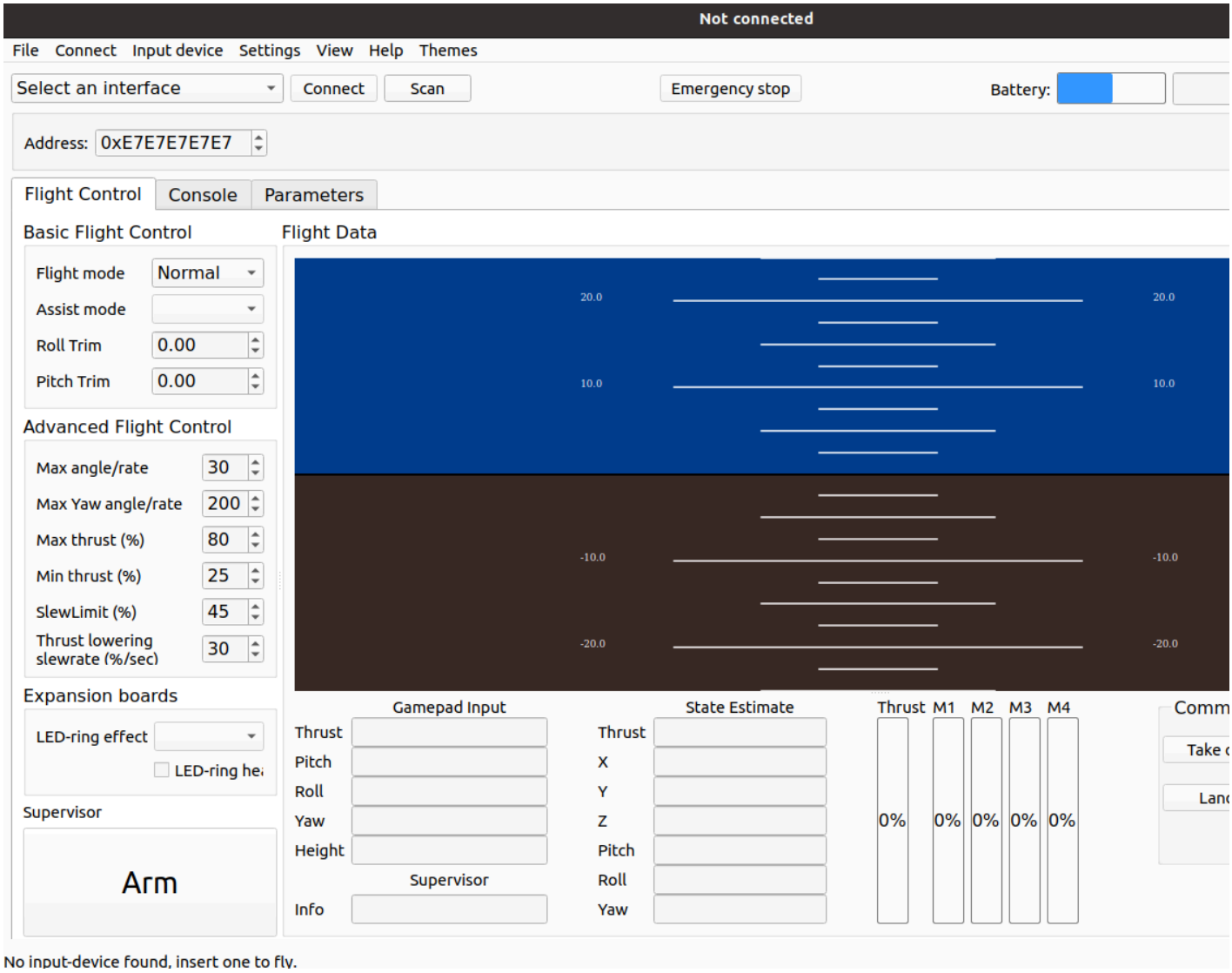
Startup Guide

Follow this guide to start the Braitenfly project.

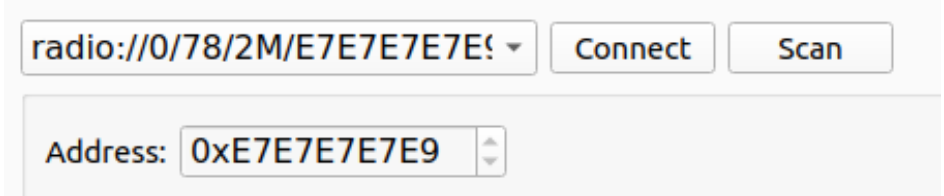
Scan for Crazyflies & test connection/flight status

In this section, you will ensure your crazyflie and radio are working correctly, and that you can successfully connect to your crazyflie.

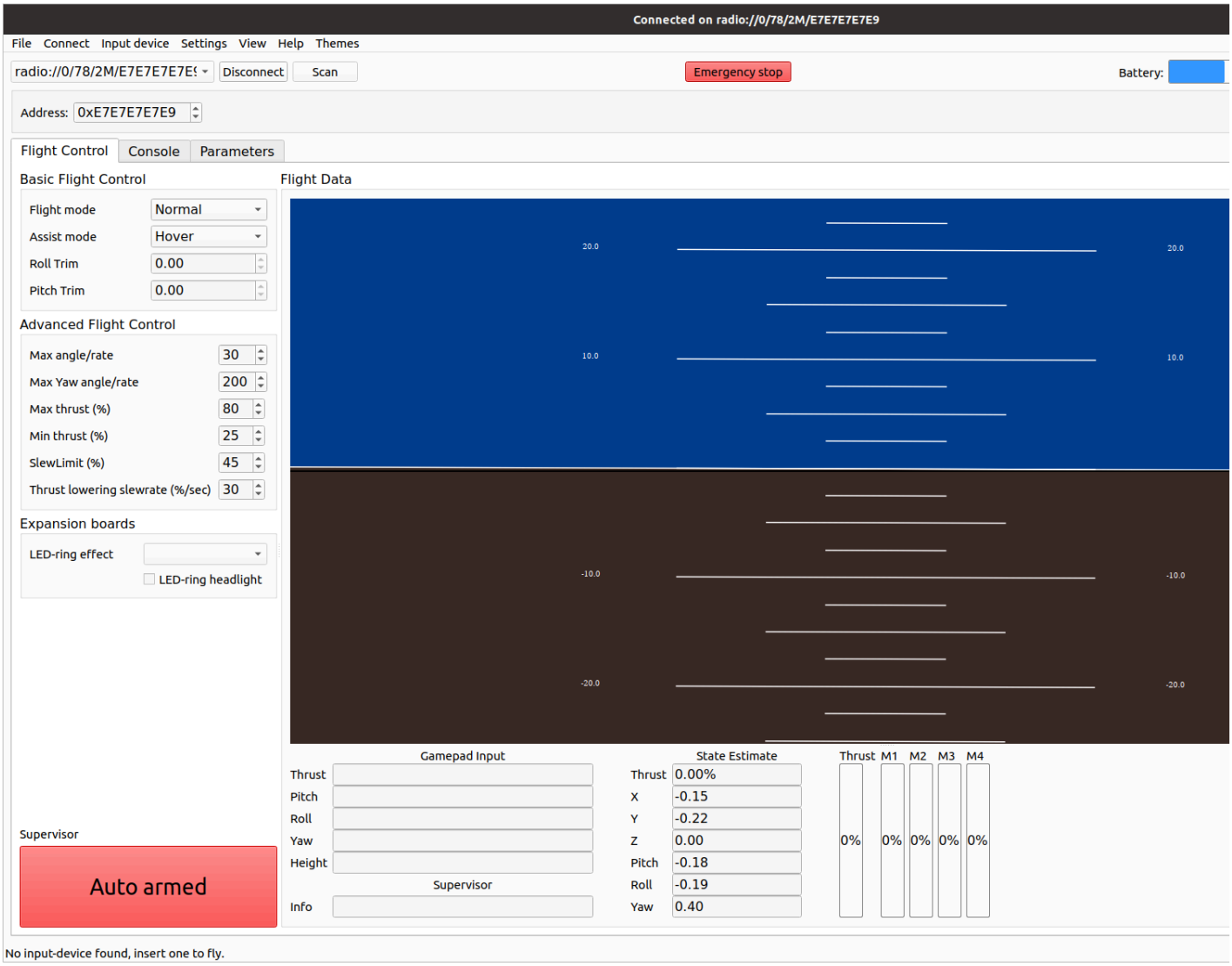
1. Turn your crazyflie on.
2. Open a terminal window using the keyboard shortcut `ctrl + alt + T`
3. Run the command `cfclient` . You should see a window pop up.



4. Click the `Scan` button at the top left. You should see a Crazyflie ID appear. Note that sometimes the Crazyflie ID will already be found, and clicking `Scan` this full interface ID. It should look something like this `radio://0/78/2M/E7E7E7E7E9'` .



5. Click `Connect` . You should see `connected` appear at the top-middle of the window, as well as a few other changes. Note the red emergency stop buttor your drone and rotate it you should see the blue/black attitude visualizer start to move.



6. At this point you may fly the drone using the controls in the bottom right. Once the drone is in a safe & level location, start by clicking `Take off` . You may keys to move the drone. When finished, click `Land` to land the drone in a safe location.
7. Exit the client.

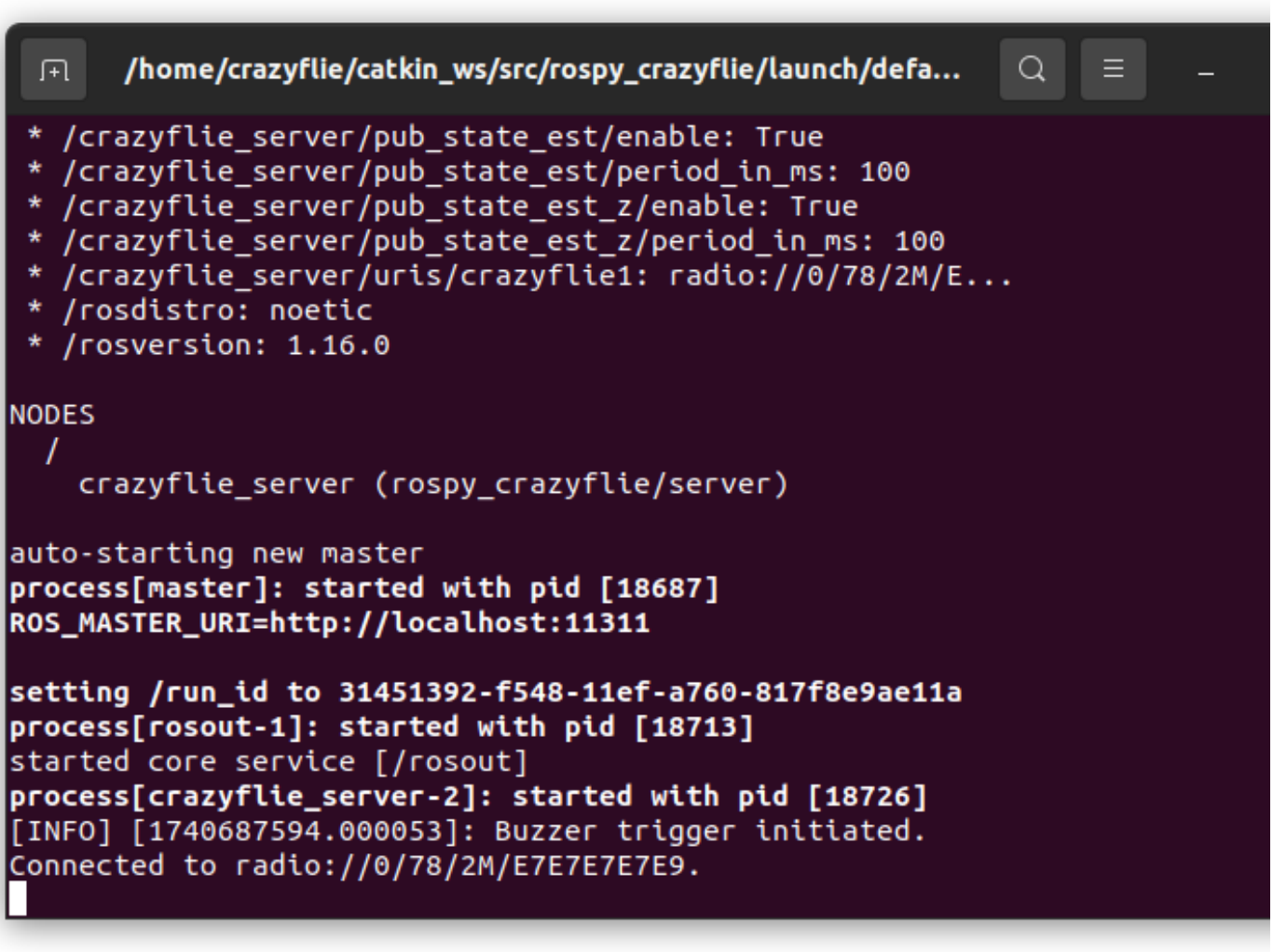
Start the Crazyflie server

This step will connect your crazyflie to your machine without `cfclient` & is required to run the *Braitenfly* modules.

1. Ensure `cfclient` has closed. You may need to close the terminal window you used to start it.
2. Navigate to `/home/catkin_ws/src/rospy_crazyflie/config` and open `config.yaml` in a text editor by double-clicking. Edit the `crazyflie1` ID to matc `cfclient` . You only have to change this once everytime you want to use a new Crazyflie drone, otherwise this can be left alone.

```
# Specifies which crazyflies to connect to, and what to name them in ROS
uris :
  crazyflie1 : 'radio://0/78/2M/E7E7E7E7E9'
```

3. Open a new terminal window and run `roslaunch rospy_crazyflie default.launch` . Within about 10 seconds the terminal should print `Connected to ra` you don't see this print, or there are other errors, double check that you correctly entered the crazyflie ID in the `config.yaml` file, that your crazyflie is on, the virtual machine (and not the host).



4. **If you Crash**. If you happen to crash you crazyflie, you will likely have to restart this service by clicking `ctrl + C` in the terminal window used to run `ros default.launch`, and then rerunning the command.

Running Braitenfly

Running *Braitenfly* will activate certain reflexes in your crazyflie drone. These reflexes will do things like cause your crazyflie to move or make sounds based thi reflexes are programmed as 'modules' that the user can modify.

1. **Edit active modules**. Navigate to `/home/crazyflie/catkin_ws/src/braitenfly/config` and open `braitenfly_config.yaml` by double-clicking. This fil when *Braitenfly* is running. You choose what modules to activate/deactivate by modifying the `modules` list. Placing a `#` in front of a module will deactiva modules `buzzer_frontrangefinder` & `orient_rangefinders` are active.

```
modules:
  - 'buzzer_frontrangefinder'
#  - 'land_toprangefinder'
#  - 'retreat_allrangefinders'
  - 'orient_rangefinders'
#  - 'approach_frontrangefinder'
```

2. **Edit module parameters**. In the same `braitenfly_config.yaml` file you can edit module parameters. Each module has a corresponding list of paramete that affect the behavior of the module. For instance, the `approach_frontrangefinder` module has three parameters, which affect the thresholds for appro customize these parameters, although it is recommended to start with the defaults.

```yaml
buzzer_frontrangefinder:
  - 200 # distance threshold, mm

land_bottomrangefinder:
  - 200 # land threshold, mm

land_toprangefinder:
  - 100 # land threshold, mm

retreat_toprangefinder:
  - 300 # distance threshold, mm
  - 0.2 # retreat distance, m

approach_frontrangefinder:
  - 500 # high distance threshold, mm
  - 200 # low distance threshold, mm
  - 0.2 # approach distance, m
```

3. **Run Braitenfly & fly drone**. Place your drone in a safe & level area. Open a new terminal and run the command `rosrun braitenfly braitenfly.py --ta` initialize *Braitenfly* and cause your drone to takeoff with the modules in `braitenfly_config.yaml` active.
4. **Landing**. To land, place your hand (or other object) over the top of the crazyflie.
5. **Run Braitenfly without taking off**. If you want to run *Braitenfly* without taking off, and/or without the buzzer active you can change the `takeoff` and/or `rosrun braitenfly braitenfly.py --takeoff=0 --buzzer=0 .`
6. Note that anytime you want to change modules/parameters you must restart *Braitenfly*. First land the crazyflie, then click `ctrl + C` in the window used to `braitenfly.py` , and then rerun the command. You will also have to do this in the event of a crash. Note that you may also have to restart you crazyflie dro

Troubleshooting

Turning off the buzzer

In the event of a crash, sometimes the buzzer may be stuck in an `on` state. To stop it, open a new terminal and run `rosservice call /play_buzzer '{numbe duration: 0.01, stop: 1}' `