Yellow Document Title Box:

FEEG2001 Systems Design and Computing 2023/24

Personal Project Logbook

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**PROJECT: Multirotor UAV**

**TEAM: M02**

**ROLE(S): Writing code for gimbal and integrating flight controller**

**How to use this logbook:**

* Please complete the section above by adding your full name, project choice, team number/name and your individual role(s).
* Please complete this individual logbook weekly by simply typing into the table provided on each of the pages. The table will expand with your content.
* Utilise bullet points to keep information clear and concise.
* Feel free to add visuals or links.
* Your individual logbooks should be completed in time for your weekly timetabled sessions.
* By using your live document in your dedicated Microsoft Project Teams Space, your project team will be given access to your individual logbook.

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# **WEEK 18:** Project Launch – Teambuilding - Initial Ideas

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| **DATE: 29/01/2024** |
| **Role(s):**   * **Programming** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  Looking forward to seeing the design of the UAV. Having equally distributed tasks may be hard since everyone has different strengths at different stages of the project. |
| **Questions Arising / Input Needed:**   * **What height should be the “drop height” to test the robustness of the UAV** |
| **Actions for the next week:**   * **Get a basic framework of the code in pseudocode and get some designs for the landing legs** |

# WEEK 19: Research, Ideation, Initial Prototyping

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| **DATE: 05/02/2024** |
| **Notable Outcomes from My Action through last week:**   * **Created a basic draft in pseudocode for the gimbal code** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  Looking forward to getting the gimbal code working. Cooperating with the person in charge of the gimbal design may be hard since there is only one gyroscope and we need to take turns in using it for testing. |
| **Questions Arising / Input Needed:**   * **Whether it is worth using the flight controller telemetry to control the gimbal** |
| **Actions for the next week:**   * **Create the presentation for the Design Context Overview** |

# WEEK 20: Design Context Overview

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| **DATE: 12/02/2024** |
| **Notable Outcomes from My Action through last week:**   * **Did the presentation and made a first draft of Arduino code** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  Look forward to getting the gimbal working. Testing it will be difficult because I’m in charge of the programming but the gimbal itself is with another person |
| **Questions Arising / Input Needed:**   * **Maybe some changes in the roles are necessary since 3 people on electronics might be too much** |
| **Actions for the next week:**   * **Completing the Arduino code for the gimbal and potentially trying to integrate the flight controller** |

# WEEK 21: Ideation, Iteration, Research & Prototyping

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| **DATE:19/02/2024** |
| **Notable Outcomes from My Action through last week:**   * **Got gimbal code working but it crashes after a while** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  Getting the gimbal to work may be a little trickier than expected because it crashes after a while and I’m not sure why |
| **Questions Arising / Input Needed:**   * **Some research is needed for getting flight data from the flight controller since it uses MSP** |
| **Actions for the next week:**   * **Try to fix the crashing issue, if unsure if able to fix then try to get MSP communications working as a backup plan. Also work on the design pitch next week.** |

# WEEK 22: Design Specification Pitch

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| **DATE:26/02/2024** |
| **Notable Outcomes from My Action through last week:**   * **Rough design specification produced ready for the pitch** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  Getting the flight test done before Easter break might be hard since the gimbal is still not working and the flight controller is not cooperating either. |
| **Questions Arising / Input Needed:**   * **Is it worth abandoning the MPU 6050 gyro in favour of using the flight controller in-built gyro instead?** |
| **Actions for the next week:**   * **Start on testing with a 3D printed gimbal mounted on a piece of plywood with the new MSP library code and interrupt code for gear switching.** |

# WEEK 23: PITCH REVIEW plus Prototyping & Testing

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| **DATE: 04/03/2024** |
| **Notable Outcomes from My Action through last week:**   * **The gimbal, SD card reader and mode switch works now.** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  The gimbal moves very slowly and it is likely because of a flaw in the MSP library which is frustrating because the library has already been archived since the MSP protocol is already outdated but unfortunately, it’s the only protocol available for our flight controller. |
| **Questions Arising / Input Needed:**   * **Should we switch back to using the MPU 6050 gyro instead of using data from the flight controller** |
| **Actions for the next week:**   * **Move the project onto GitHub to collaborate easier and write code to do the mode switching without the help of the library by decoding the signal sent via pulse length.** |

# WEEK 24: Prototyping & Testing

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| **DATE:11/03/2024** |
| **Notable Outcomes from My Action through last week:**   * **Entire project moved to GitHub and the interrupt code has been added which works but still lags the gimbal.** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  Continuing to collaborate on the programming side of things might be difficult during easter break since it’s hard to test the program without the physical gimbal to test. |
| **Questions Arising / Input Needed:**   * **Whether we’ll actually be able to test fly the drone since the electronics is still not ready yet.** |
| **Actions for the next week:**   * **Try to help with the flight controller and also experiment with using pulseIn() for interrupting the code to do the mode switching and also start working on the documentation for design report and EML report.** |

# WEEK 25: Prototyping & Testing

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| **DATE:18/03/2024** |
| **Notable Outcomes from My Action through last week:**   * **Tidied up the code and tested multiple different iterations for the interrupt code for mode switching but unfortunately nothing worked** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  The test flight couldn’t go ahead due to a technical hitch in the flight controller which is a major setback because we were hoping to get it done before easter so we can use what we learnt from it to improve over the easter. |
| **Questions Arising / Input Needed:**   * **How much do we have to work throughout the easter holidays since we are behind on schedule now due to the flight test not being able to go ahead and the gimbal code being more problematic than expected.** |
| **Actions for the next week:**   * **Try to work on the reports as much as possible during the easter and try to figure out why the gimbal is still not working as expected. Also try to troubleshoot the flight controller so we can fly right after easter.** |

# WEEK 30: Prototype Finishing

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| **DATE:22/04/2024** |
| **Notable Outcomes from My Action through last week:**   * **A decent chunk was done for the 2 reports and the flight test was finally done.** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  Other work like lab reports and exam preparation is starting to ramp up |
| **Questions Arising / Input Needed:**   * **Flight test went perfectly but it’s still over the weight limit so thinner plywood might be needed at the cost of structural rigidity.** |
| **Actions for the next week:**   * **Try to get the gimbal working and also assemble everything together since the test flight was done without the gimbal on top.** |

# WEEK 31: Prototype Finishing

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| **DATE:29/04/2024** |
| **Notable Outcomes from My Action through last week:**   * **Unfortunately the same issue happened with the flight controller so we couldn’t get a second flight test in. The Arduino is also not cooperating and the SD card is no longer working with the servo motors due to voltage sag and grounding issues.** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  It’s going to be very tight getting everything working together in time for the demonstration |
| **Questions Arising / Input Needed:**   * **Maybe worth pausing on the reports to focus on actually getting the drone flying since that comes first** |
| **Actions for the next week:**   * **Try to cram everything to make it work. Likely to be an electronics issue so there’s not much I can do on the programming side of things but will try to help as much as I can with electronics.** |

# WEEK 32: Demonstration

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| **DATE:09/05/2024** |
| **Notable Outcomes from My Action through last week:**   * **Everything went wrong and flight controller broke 2 days before the demonstration. Worked night and day to get the replacement flight controller to work since it’s a different model. Essentially the entire electronics system had to be redone and there was no way to test the code until the electronics was done. With everyone’s hard work we got everything to just about work 10 minutes before the demonstration. It wasn’t perfect and the quality was questionable but every function worked and it flew quite well.** |
| **Weekly Reflection** (What are you **looking forward** to, **what may be difficult**, and **why?**):  I was very glad that I made several versions of the code since I had them ready right when the electronics is done and then use the version that worked the best. |
| **Questions Arising / Input Needed:**   * **Helpful input gotten from the flight test that can be put into the design report** |
| **Actions for the next week:**   * **Finish the EML report and Design report and then celebrate.** |