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### Background

Ostracods are tiny crustaceans that create luminous courtship displays. WALL-E is a submersible low-light camera that can be deployed to analyze these patterns using computer vision techniques.

### Overview

WALL-E is a two-part project: the hardware setup to effectively capture footage, and the computer vision pipeline (shown below) to extract 3D points from ostracod footage.

### Key Components

- **Teensy 3.6 Development Board**: Microcontroller used to communicate with external modules
- **PAM-7Q-0 U-Blox GPS Module**: GPS to initialize timestamp on videos and gather location data on deployments.
- **Watec WAT-910HX/RC 570TVL Camera**: Low-light cameras that capture ostracod footage

### Frame Synchronization Results

Fixing the offset between frames on left and right feed

### Stereo Rectification Results

Transforming the footage to fix fisheye distortion and level out the two feeds

### Pulse Matching Results

Identifying light pulses in the left and right feed that correspond to the same ostracod

### 3D Mapping Results

Creating 3D models of ostracod pulses in time

### Final Product

- **Cameras and External Hardware**
- **Printed Circuit Board with Soldered Components**

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