Project proposal for the development and validation of a DIY profiling float for salinity estimation– draft 1

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**Key words:** AUV, DIY, open-source, halocline, mixing

**Project summary**

**Introduction**

**Proposed research**

**Proposed timeline and budget**

**Timeline**

This project will occur in three main stages. The floating build, data analysis, and paper writing stages (see <https://github.com/cflaim1123/openFloat/blob/main/proposal/timelines/flaimThesisTimelineFull.pdf> for the full Gannt chart project timeline). The float building stage is to occur from 27 September 2023 to 13 December 2023, the duration of the autumn offering of Ocean 443. This stage has 11 components (see Table 1) and is likely to be the most time-intensive portion of the project. The following two stage will occur during the winter 2024 academic quarter.

**Budget**

**References**

**Figure captions**

**Tables**

**Table 1: Project timeline**

|  |  |  |  |
| --- | --- | --- | --- |
| **Project stage** | **Subsection** | **Start date** | **End date** |
| Float building | Concept development | 9/25/2023 | 10/04/2024 |
| Find and order parts | 9/25/2023 | 10/10/2023 |
| Background research | 10/02/2023 | 10/29/2023 |
| Electronics design | 10/09/2023 | 10/21/2023 |
| Electronics build | 10/20/2023 | 11/01/2023 |
| General programming | 10/30/2023 | 11/08/2023 |
| Float testing and deployment without profiling capability near Shilshole | 11/06/2023 | 11/10/2023 |
| Buoyancy engine build | 10/23/2023 | 11/03/2023 |
| Buoyancy engine build | 11/04/2023 | 11/20/2023 |
| Float assembly | 11/20/2023 | 11/26/2023 |
| Final float testing and deployment in Colvos Passage. | 11/27/2023 | 12/05/2023 |
| Data analysis | Produce desired plots to compare float data to seaglider data | 1/03/2024 | 1/11/2024 |
| Produce salinity transects of Colvos Passage | 1/11/2024 | 1/15/2024 |
| Produce engineering plots to asses float’s performance | 1/12/2024 | 1/16/2024 |
| Paper writing | Follow Ocean 444 assignment deadlines | 1/03/2024 | 3/12/2024 |

**Table 2: Project budget**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Electrical - general | perfboard (pack of 50) | 7 | $0.50 | $3.50 |
| Misc wires | NA | NA | $15.00 |
| Male header pins | NA | NA | $5.00 |
| Female header pins | NA | NA | $5.00 |
| Solder | NA | NA | $10.00 |
| Resistors | NA | NA | $0.10 |
| Misc GPS radio wires | NA | NA | $15.00 |
| Electrical - control | ESP32 feather huzzah v2 | 2 | $19.95 | $39.90 |
| BLDC motor | 1 | $30.00 | $30.00 |
| 5V, 5A voltage step-down regulator | 1 | $32.95 | $32.95 |
| custom battery pack | 1 | $15.00 | $15.00 |
| |  | | --- | | Electrical - sensing | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | | analog pressure sensor | 1 | $20.00 | $20.00 |
| Thermistor | 1 | $2.00 | $2.00 |
| adafruit data logger feather wing | 1 | $8.95 | $8.95 |
| digital temperature sensor (pack of 5) | 1 | $10.00 | $10.00 |
| BMP180 pressure sensor | 1 | $9.95 | $9.95 |
| DHT22 humidity sensor | 1 | $9.95 | $9.95 |
| TSL2591 lux sensor | 1 | $6.95 | $6.95 |
| Adafruit 9-DOF absolute orientation IMU - BN055 | 1 | $35.00 | $35.00 |
| Adafruit ultiamte GPS | 2 | $30.00 | $60.00 |
| 915 mHz LoRa radio module | 2 | $20.00 | $40.00 |
| Precision current meter | 1 | $10.00 | $10.00 |
| GPS antenna | 1 | $20.00 | $20.00 |
| Radio antenna | 2 | $10.00 | $20.00 |
| |  | | --- | | Mechanical | |  | |  | | Low-pitch, high-precision ACME lead screw | 1 | $15.00 | $15.00 |
| Misc O-ring | NA | NA | $10.00 |
| Misc PVC pipe for piston | 1 | $10.00 | $10.00 |
| 4" PVC pipe | 1 | $20.00 | $20.00 |
| 4" PVC endcaps | 2 | $10.00 | $20.00 |
| metal cable glands | 5 | $10.00 | $50.00 |
| Epoxy | 2 | $10.00 | $20.00 |
|  | | | Total: | $529.25 |

**Figures**