# Project Configurability and Field Deployment Plan:

## Project Configurability:

### Reusability:

The steps taken to allow our project to be reusable is in fact that our group has used general worldwide functionality and protocols such as zephyr, MQTT, UART and ROS when developing this project. By utilizing this functionality, it allows our firmware to be integrated onto many different types of hardware allowing it to be reusable. This hardware selection includes any programmable board/platform that supports zephyr and UART communication and even MQTT transmission. As well as any autonomous robotic that can run ROS and can have a LiDAR sensor attached already or installed and utilized through UART communication protocols. From these hardware selections it allows our project to be utilized on many different platforms maximizing its reusability. To further maximise the reusability of our project the TurtleBot’s code is run through a python script that can be converted into an executable file allowing any OS to run our code through ROS.

### Reconfigurations or possible addition features:

For our project’s possible reconfigurations some are achievable by replacing the inputs of our system such as the ultrasonic sensors, with a variety of different sensors allowing for variable input. An example of this is using LiDARs for proximity detection instead of ultrasonics. Another feature that could be added to the system is the capability to utilise multiple different sensor types allowing the range of gestures and their complexity to increase. For further gesture refinement the variety of sensors could be replaced with a single camera and a simple machine learning algorithm can be integrated. Another reconfiguration is by finding a programmable board that supports MQTT communication allowing for the external m5core2 communication node to be disconnected. This cross-communication removal allows for the tracking and displaying of the TurtleBot’s location to be displayed on many different digital display devices that utilise the UART communication protocol instead of the m5core2 making the overall system simpler as it removes one of the programmable modules involved and replaces it with a simple UART LCD display. For further features the programmable board used could also have other features such as being able to utilise low energy Bluetooth capabilities.

## Field Deployment Plan:

### Ease of use:

To allow our product to be deployed easily into the field some steps have been taken and can be taken to make the experience as easy as possible. These steps include converting the TurtleBot’s python script into a python executable file. Creating a manual describing the gestures actions and the TurtleBot’s response to these gestures. Another step to be undertaken is to simplify the circuit and it’s wiring and then creating another manual that describes the setup of the whole product which includes the wiring, the gesture manual and information about how to setup ROS connections.