

# Environmental Monitoring using a Drifter Sensor Network

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Figure 1. Deployment of three drifters over the coral reef off the Bellairs Research Center, Barbados.

**Abstract**—This paper presents the design development and deployment of a sensor network of drifter nodes.

**Keywords**-Sensor network; Image sticking; Cooperative localization; Underwater Vision

## I. INTRODUCTION

This paper presents

## II. BACKGROUND

The problem of tracking ocean currents was very important for navigation, sailors off the Marshal Islands utilized twig maps to record the direction of different currents and swells [1]. As early as 1953, floating devices were used to record the Lagrangian motion of the currents [2]. Around the same time, Laughton [3] developed an deep sea underwater camera to obtain additional information.

[4] [5] [6] [7] [8] [9]

Tinka et al. [10] developed an actuated floating sensor network for estimating water flow.

## III. HARDWARE DESIGN

## IV. SOFTWARE DESIGN

## V. CURRENT ESTIMATION

Using the GPS trail over time we can estimate the combined wave and current action using the Lagrangian model.

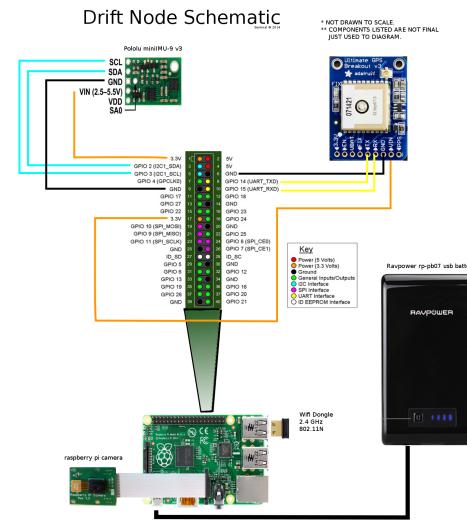


Figure 2. Schematic of hardware components and their connectivity used in the deployed drifters.

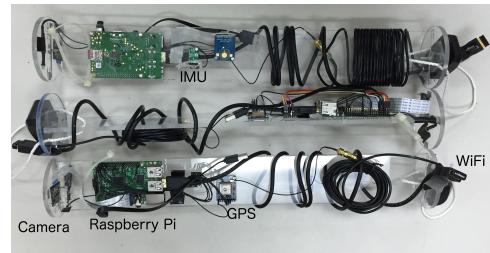


Figure 3. The assembled electronics for the three drift nodes.

## VI. UNDERWATER VISION

The driftNode uses a camera mounted on the bottom of the enclosure to capturing images at 2Hz. These images are then stitched together in a single larger image so that the entire path the driftNode took can be viewed as a single large image. If other nodes took a similar path the images captured can be used in conjunction to give a larger picture of the ocean floor. In this manner multiple driftNodes can be used to map shallow coral reefs.

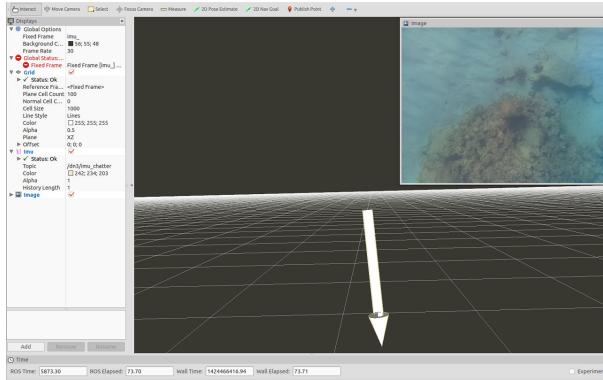


Figure 4. Schematic of hardware components and their connectivity used in the deployed drifters.

#### A. Transect Mapping

#### B. Wave Actuated Vision

Using ocean waves to actuate the driftNode allows the camera a wider field of vision as the camera's field of view is shifting. The cameras field of view can be modeled as wondering about a hemisphere. When combined with the linear motion imparted by ocean currents or wind this gives the camera field of view hemispherical view of the ocean floor.

## VII. COOPERATIVE LOCALIZATION USING WiFi SIGNAL

## VIII. CONCLUSION

The conclusion goes here. this is more of the conclusion

## ACKNOWLEDGMENT

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