



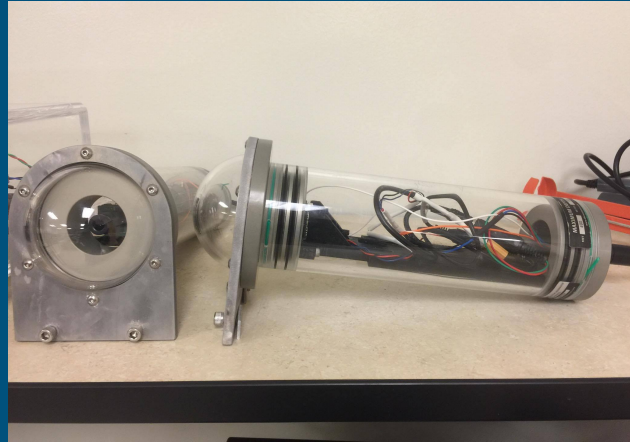
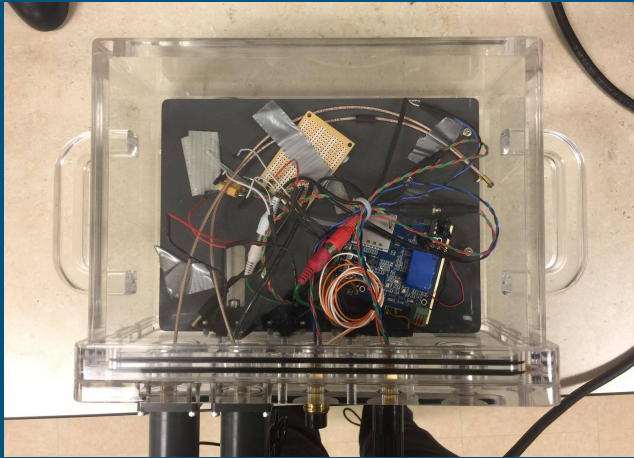
OstraCam II IDR

Paul Killam, Oliver Thio, Christina Lim



OstraCam I

- The purpose last year was to design a system that is able to record low-light video of bioluminescent ostracods and document data about the oceanic environment at the time
- Data saved to be analyzed later
- Issues they ran into on the field
 - Camera re-calibration and maintenance
 - Lack of feedback from device
 - Ease of use by someone in full diving gear (IR remote, etc..)
 - Poor quality from the cameras in-situ



Goals for OstraCam II

- How we're improving it
 - Transitioning to a more appropriate microcontroller
 - Adding additional sensors for more data collection
 - Working on distortion issues with the cameras

Team members

- Paul Killam - Team lead, Firmware, Computer Vision
- Oliver Thio - Software, MATLAB, Computer Vision
- Christina Lim - Hardware, DxDesign

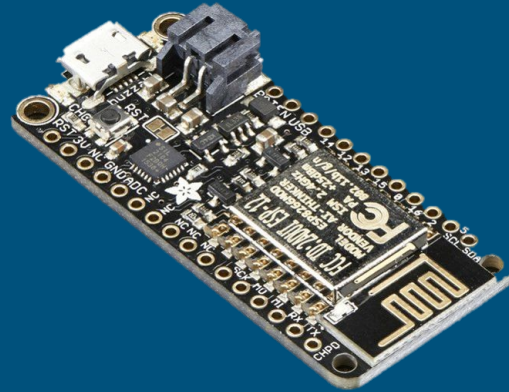
What we're keeping

- Inertial Sensor: ADIS16300AMLZ SPI interface
- pH Sensor: EZO pH sensor UART/i2C interface
- Salinity Sensor: EZO Conductivity Circuit UART/i2C interface
- LCD Display: MCOC2002AWMRE Parallel interface
- Video decoder: TVP5158IPNP i2C/parallel interface
- 2 Low-light cameras: Watec WAT-910HX
- SD Card
- Waterproof casing

*Data recorded to be stored on SD card

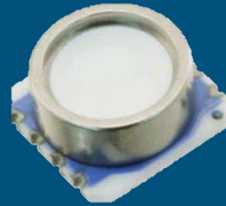
What we're changing

- New microcontroller: ESP8266
 - Reduces programming complexity of LPC 4088
 - Arduino compatible
 - Has RTC
 - Adafruit feather HUZAZH development board with USB programming and battery charging
 - \$15.95



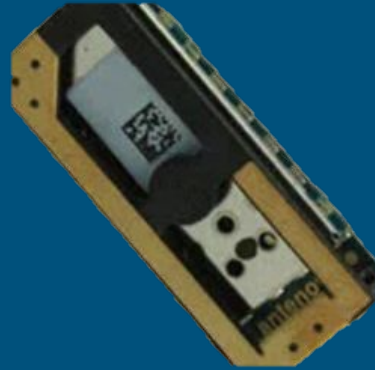
What we're adding

- Underwater pressure and temperature sensor
- MS5803-30BA
- i2C/SPI interface
- (some capacity specs from datasheet)
- Digikey: \$29.03



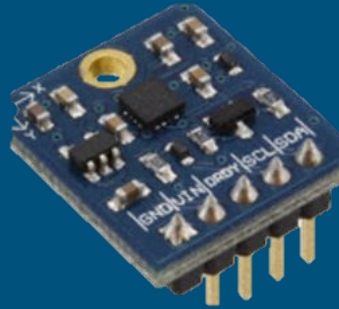
What we're adding

- GPS Module
- Antenna M10382-A1
- UART/SPI/i2C interface
- \$19.24



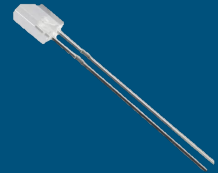
What we're adding

- Compass
- Parallax 29133
- i2C interface
- \$5.05

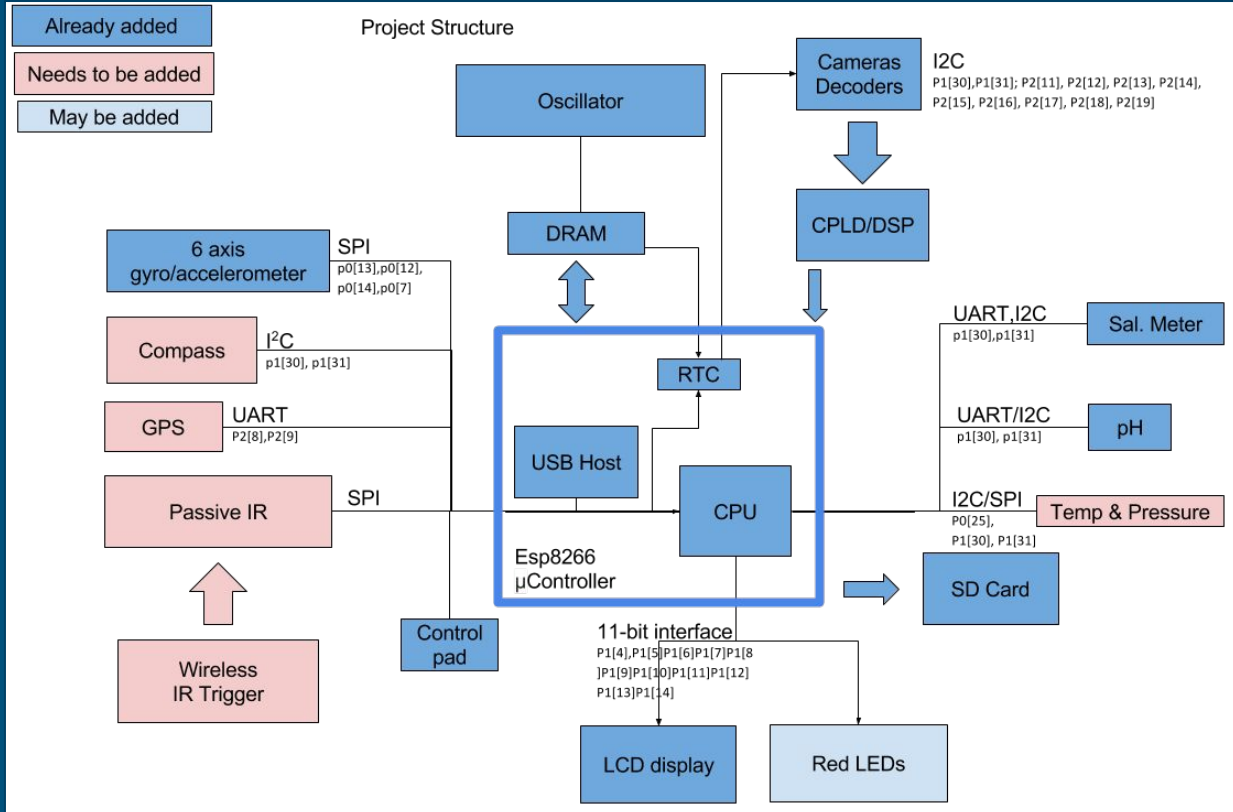


What we're adding

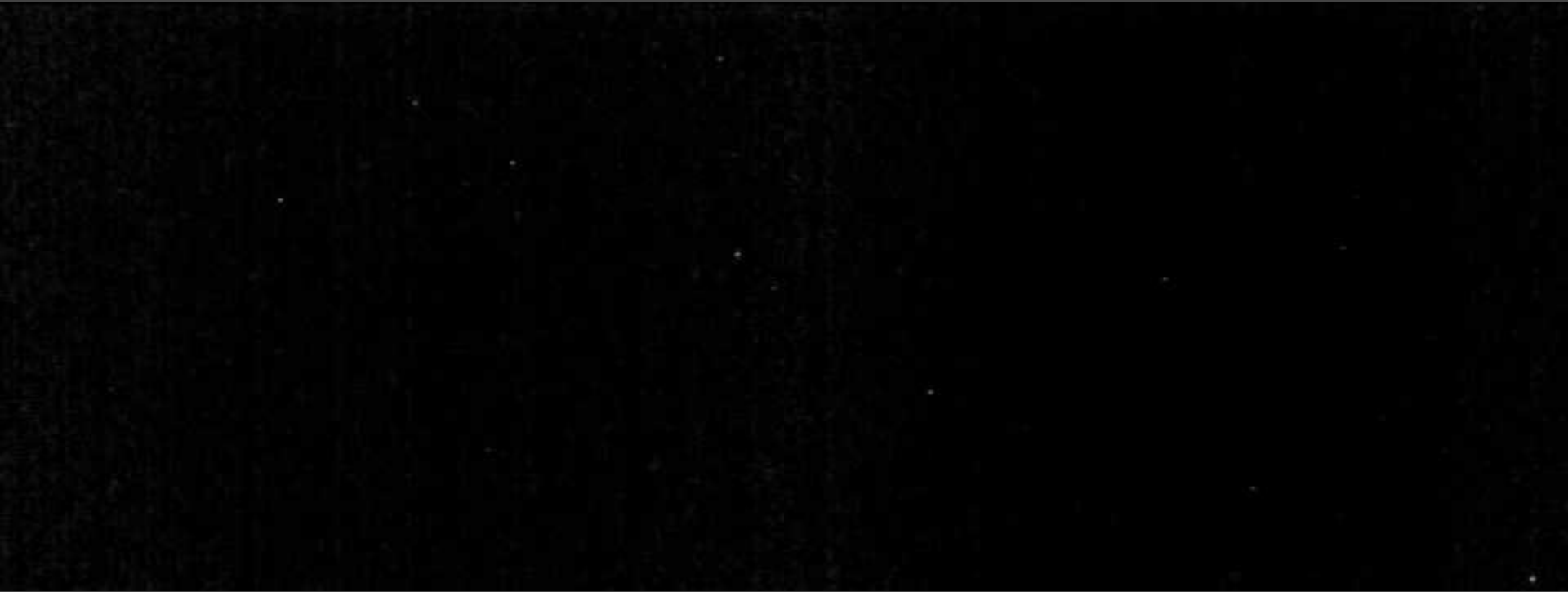
- Wireless infrared trigger
- IR LED + Passive IR sensor
- Trigger without opening waterproof case
- IR LED: IR533C
 - Digikey: \$0.42
- PIR Sensor: 555-28027
 - Digikey: \$12.99



Block diagram of peripherals



Raw Footage from OstraCam I



Postprocessed Footage from OstraCam I

Software and firmware issues to be addressed this year

- Recalibration for every data set due to bad 3D-printed camera mountings
- Frame synchronization
- Postprocessing fishbowl distortion correction
- Sub-pixel interpolation to maximize image quality
- 3-D mapping