

U-Seadon

Autonomous submarine



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Description

- ▶ Unmanned Autonomous Underwater Vehicle
- ▶ Restricted Dimensions
- ▶ Experimental platform for further third party development

Product Goals

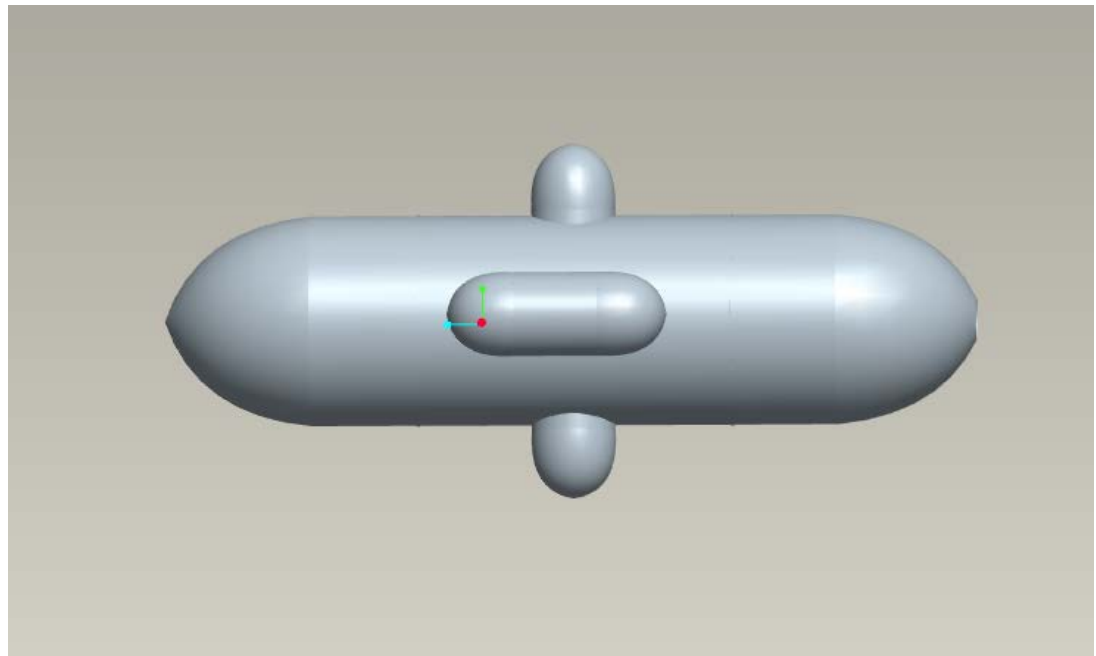
- ▶ A viable low-cost research AUV Platform
- ▶ Underwater Inspection
- ▶ Water Surveillance
- ▶ Water Analysis through Sensors
- ▶ Ship Hull Inspection

Hull Specifications

- ▶ Durable
- ▶ Fully Waterproof
- ▶ Symmetric
- ▶ Cheap
- ▶ Ease of Manufacturing

Outer dimensions

About 30cm long and
12cm diameter



Components

- ▶ Ultrasonic Sonar Platform
- ▶ Central Processing Unit
- ▶ Sensors
- ▶ Camera
- ▶ Thrusters
- ▶ Waterproof Shell

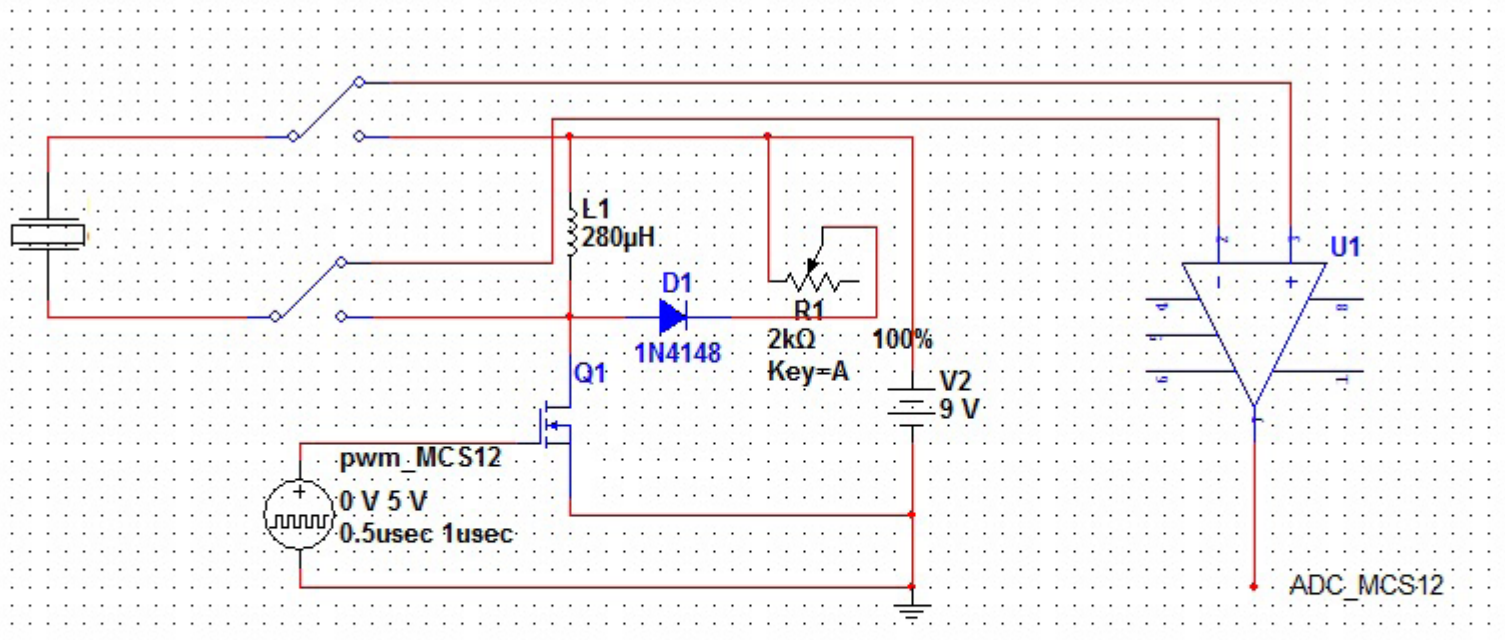
Sonar Specifications

The sonar platform should accomplish the following specifications:

- ▶ Sampling, receiving and amplification of acoustic signals
- ▶ Transmitting sound pulses
- ▶ Data transmission and receive
- ▶ Sound echo delay calculation

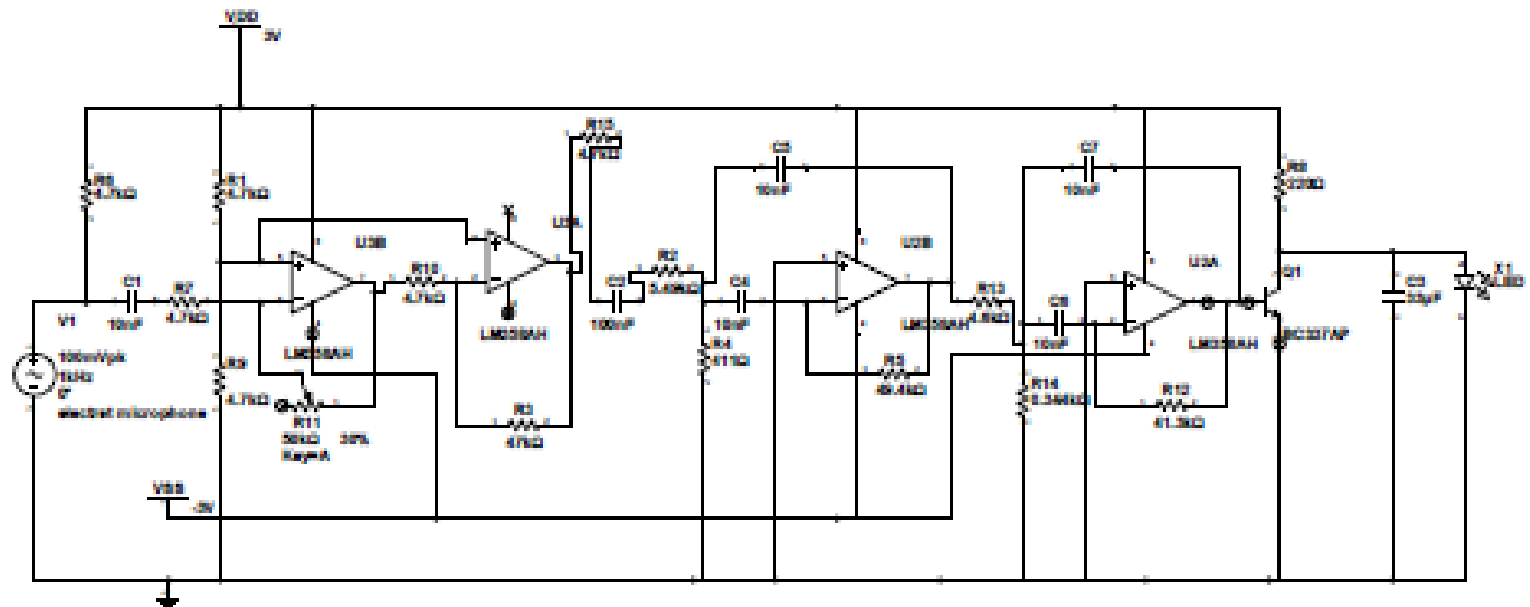
Electronic Interface Development

Transmitter



Electronic Interface Development

Receiver

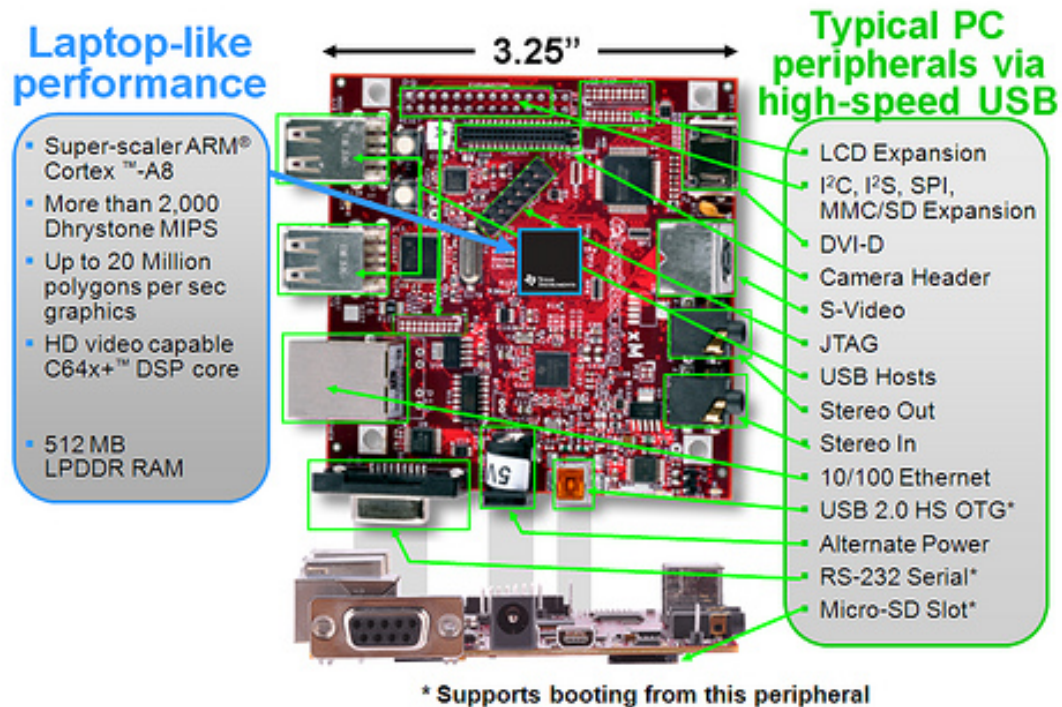


Software Stack

- ▶ Adhere to “Openness”
- ▶ Completely Open-Source Software Stack
 - ▶ License is LGPLv3
 - ▶ We can use this in commercial applications!
 - ▶ Users will be able to access to OpenSeadonAPI (TBA)
 - ▶ Gives them the ability to build their own software-modules
- ▶ Lightweight Implementation
 - ▶ by using Embedded Linux and relative tool-chains

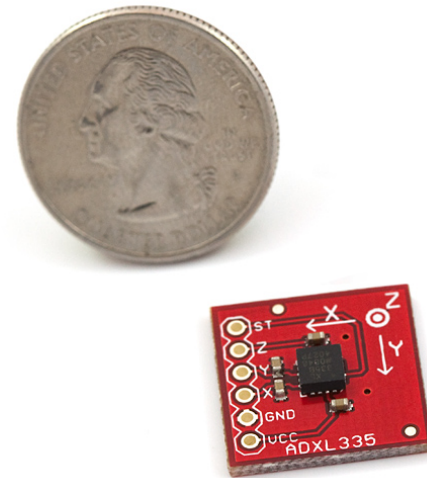
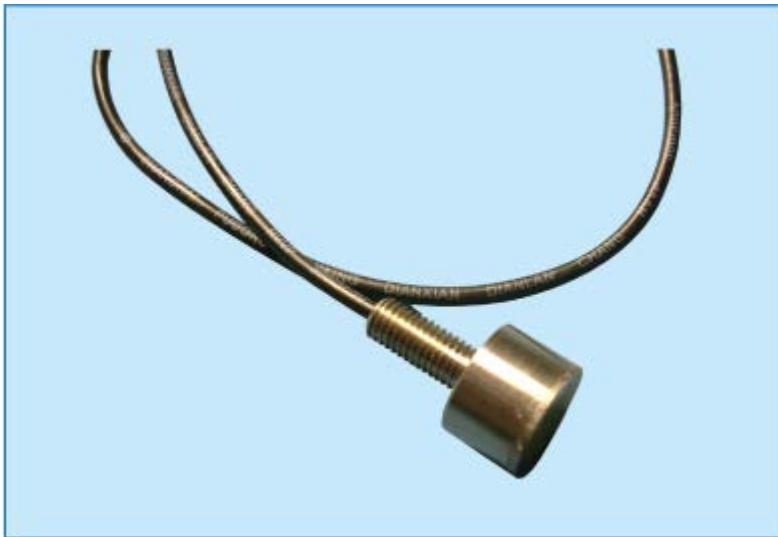
Central Processing Unit

► Embedded System BeagleBoard



Sensors

Ultrasonic Waterproof Transducer

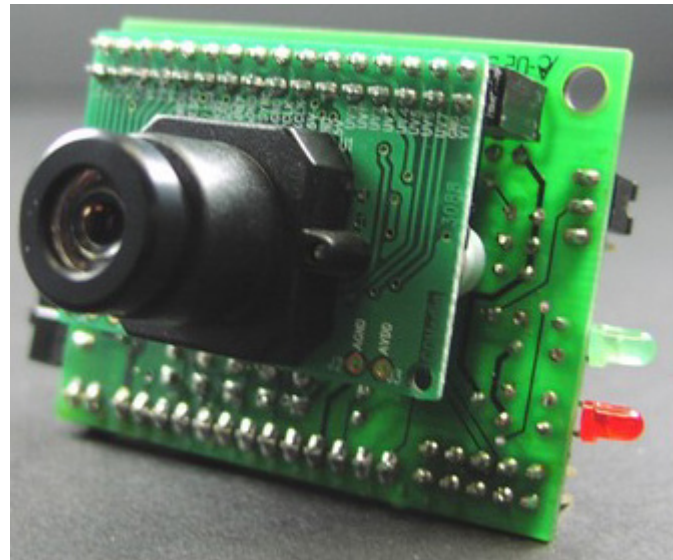


Accelerometer

Camera

► CMU3 Cam

- 17 frames per second capture rate
- 80 x 143 Pixel Resolution
- Gather mean color and variance data
- Hi-Speed TTL serial port
- Find center of object
- Raw image dump
- Color Detection



Waterproof and Stability Test



Outer Shell



Platform Cost

- ▶ BOM is Around ~600 euros
 - ▶ Very affordable vehicle compared to competitors which have an average BOM of 4 figures and above.



We brought some
"disturbance to the force"

Future work

- ▶ Complete the first working prototype
 - ▶ Vehicle testing in order to check it's strength and performance
- ▶ Implement the pluggable sensor module
 - ▶ Specifications to be announced!

Thank You!

Questions?

