

Team Butterfly (ELEC330) – Group 5 Logbook – Assignment 3

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Student Names /Attendees:	1. Mesa Giner, Alvaro	2. Tladi, Gideon Omaatla Pako	3. Wang, Yanzhang
	4. Wang, Yifan	5. Wu, Zijin	6. Xiao, Junyang

Week 1

Date: Wednesday, 29th January 2025

Notes:

- We had a team meeting to review progress and create a project plan for Assignment 3.
- Tasks were distributed as follows:
 - Stabilising the butterfly's orientation when stationary (W1 - 3) = Junyang, Yifan
 - Basic Butterfly Movement (W1 - 2) = Yanzhang, Zijin
 - Tele-op keyboard (manual operation)
 - Generate a map of the environment & saving it (W1 - 3) = Alvaro & Gideon
 - Use ROS to broadcast sensor data
 - Demonstrate Object Recognition (W3 - 5)
 - Interface with sensors (Semester 1)
 - Identify one target object
 - Autonomous navigation and flight (W4)
 - Movement
 - Drone-like or submarine-like movement (buoyancy plugins and such)
 - Butterfly flapping wings
 - Target object and safely land on it.
 - Project Plan Update = W4
 - Project Plan Update = W7
 - Fully Functional Robot Simulation (W10)
 - Bench Inspection (W12)
 - Practice (W11)
 - Report Writing and Submission (Easter - W12)
 - Prepare a Bill of Materials
 - GitHub documentation (ReadMe files, etc)
 - Upload report and all code and maps

Week 2

Date: Monday, 3rd February 2025

- Gideon & Alvaro
 - Worked together from 2 pm – 5 pm.
 - Slowly reviewed the env_ws.sdf, butterfly.sdf, and butterfly.urdf files to identify bugs in the code to correct in future sessions.

Date: Wednesday, 5th February 2025

- Gideon & Alvaro
 - Worked together from 9 am – 12 pm.
 - Tried adding a point cloud lidar function to our robot system.
 - Encountered errors while trying to develop a proper publisher-subscriber relationship.

Week 3

Date: Wednesday, 12th February 2025

- Gideon & Alvaro
 - Encountered a ROS2 Launch error: Missing Robot Tag. Worked on debugging the error during the lab session.

Week 4

Date: Monday, 17th February 2025 – Tuesday, 18th February

- Gideon & Alvaro
 - Worked individually at home, using Virtual Machines installed in USB drives.

Date: Wednesday, 19th February 2025

- Gideon & Alvaro
 - Experimented with adding an ultrasound sensor to our robot's URDF instead of using LiDAR.

Week 5

Date: Wednesday, 26th February 2025

- Gideon, Alvaro
 - Updated the links, joints and plugins for the lidar, camera and IMU sensor. Aimed to implement full sensor integration, and achieved better lidar functionality with fewer errors, though some persistent bugs still remained.
 - Teleoperation for basic movement was still challenging, so we reassessed the group's week 1 plan for autonomous navigation.

Week 6

Date: Wednesday, 5th March 2025

- Gideon, Alvaro, Yifan
 - The lab instructors (C. Taqizade and A. Al-Irhayim) suggested our team could use propellers in our design. So we relayed the message to the rest of the team, then the three of us discussed in the lab and conducted basic research to get inspiration for crafting a new design.

Date: Sunday, 9th March 2025

- Yifan
 - Designed the new robot drone.
 - Uploaded all associated STL files to the group's OneDrive.

Week 7

Date: Wednesday, 12th March 2025

- Zijin, Junyang, Yanzhang
 - Exported the new butterfly CAD model from Solidworks to a URDF.
- Gideon
 - My USB-based VirtualMachine kept crashing, so I installed Linux on my laptop (dualboot), with assistance from the instructor (C. Taqizade) during the lab session.

Week 8

Date: Wednesday, 19th March 2025

- Gideon
 - Encountered multiple bugs and errors whilst trying to use the new URDF file.

Week 9

Date: Wednesday, 26th March 2025

- Gideon
 - Updated the plugins in the env_ws.sdf file.

Week 10

Date: Wednesday, 2nd April 2025

- Bench Inspection Time – No Lab Session.

Easter Break

Date: Friday, 25th April 2025

- Gideon
 - Created a plan and WhatsApp poll to help distribute tasks among group members, with consideration of Bench Inspection in 2 weeks' time.
 - Junyang and Zijin selected: Update sensor integration.
 - Gideon selected: Mapping
 - Yanzhang selected: Object recognition
 - Yifan and Alvaro selected: (Basic) Autonomous navigation

Week 11

Date: Monday 28th April 2025

- Yanzhang
 - Finish the basic code of object recognition
 - Create the GitHub repository and invite other team members.
 - Uploaded the work of object recognition

Problems encountered

Due to there is no camera sensor in the new model in the gazebo, my work cannot test on the gazebo to work with other tasks.

Date: Wednesday 30th April 2025 (Morning)

- Gideon, Zijin, Junyang
 - Worked together to add sensors in new butterfly.sdf
 - We modified the path to open the STL file of the butterflybot and environment models.
 - The sensors include Lidar, IMU, and camera
 - Create and debug the launch file for the new model.
 - Now the launch.py could work.

Problems encountered

- The interaction between the sensors and the Rviz still have some problems
- The image from the camera and the result from the Lidar cannot be observed in Rviz

Date: Wednesday 30th April 2025 (Afternoon)

- Gideon
 - Organized the GitHub repository.
 - Uploaded the most up-to-date version of our code from today's morning session.
 - Created a bash script (butterflybot.sh) to help save time when building and launching the simulation.

Date: Thursday 1st May 2025 (Afternoon)

- Yanzhang
 - Find and solve a few problems from Wednesday's work. The reason is that the path of the sensor is wrong; it uses version 1's path.

Date: Friday 2nd May 2025 (Afternoon)

- Yanzhang
 - Finish the object recognition in the gazebo.
- Alvaro:
 - Solved some problem with the environment and robot density causing unprevented movement on the drone when spawned

Date: Saturday 3rd May 2025 (Morning/afternoon)

- Alvaro:
 - Installation of ardupilot

- Correctly connection between ardupilot console and simplified gazebo environment and simplified drone (drone respond to the ardupilot commands but no visual connection with gazebo yet)
- Visual connection of gazebo and ardupilot established, simplified version of the drone plus hardware limitations results in a discard of this option (lack of time too).

Date: Sunday 3rd May 2025 (Morning/afternoon)

- Alvaro:
 - Simplified autonomous movement idea: utilization of thrusters to produce drone movement. Despite the attempts, the implementation could not be fully completed do some need of extra polishing on the drone sdf that caused problems during the simulation.

Week 12

Date: Monday, 5th May 2025

- Gideon
 - Created a Linktree to enable easy access of our GitHub repo and other files we will need for bench inspection day.

Date: Tuesday, 6th May 2025

- Gideon
 - Created an outline and plan for how the team will present tomorrow during the bench inspection.
 - Created a good publisher-subscriber relationship for the lidar and camera. (No error messages being displayed.) However, the camera and lidar data still had some issues with showing clearly on RViz.
- Alvaro:
 - Different autonomous fly attempts code scripts uploaded to GitHub.