Current advancements in marine research are limited by a lack of standardization in connection protocols. In response, Remora aims to expand on the Bristlemouth platform, an open standard plug-and-play system for marine hardware, to become a scalable and affordable solution for collecting marine data. Remora can capture and wirelessly transmit live image data while using motion detection to verify objects of interest, allowing users to focus on making breakthroughs in research.

Overview / Design Specs

- **Raspberry Pi 4B microcontroller**: Operates camera, processes data, and runs motion detection.
- **Bluerobotics Low-Light HD USB Camera**: Connects to Raspberry Pi, delivers 800x600p images to the system.
- **PiSugar and battery**: Powers the Raspberry Pi and automates sleep and wake cycles to save power.
- **Development Board and Spotter**: The Spotter is equipped with solar panels, enables cellular access, and is the basis of the system.

**Functional Flow Diagram**

- Camera subsystem sleeps
- Every hour, camera subsystem wakes and motion detection runs
- Motion detected?
- Yes
- Transmit to Sofar API via cellular
- Transmit to Dev Board via UART
- Capture and encode photo
- Locally download and decode images
- No

**Key Components**

1. Sofar Spotter
2. Bristlemouth Development Board
3. Raspberry Pi 4B
4. Low-Light HD USB Webcam
5. PiSugar 2 Plus and 10000 mAh Battery

**Image Flow Process**

The system is constrained by data transmission sizes and types so to address this issue, the system utilizes base-64 encoding and feeds buffers through the system.

1. Capture JPEG image
2. Add tags for easy parsing
3. Read Raw Binary
4. Transmit via cellular
5. Encode using Base64
6. Grab from API with Python ‘requests’
7. Split into 300 byte buffers
8. Parse, decode, and save as JPEG

**Key Results**

- **Deployment Environment**
- **Captured Image**

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