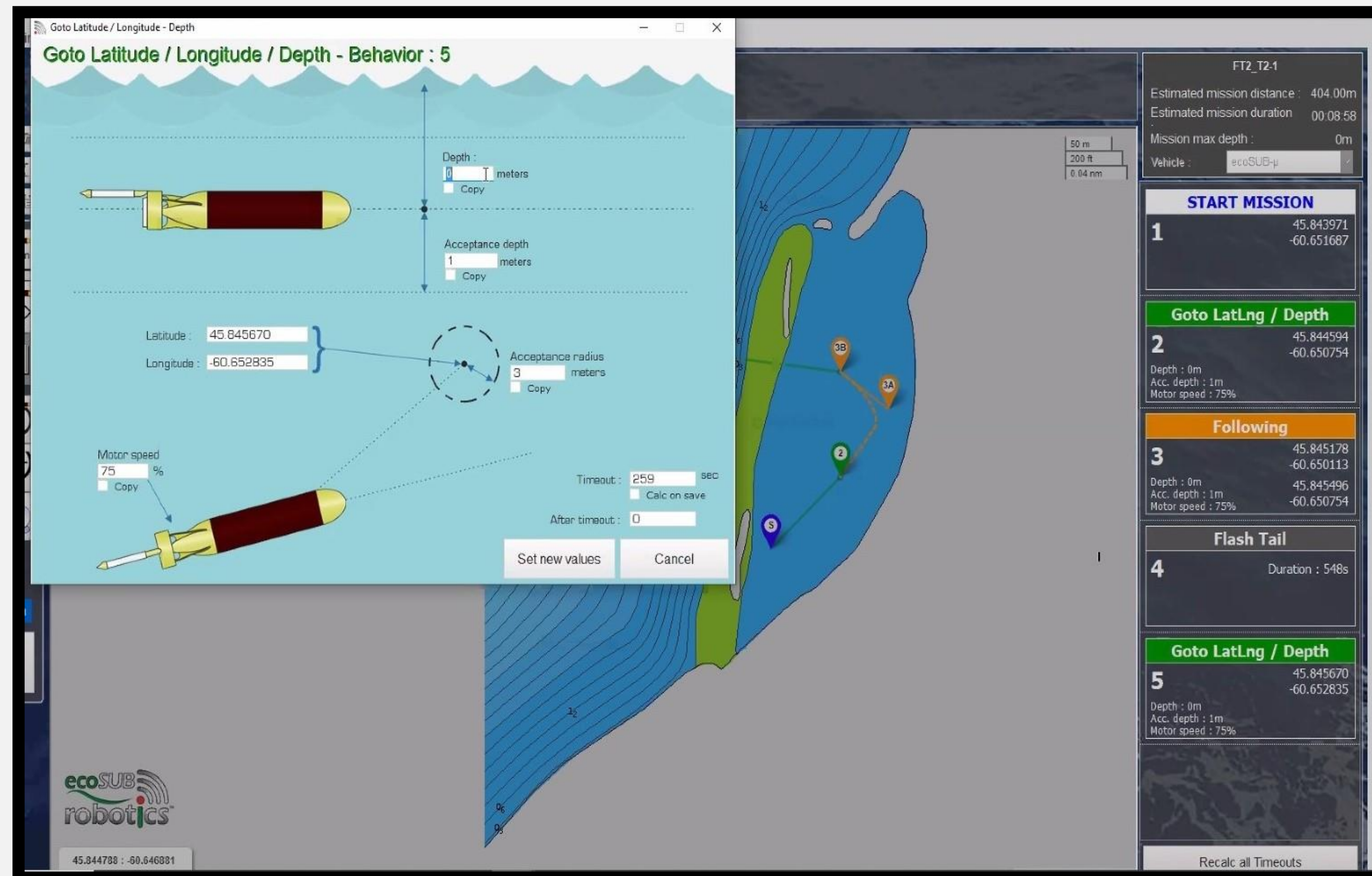


Figure 1: ecoSUB Navigation Mapping

Project Resource Allocation

This project was **code based**, as a result the process was dependent on proper **communication** of the project's weekly and monthly goals, as well as **time management**. Rather than monetary budget constraints.

Project Task

We were tasked with developing the code for oil detection near ocean surface.

With our team's code, the AUV is supposed to (Referring to fig.2 below):

Step 1:

- Interrupt its current navigation based on sensor values
- 2 New points are generated
- Search the points generated for oil patches

Step 2:

- AUV Checks the first point generated, no oil detected
- AUV backtracks and heads towards the second point generated

Step 3:

- AUV checks the second point generated and finds oil.

Step 4:

AUV returns to its initial navigation instructions

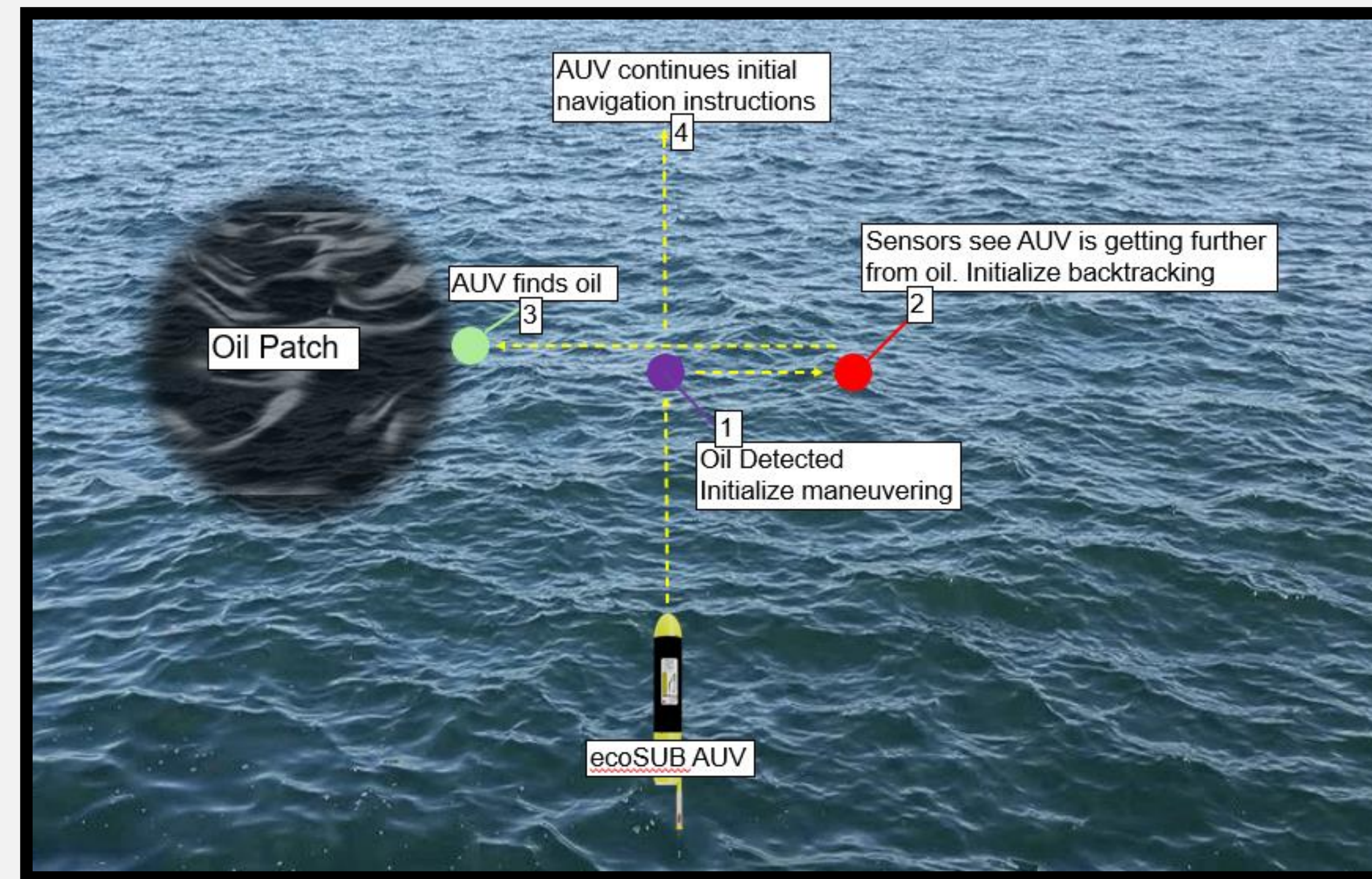


Figure 2: ecoSUB Navigation Interrupt

Performance Testing

The code developed was not tested in a real-world environment.

The testing was done through theoretical analysis of code performance:

- Secondary code was written to test different parts of the main code.
- Samples of researched real-world sensor readings were tested.

Initial starting coordinate:
lat: 45.844086
long: 60.651436

First new coordinate:
lat: 44.066850
long : 45.649000

Second new coordinate:
lat: 44.480444
long : 45.605768

Figure 3: Testing New coordinates

Conclusion and Recommendations

A basic code architecture to achieve the goal necessary has been implemented.

Real-world testing could help improve:

- Maneuvering upon oil detection
- Oil detection interrupt values

Overall, further testing in a real-world scenario is necessary for guaranteeing code performance.

References

- EcoSUB Robotics
<https://www.ecosub.uk/>