

Drone Simulator User Manual

Jouke Geerts

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Starting Up

Hello, and welcome to the Drone Simulator User Manual. In this Manual you will find everything you need to operate the Drone Simulator. Let us get started. You can launch the Application by clicking on the DroneSimulator.exe. You should see a loading screen.

Main Menu

You are now on the Main Menu. From here you have several options to choose from. The 'Select Mode' button will take you to the Select Menu from which you can start the simulation. The 'Options' button will take you to the Options Menu. The 'Profile' Button will take you to the Profile Menu. The 'Quit Game' button will exit the application.



Figure 1: Main Menu

Profile Menu

The profile menu allows you to create and manage your own profile, and view your profile's statistics. You can return to the main menu by clicking on the 'Back' button.



Figure 2: Profile Menu

Creating a profile

You can create a profile by filling in a profile name in the designated box, the one with 'Enter Name'. You can then click on the 'Create' button in order to add the profile to the existing list.

Selecting a profile

You can select a profile by clicking on the Dropdown menu next to 'Select Profile' and subsequently clicking on the desired profile. The Profile Panel will then show the statistics of the selected profile.

Deleting a profile

If you press the 'Delete Selected' button you will delete the currently selected profile.

The Profile Panel

The Profile Panel Displays your profiles statistics depending on the selected Control Mode. You can select a Control Mode by picking one from the Dropdown menu in the Profile Panel. If you used a certain Control Mode with a BCI you can toggle the box that says 'Control With BCI'. It will now display the statistics of using a certain Control Mode with a BCI.

Developer Note: The Graph Display is currently not working.

Options Menu

The options menu allows you to configure some graphical settings as well as Key and BCI bindings for actions.



Figure 3: Options Menu

Resolution

You can select the desired resolution by clicking the dropdown menu and subsequently selecting the desired resolution. Recommended resolution is 800x600 or higher.

Quality

You can select the desired quality by clicking the dropdown menu and subsequently selecting the desired quality. The differences in quality for this application are minimal.

Fullscreen

You can toggle Fullscreen mode by ticking the checkbox.

Key Configuration

In order to set your key bindings you can click the button next to the action you want to set and subsequently press the key you want. These keys bindings will also be used when you use keyboard events for the BCI.

BCI Configuration

A classifier can predict several classes depending on how many it is trained. In order to make sure the right class is connected to the right action you can set the classes by selecting them from the dropdown menus. The Script will assume that the first element of the prediction array is the first class and so on.

Select Menu

The select menu allows you to set the controls for you drone and start the game. Do you for instance want to control everything, or just its height?



Figure 4: Select Menu

Control Presets

The Control Preset dropdown shows you which types of actions you can control. Select the actions you want to control and start the game. Note that only the preset Control Modes will record your statistics!

Custom Controls

You can set your own Control Modes for each axis. This can be usefull if you want to combine Keyboard controls with BCI controls. Do note that the game results will not be recorded by the game itself!

BCI Controls

If you want to use BCI Control instead of Keyboard you can check the BCI Control Activate Box. Note that in order to use the BCI you need to be connected to the buffer. For more information on the buffer check the 'Using the BCI' section.

The Game

You are now loaded into a new scene. It consists of a small meadow somewhere in the forrest where you have chosen to test fly your drone. Around the meadow are 10 hoops. The goal of the game is to fly through all the hoops before the timer runs out. The timer starts when you fly through the first hoop and is set to 60 seconds. Until you fly through the first hoop you are able to fly around freely (difficult when you have the autopilot control parts of your movement). You can pause the game anytime by pressing the 'escape' key, this allows you to return to the main menu aswell. Statistics are only recorded if you win or lose the game, not when you leave the game.



Figure 5: Game Scene

The Heads Up Display

When you have started the game you will see some information displayed on your screen. In the upper left corner you can see the number of targets you have left. In the upper right corner you can see the remaining time. In the lower left corner you can see which action you are currently performing.

Using the BCI

This Application uses the FieldTrip Buffer system in conjunction with buffer_bci. In order to control the Drone through the use of a BCI you need to do the following.

- Start up the buffer
- Start up the appropriate data acquisition device or a proxy.
- Make sure you have something sending events to the buffer, either a classifier that sends classifier.prediction events or a proxy that can send keyboard events
- Start up the Drone Simulator
- Check if your keys/classes are set to the correct action in the Options menu
- In the Select Menu, toggle the Active BCI control
- Press the Connect Button, if the Status turns green and says 'Connected' you are good to go. Don't forget to select the appropriate control preset.

Developer Note: currently the eventprocessor can't handle prediction events, but keyboard events (generated by the MatlabSignalProxy) can be used to test the buffer to application pipeline.



Figure 6: When you connect to the buffer it should look like this!