**IMPORTANT!**

Before proceeding with anything in this document make sure that you run the command:

git -pull

This will ensure that all of the code that you are attempting to work with is the most up to date source code available for you to use.

# Introduction

This document will cover the various aspects of the ugv\_controller and what makes up the project and how each should be used.

# GPS\_NAVIGATION

This is the automated code that will perform very basic point to point navigation using GPS coordinates.

## Starting

This ros module is started by running the following command:

rosrun gps\_navigation gps\_navigation

This will produce a set of directions that will be passed down to the arduino controller.

# UGV\_ARDUINO\_CONTROLLER

This is the ROS module that is responsible for controlling the UGV as well as communicating with any of the higher level ROS nodes that are operating on the PC104 computer.

## Compiling

In order to compile and ship the Arduino code that is located in this directory the code must be located on a machine that has ROS set up. You will also need to download that rosserial\_arduino [<http://www.ros.org/wiki/rosserial_arduino>] stack from ROS in order to compile the code. Use the instructions located at [<http://www.ros.org/wiki/rosserial_arduino/Tutorials/Arduino%20IDE%20Setup>] in order to properly set up the rosserial\_arduino package on your machine. Once you have properly set up both the rosserial\_arduino and the arduino IDE then you can simply compile the included arduino project and send it to the arduino of your choice.

## Running

This node has three modes of operation:

1. Dead Man Switch on
2. Manual control
3. AI control

### Dead Man Switch ON

In this mode no control commands can be sent to any of the control surfaces in the UGV. The ROS node will continue to collect information and to pass it back to the PC104 but no commands will be executed by the UGV.

### Manual Control

In this mode of operation the UGV continues to collect and provide information to the PC104 but it is also allowed to receive and execute commands that are provided to it by a person. These commands will be sent through a RC remote control unit and will allow for simple navigation of the UGV.

### AI Control

The AI mode of operation will allow for the UGV to receive control commands from the PC104. At the moment the UGV simply looks for a particular message and so it does not care where the commands come from on the PC104 but rather that they are properly formatted.