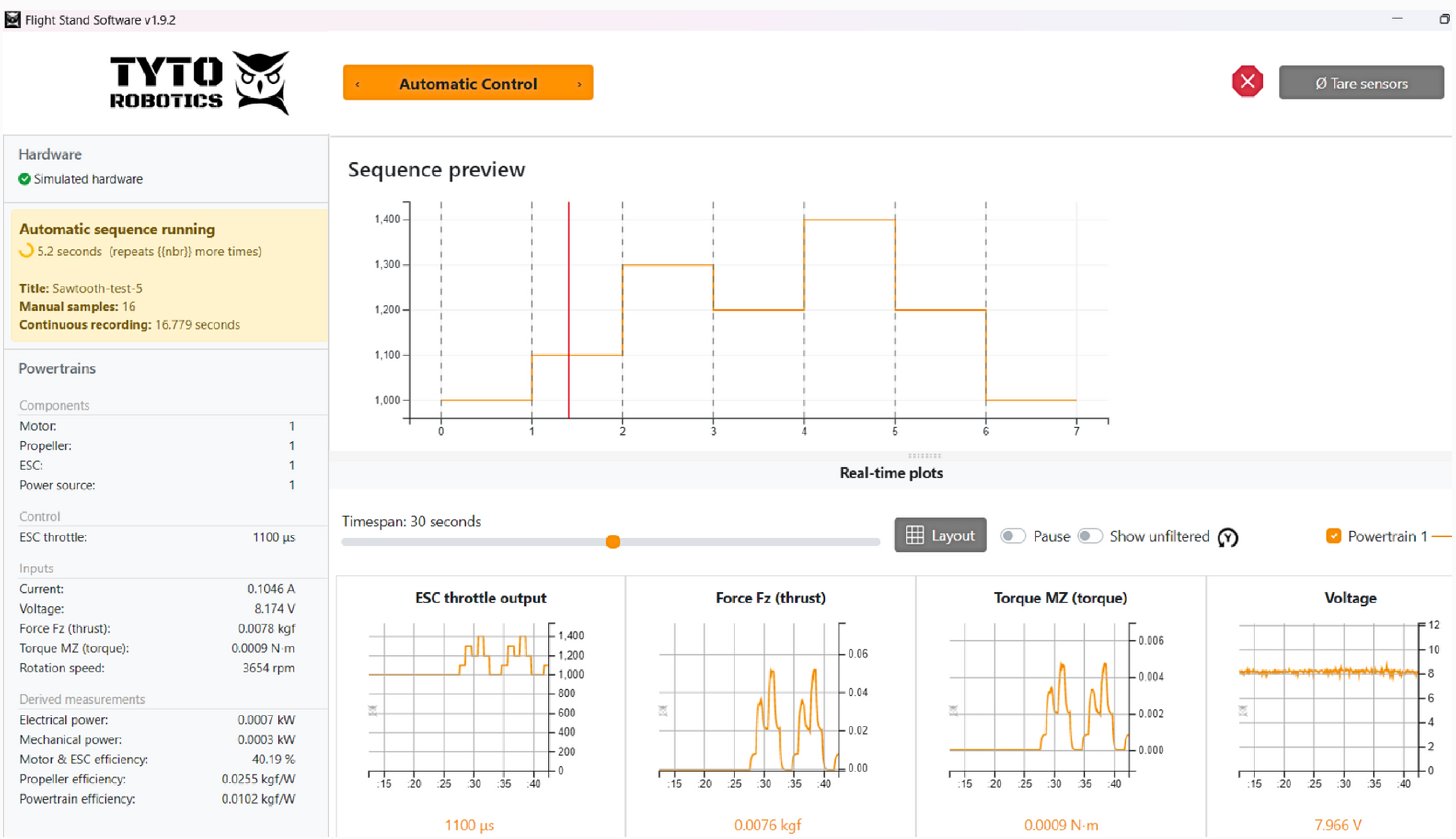
Flight Stand Software User Manual
Document ID: FUM112
V1.0 2023-12-21

Flight Stand Software
User Manual

Plan, control, and manage tests with the Flight Stand software



Made in Canada

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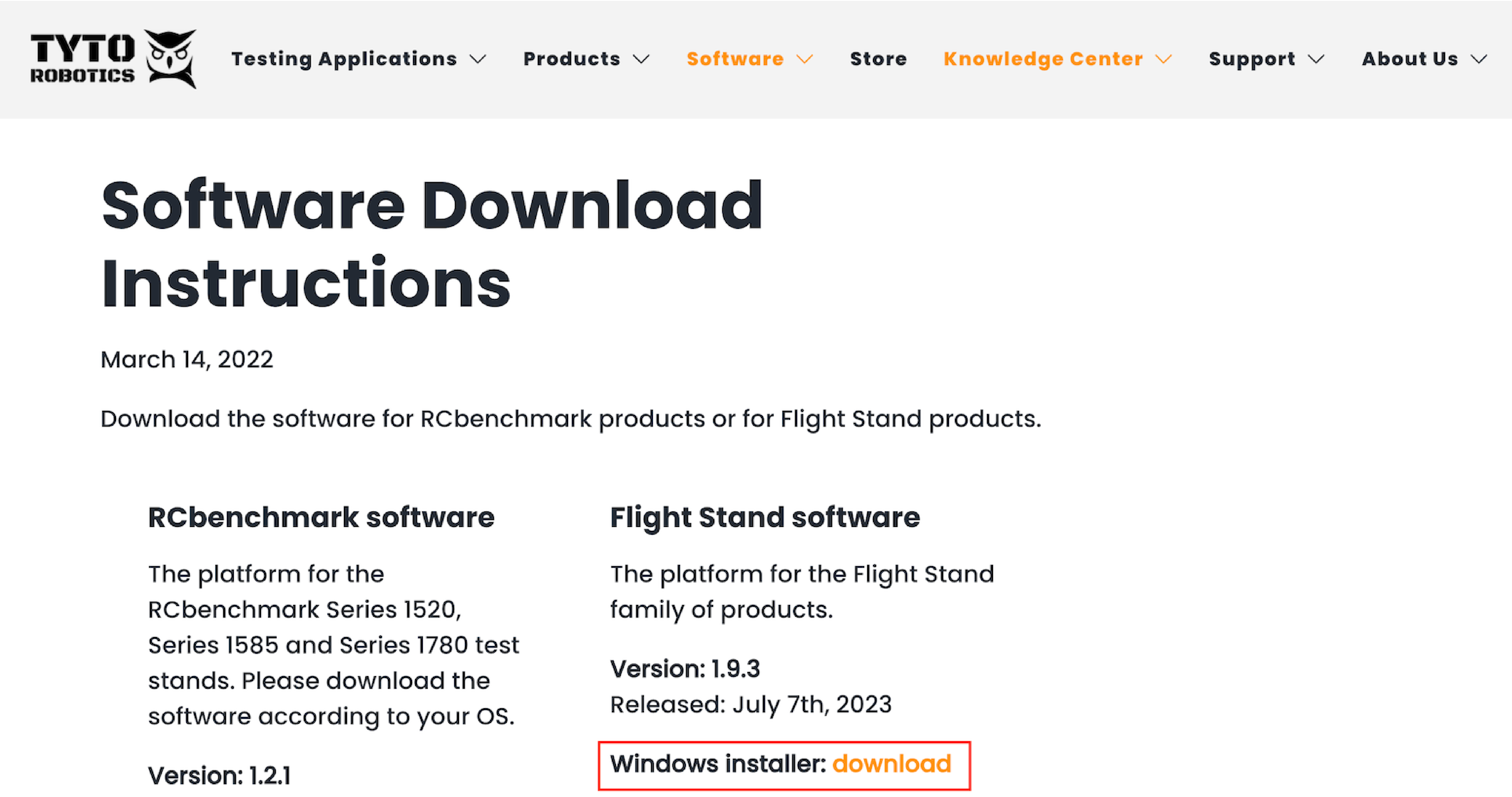
1. Download the Software

Download and install the Flight Stand Software on your computer.

Steps:

1. Visit tytorobotics.com/download
2. Locate the "Flight Stand Software" section and click the "download" button.



3. After the download is complete, run the installer.

If you encounter any issues installing the software, try performing the installation in administrator mode.

2. Setup the Simulated Board (optional)

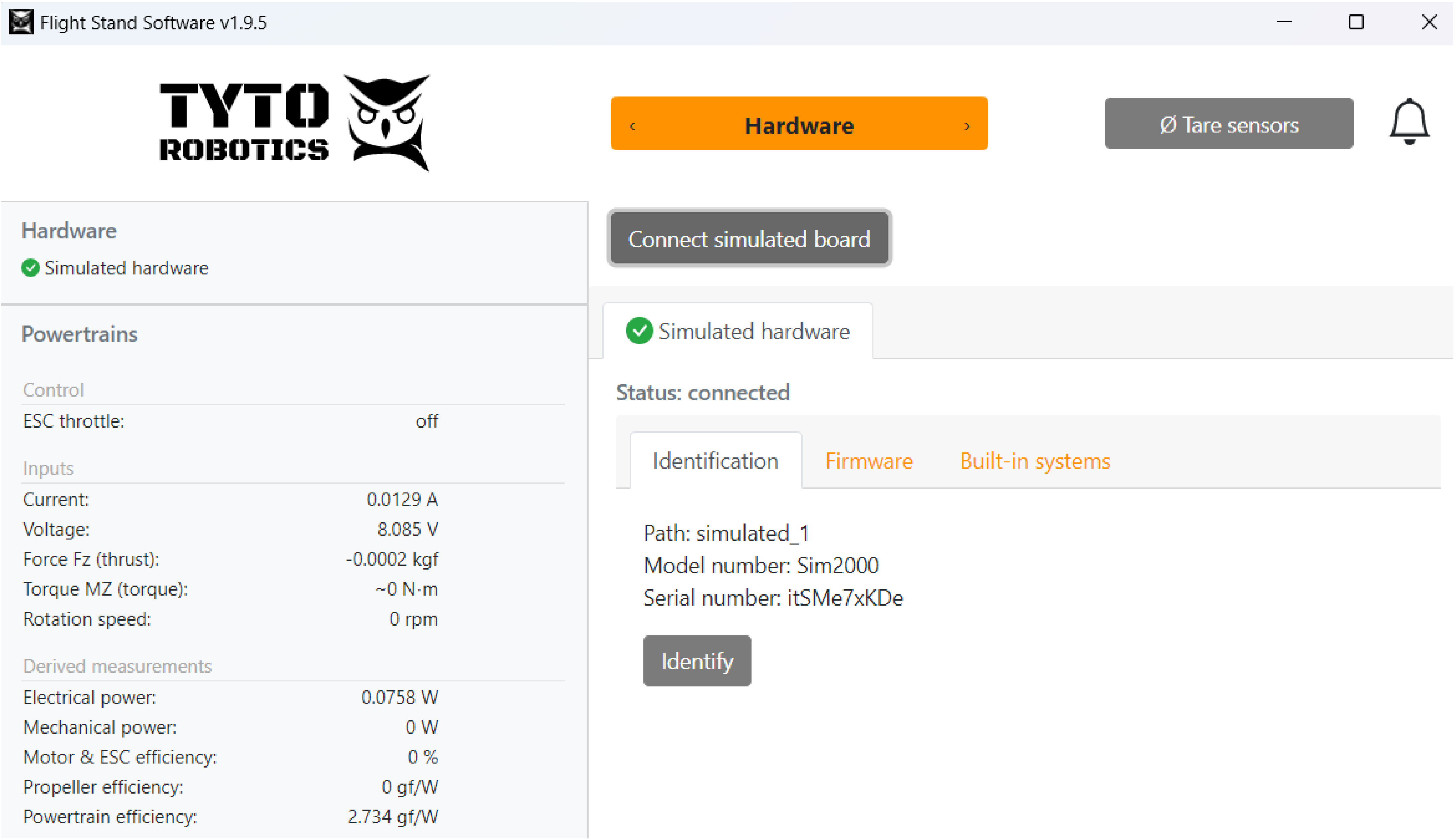
The software includes a simulated board that users can use to simulate a test and explore the software before purchasing a thrust stand. Connecting a simulated board is optional but a great way to become familiar with the platform, no purchase necessary.

The data output from the simulation are based on tests with a real motor, which were used to create a performance model.

Video Tutorial: https://www.youtube.com/watch?v=oszJTbkftbE

Steps:

1. Open the Flight Stand Software and navigate to the Hardware tab.
2. Click "Connect Simulated Board". In the left panel, simulated data will be displayed.

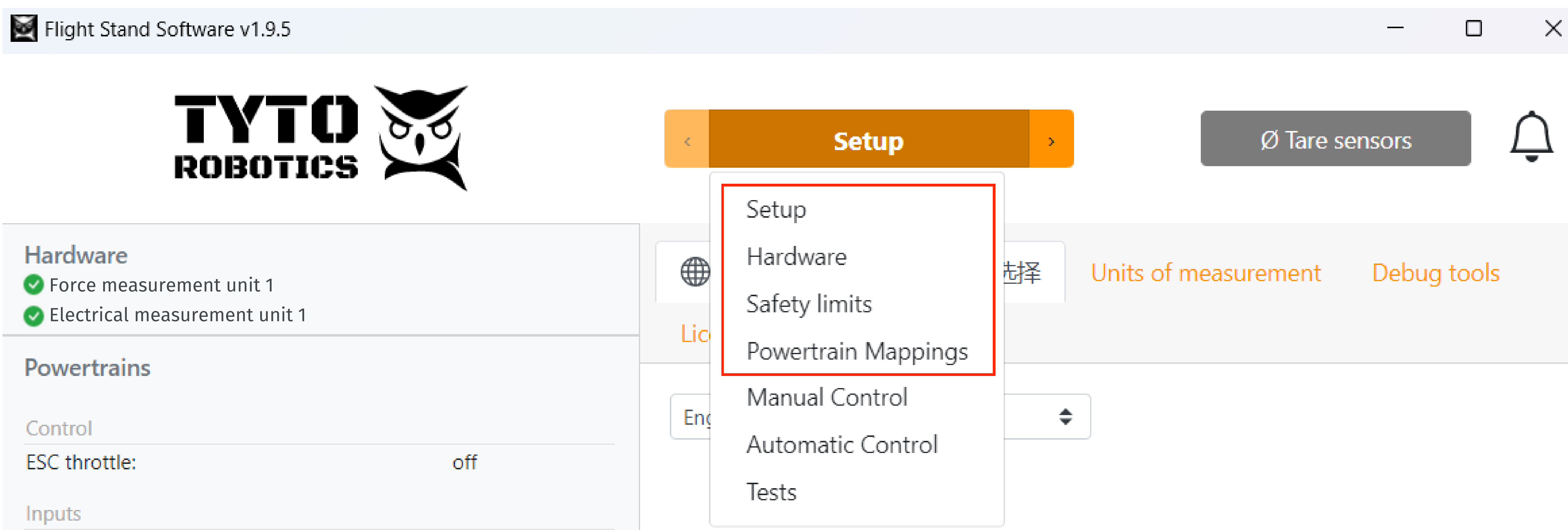


3. To simulate a dual or multi-motor system, return to the Hardware tab and click "Connect Simulated Board" again, adding another simulated powertrain.

Once the simulated board is connected, you can proceed as if it were a real thrust stand and perform the setup, tests, and data visualization described in the next sections.

3. Software Configuration

Configure the software before beginning your tests to ensure optimal performance and safety. Here we will cover the settings in the first four options of the drop-down menu.



Video tutorial: https://youtu.be/JUSK1Mns0TA?si=jojtv8rcm57Np1vZ&t=27

Steps:

1. Open the Flight Stand software.
2. Connect your Flight Stand to the USB port of your computer. In the left panel, the Force Measurement Unit and Electrical Measurement Unit will appear.
3. Click on 'Setup': customize your units of measurement.
4. Click on 'Hardware': see details about the Flight Stand(s) connected, including serial number, firmware, and which additional systems are active, such as servo controllers and probes.
5. Click on 'Safety limits': set safety cut-off values that will limit how high or low your thrust, torque, voltage, current, RPM, and other parameters can go.
6. Click on 'Powertrains': map your powertrains by assigning names to your motor, propeller, ESC, and power source. Ensure that the powertrains are associated with the correct force and electrical measurement units.

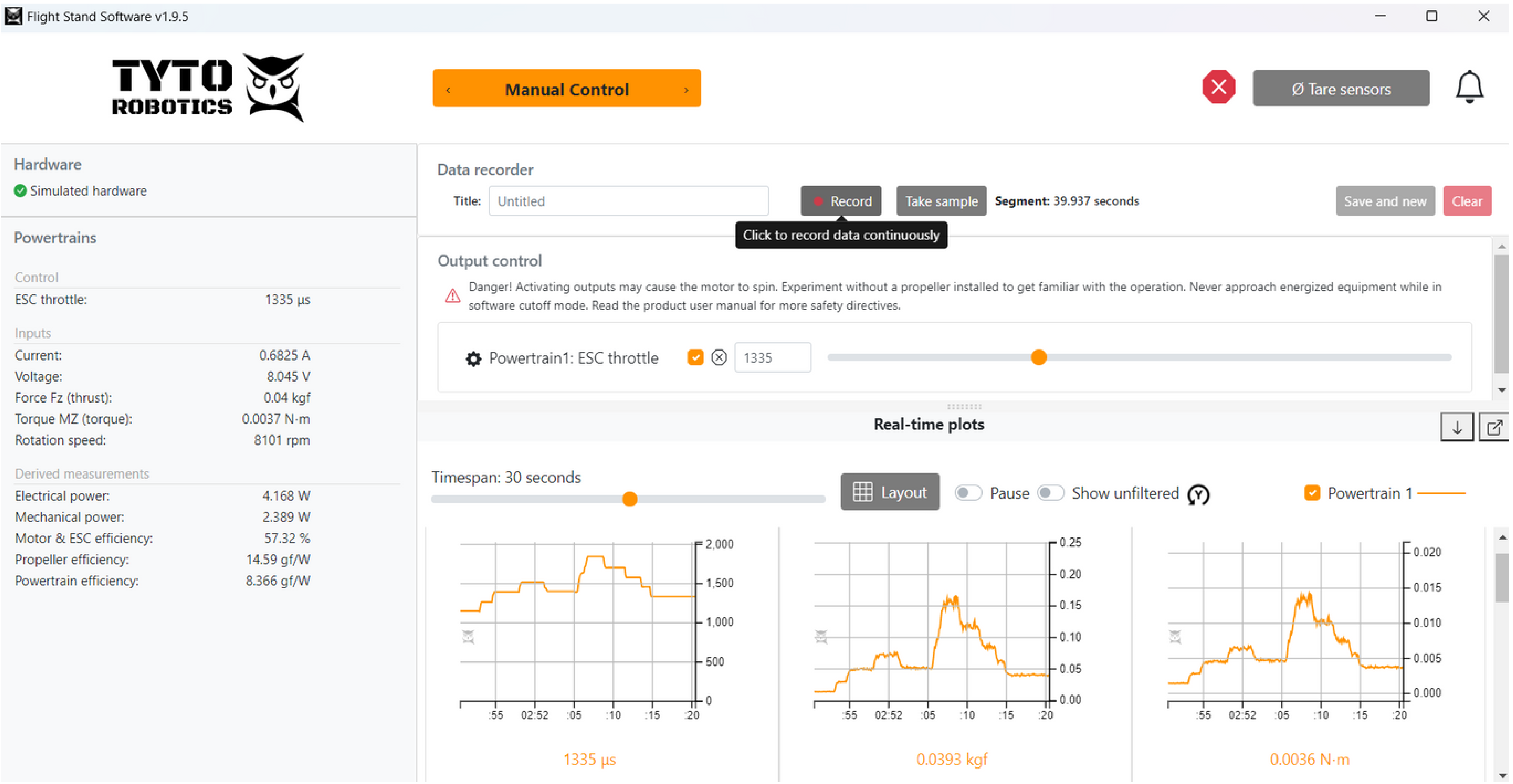
4. Manual Testing

Perform manual control tests using the ESC throttle slider.

Video tutorial: https://youtu.be/FzfvaZogpwQ?si=6XANU7NCvHQAaHju

Steps:

1. Connect and configure your Flight Stand.
2. Select ‘Manual Control’ in the main drop-down menu.
3. Name your test.
4. Select how you would like to record data: continuously by clicking ‘Record’ or with snapshots using the ‘Take sample’ button.
5. Activate your ESC by checking the box next to the throttle slider.
6. Drag the throttle slider to start the test or enter a throttle value in the text box. The incoming data is visible on the real-time plots.



7. When you are finished, deactivate your ESC by unchecking the box next to the slider.
8. Stop continuous recording by again clicking on the ‘Record’ button
9. Click ‘Save and new’ to save your test.
10. View your results in the ‘Test’ tab where you can also export your data.

5. Automated Testing

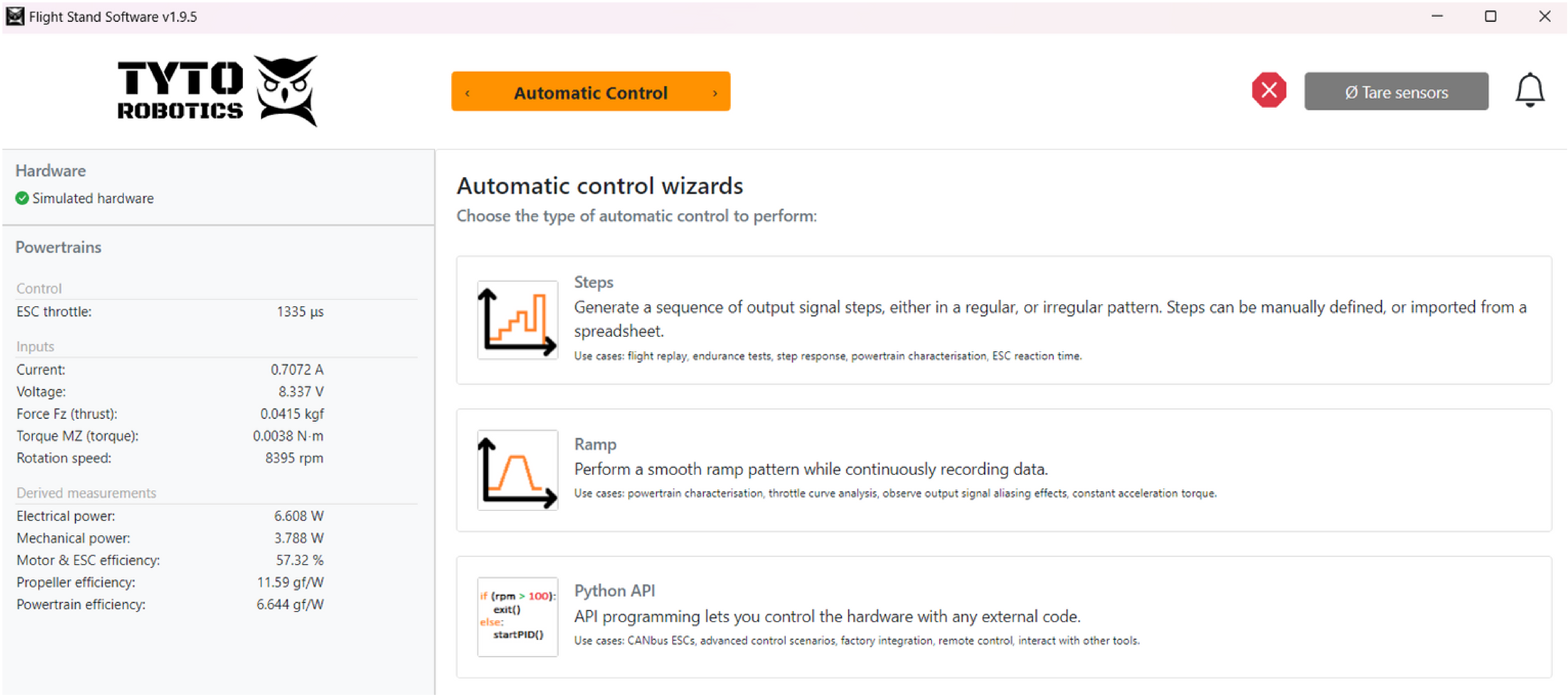
Set up and program automated tests using one of several methods.

a. Values table

Video tutorial: https://youtu.be/0RqCtd3qnwc?si=l44I6jeJQab18dnr

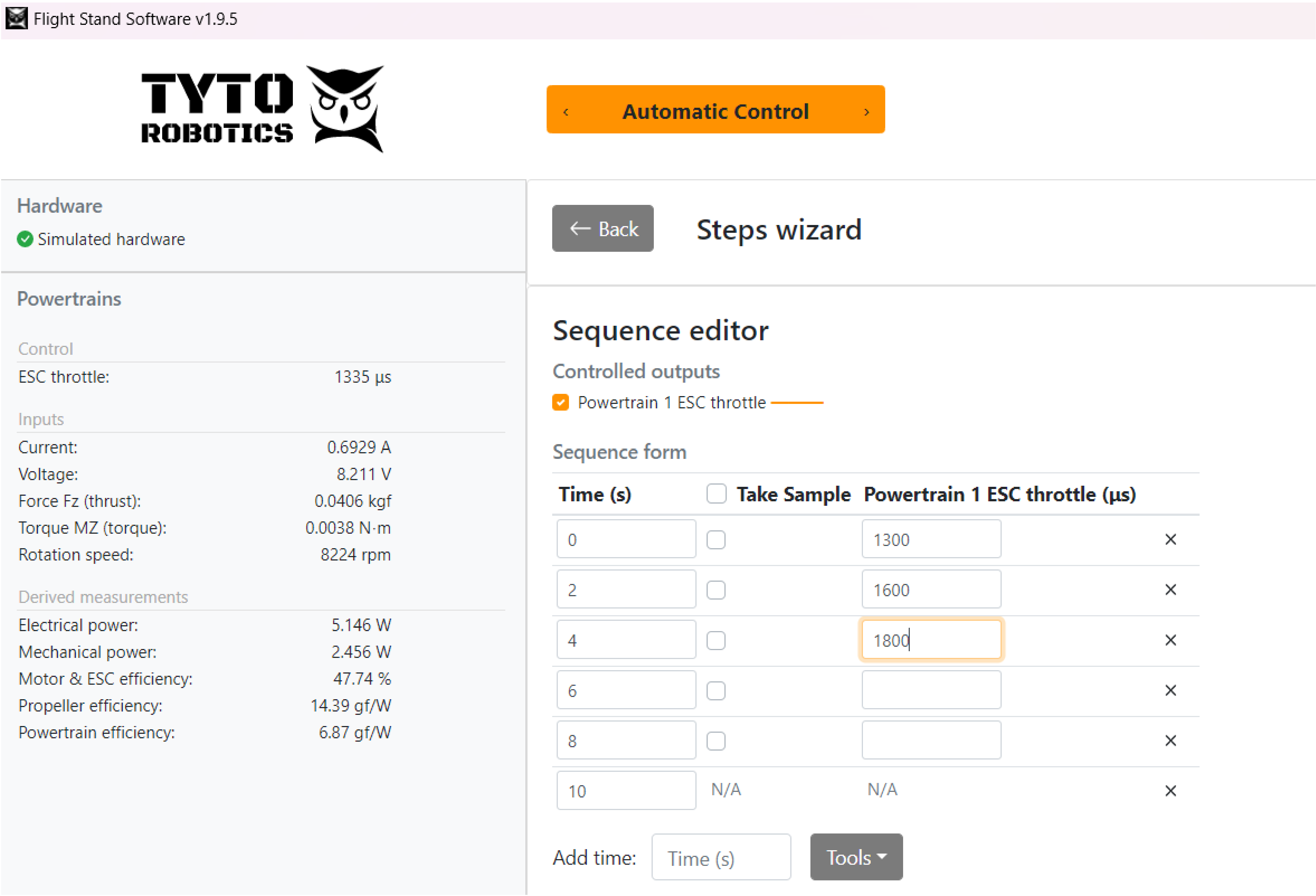
Steps:

1. In the 'Manual Control' tab, activate the ESC.
2. In the 'Automatic Control' tab, select a type of test (Step or Ramp).



3. Under 'Controlled outputs' check the box next to the powertrain(s) you'd like to test.
4. Under 'Sequence form', use the 'Add Row' box to enter the time points at which you'd like to make a change in the throttle.

5. Automated Testing



5. In the ‘Powertrain throttle’ column, add the throttle values you’d like to correspond with the time points in the ‘Time’ column.
6. Choose how you would like to collect data:
   a. To take a sample at each time point, check the ‘Take sample’ box in the table.
   b. To continuously record data, scroll down to ‘Sequence runner’ and toggle on ‘Continuous recording”.
7. Scroll down to the ‘Sequence Preview’ to see how your test looks.
8. To loop your test, enter the number of repeats in the ‘Loop sequence’ box.
9. Name the test in the ‘Title’ box.
10. Click ‘Execute sequence’ to run the test.
11. Once the test is complete, a yellow box will appear in the left panel where you can Save or Discard your data.

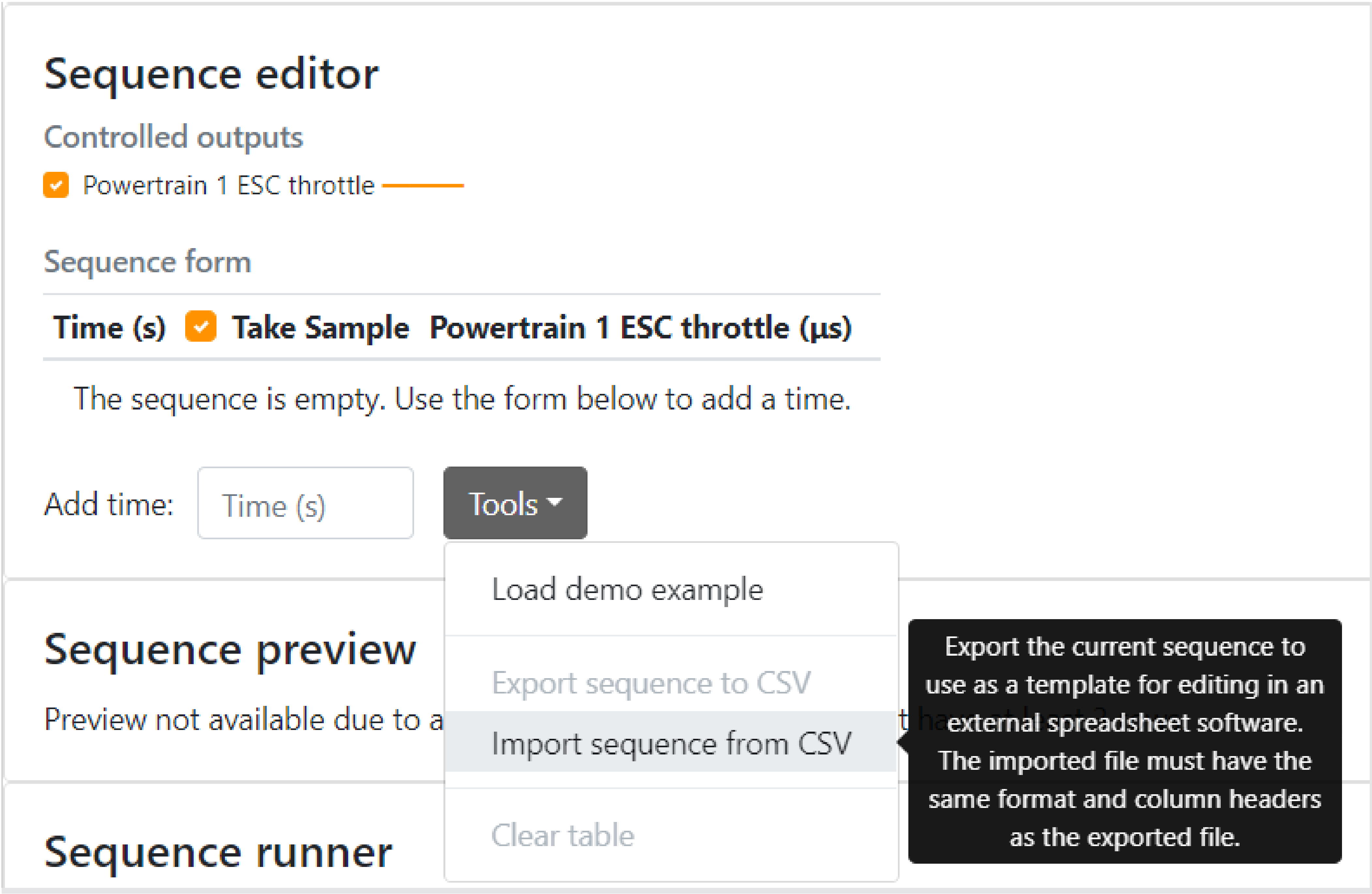
5. Automated Testing

b. CSV Upload/ Flight Replay

Video tutorial: https://youtu.be/FroCYgVlPgQ?si=3QrXeoAZ26-I1jBM

Steps:

1. After selecting a type of automated test, under 'Sequence editor', click the 'Tools' drop-down and select 'Load demo example'.
2. Again under the 'Tools' drop-down, select 'Export sequence from CSV'.
3. Use the exported CSV file as a template and add your desired time and throttle points.
4. Once your file is ready, return to the 'Tools' drop-down, select 'Import sequence from CSV' and upload the edited CSV file from your computer.



5. Scroll down to preview and execute the sequence. Once the test is complete, a yellow box will appear in the left panel where you can Save or Discard your data.

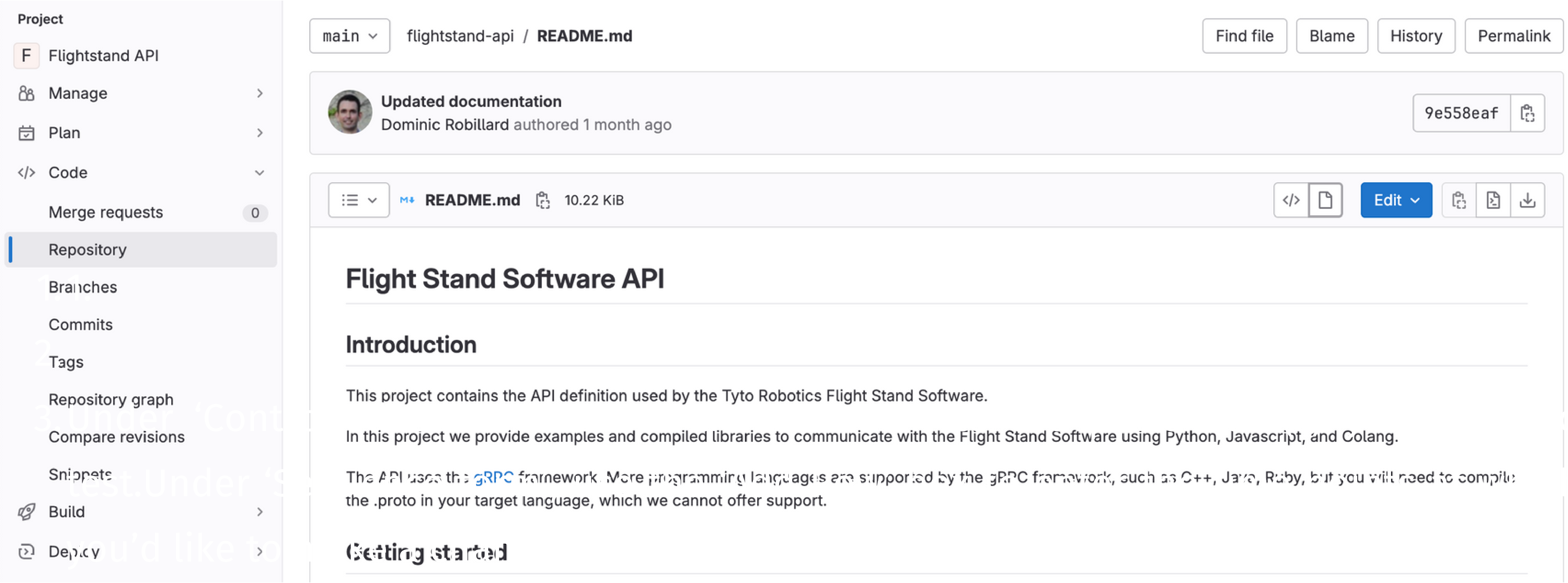
5. Automated Testing

c. Python API

Video tutorial: https://youtu.be/Gkf0dAnA1w4?si=nV3WNBGPCv49miR8

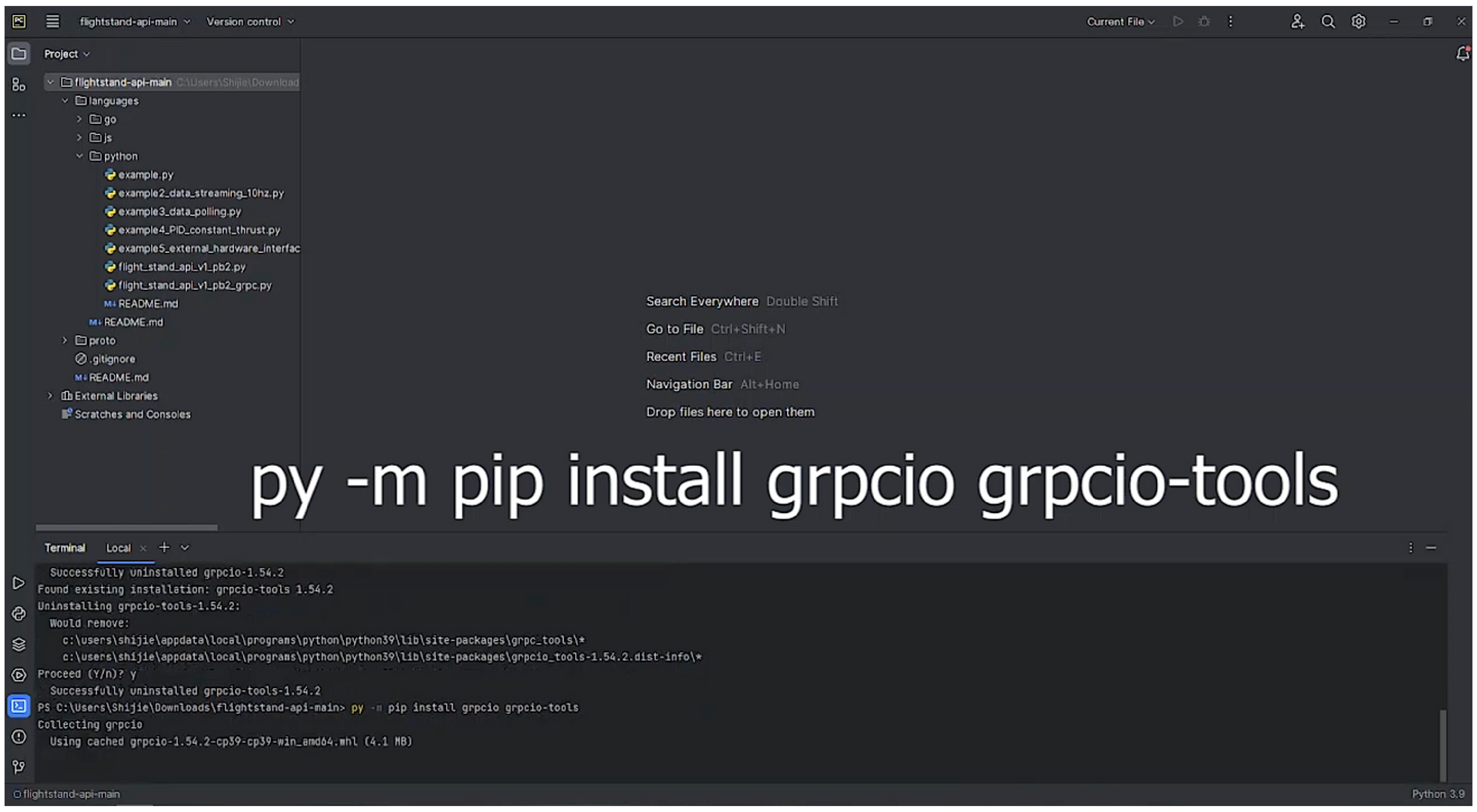
Steps:

1. Before starting, ensure you have the latest version of the Flight Stand software installed on your computer as well as a text editor with a Python compiler.
2. In the ‘Hardware’ tab of the Flight Stand software, connect your Flight Stand.
3. Navigate to the ‘Automatic Control’ tab and select ‘Python API’ from the test options.
4. Open the repository at: https://gitlab.com/TytoRobotics/flightstand-api and read the ‘README’ file.

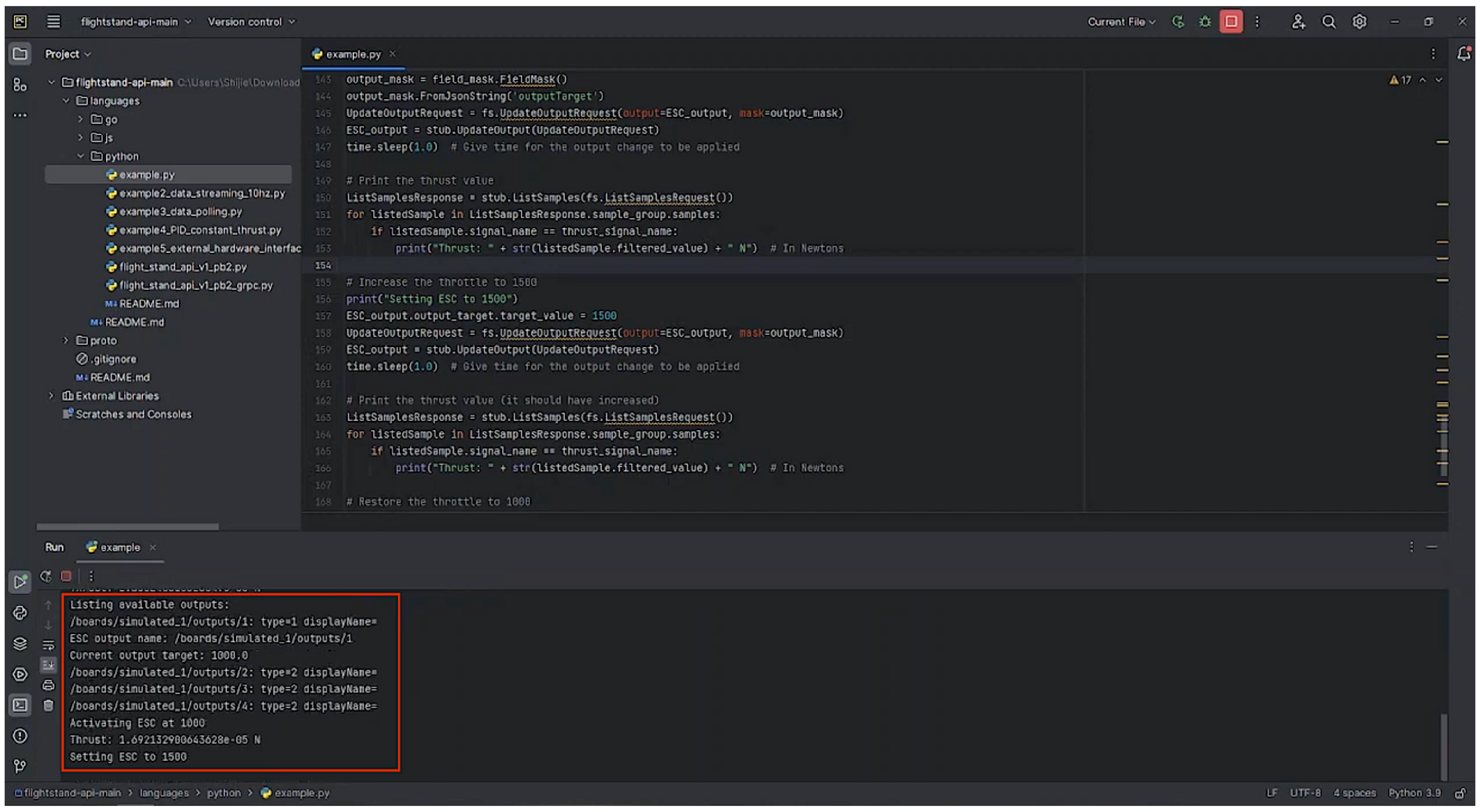


5. Open your preferred text editor (i.e. PyCharm).
6. In PyCharm you will need to configure a virtual environment.
   a. If you are using another text editor such as VS Code you will have to install Python or the Python extension.
7. In PyCharm, open the Python folder in the repository.
8. Open up a terminal in the folder and run the following command: py -m pip install grpcio grpcio-tools

5. Automated Testing



9. To verify your connection, open the Flight Stand software and make the real-time plots visible. Then in Python, run example.py.
   a. In PyCharm, the terminal will output all available boards, automatically connect the simulated board, and list all available inputs and outputs for that board.
   b. If the connection was successful, the last few lines in the terminal should reflect the ESC throttle values you see in the Flight Stand software.



d. Prepared test scripts

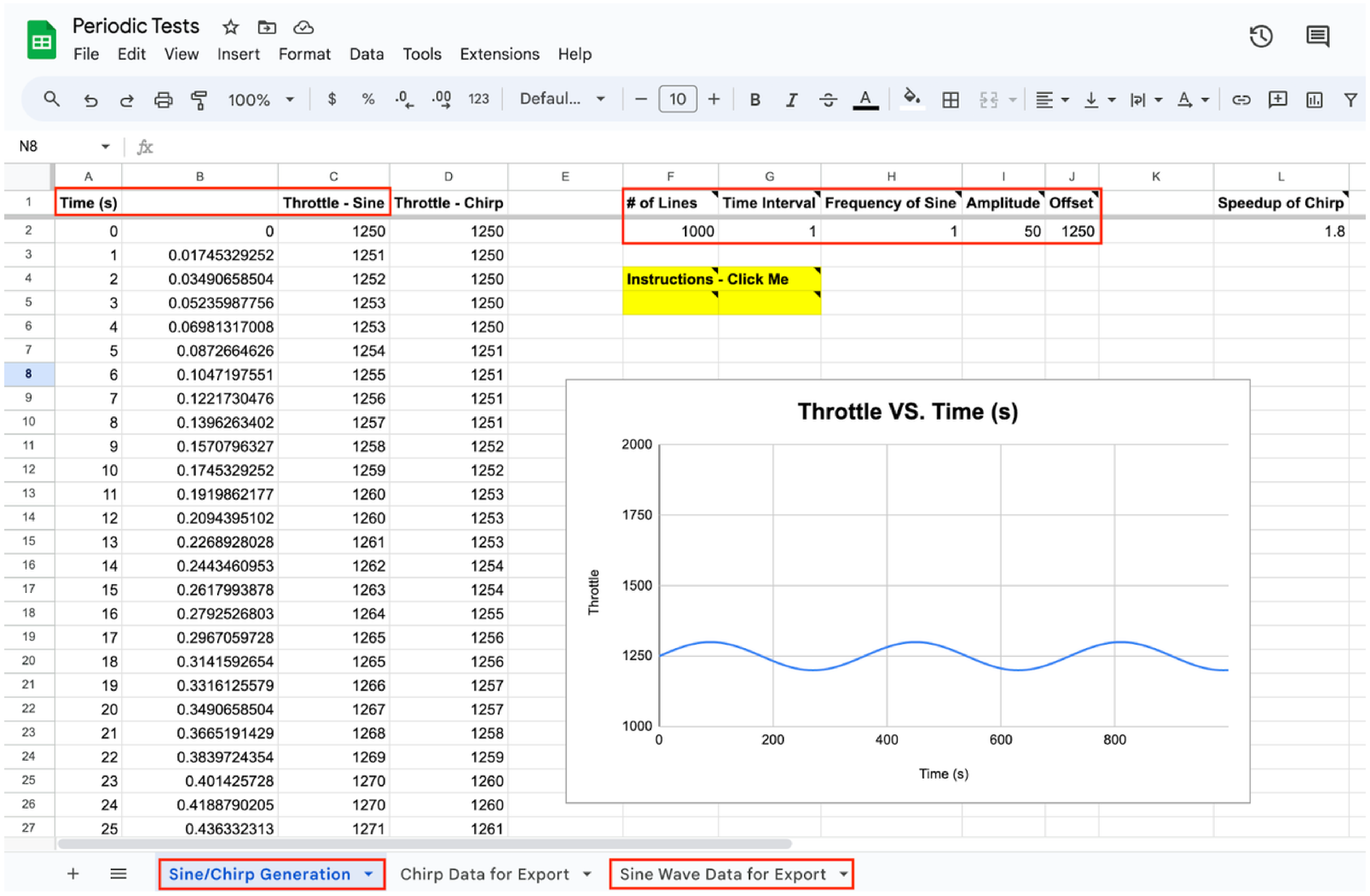
This Google sheet: https://docs.google.com/spreadsheets/d/1XvXoo7h2_0t1s1L2px2kDtGj2X2kDnwxDqttWxkEFus/edit?usp=sharing contains the templates for the Sine wave, Chirp signal, and Sawtooth tests. Add a copy to your Google Drive by clicking ‘File’ → ‘Make a copy’.

i. Sine wave

Video tutorial: https://youtu.be/0pu8JYqnV80

Steps:

1. Open your copy of the Google sheet and navigate to the ‘Sine/Chirp Generation’ tab.
2. Adjust the # of lines, speedup, frequency, amplitude, and offset values in row 2 to design your sine wave. This will adjust the preview in the ‘Throttle vs. Time’ graph.
3. Copy the ‘Time’ and ‘Throttle - Sine’ data into the ‘Sine Wave Data for Export’ tab.
4. Download the file as a CSV file (File → Download → .csv).



5. Automated Testing

5. Open the Flight Stand software and navigate to the 'Automated Control' tab, click on 'Step test'.
6. Under 'Tools', select 'Import sequence from CSV'.
7. Select and import the CSV file that you downloaded from the Google sheet.
8. The sine wave data points will be displayed in the table and a preview of the wave will be shown in the Sequence preview window.
9. Click 'Execute sequence' to run the test.
10. Once the test is complete, a yellow box will appear in the left panel where you can Save or Discard your data.

ii. Chirp signal

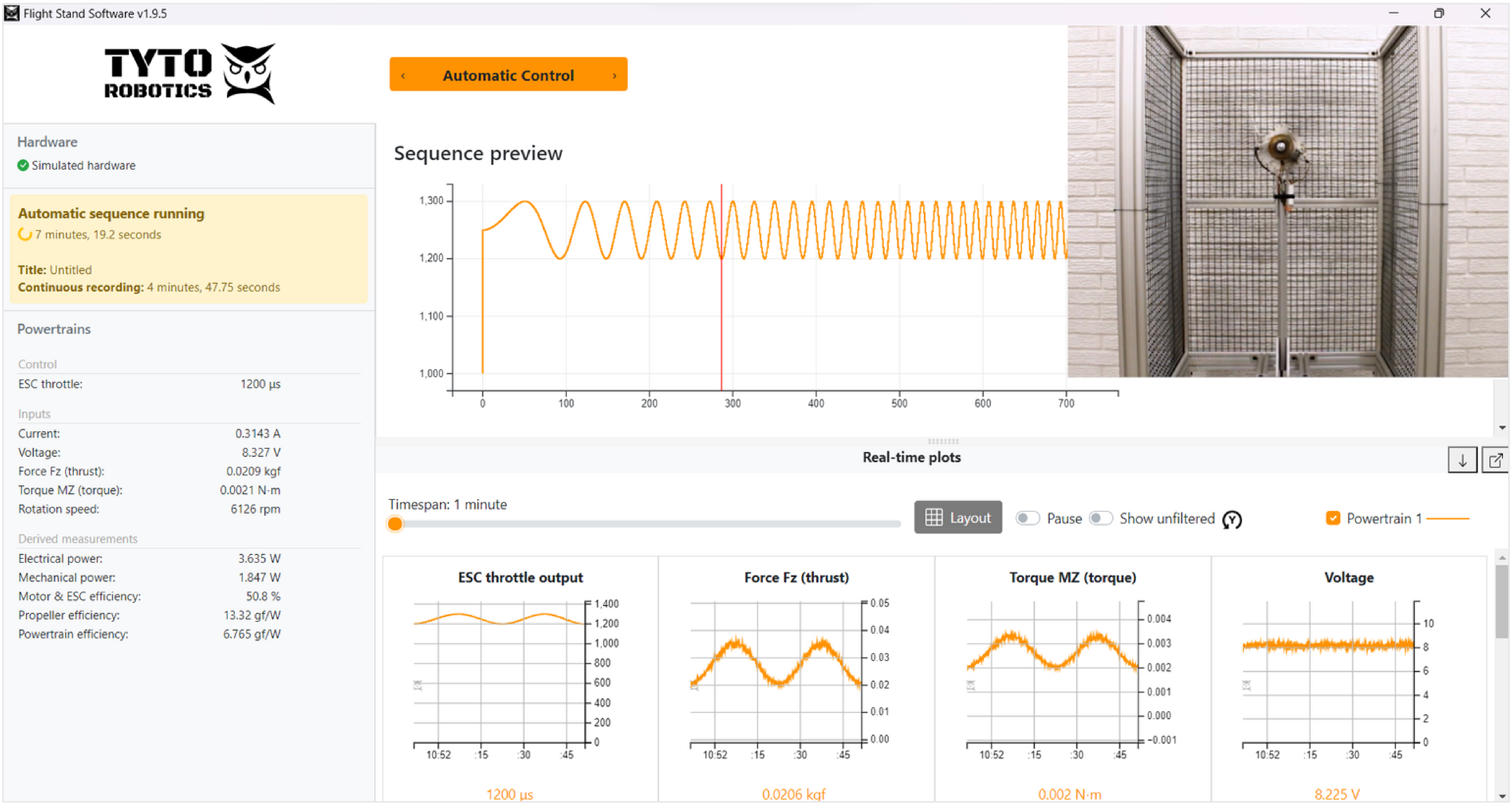
Video tutorial: https://youtu.be/0pu8JYqnV80?si=GQYjKerpszKwcb5q&t=129

Steps:

1. Open your copy of the Google sheet and navigate to the 'Sine/Chirp Generation' tab.
2. Adjust the # of lines, speedup, frequency, amplitude, and offset values in row 2 to design your wave. This will adjust the preview in the 'Throttle vs. Time' graph.
3. Adjust the 'Speedup of chirp' value.
4. Copy the data from the 'Time' and 'Throttle - Chirp' columns into the 'Chirp Data for Export' tab.
5. Once you have added the data to the appropriate columns, download the file as a CSV file (File → Download → .csv).
6. Open the Flight Stand software and navigate to the 'Automated Control' tab, click on 'Step test'.
7. Under 'Tools', select 'Import sequence from CSV'.
8. Select and import the CSV file that you downloaded from the Google sheet.

5. Automated Testing

9. The chirp test data points will be displayed in the table and a preview of the wave with increasing frequency will be shown in the Sequence preview window.
10. Click 'Execute sequence' to run the test.
11. Once the test is complete, a yellow box will appear in the left panel where you can Save or Discard your data.



iii. Sawtooth

Video tutorial: https://youtu.be/0pu8JYqnV80?si=c1WeU3UYjajHE6Bu&t=204

Steps:

1. Open the Flight Stand software and navigate to the 'Automated Control' tab.
2. Click on 'Ramp test'.
3. In the 'Sequence editor' table, enter 2 lines of data for time, throttle and rate of change.
4. A preview of a simple up/down pattern (sawtooth) will appear in the 'Sequence preview' window below.

5. Automated Testing

5. Enter the number of repeats you would like in the 'Loop sequence' box and click 'Execute sequence'.
6. Once the test is complete, a yellow box will appear in the left panel where you can Save or Discard your data.

iv. PID tuning

Note: we highly recommend watching the video tutorial for this section (link on page 15).

A PID controller is a special algorithm that aims to maintain a specific value for a sensor. For propulsion systems, the PID controller achieves this by continuously adjusting the throttle output required to make your propulsion system converge on the desired value.

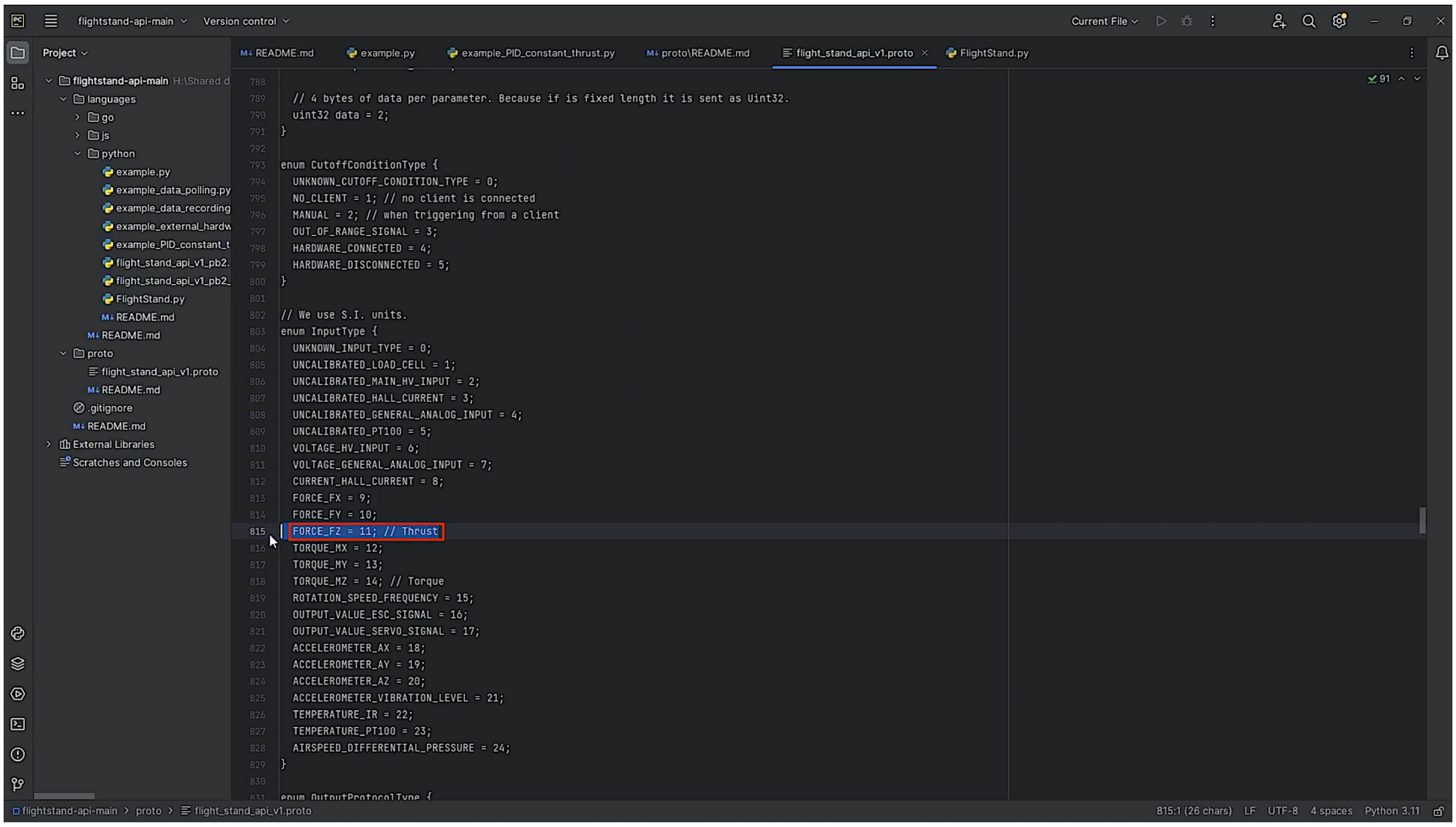
Before completing this tutorial, you will need to be able to successfully run the first example.py file in the repository. If you have not yet done so, go to section 5c of this user manual to learn how to do so.

5. Automated Testing

Video tutorial: https://youtu.be/8HSNoONR3yg

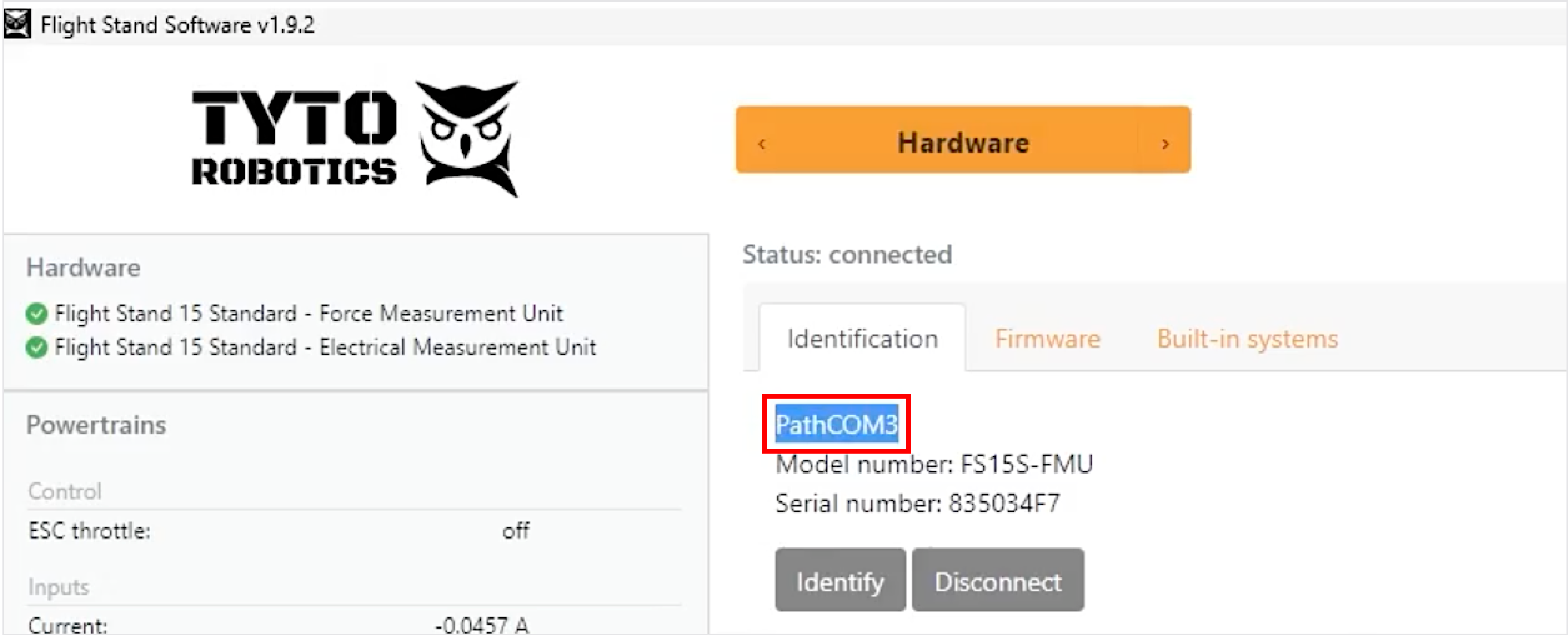
Steps:

1. Assuming you were able to successfully run the example.py file (section 5c), open the Flight Stand software.
2. Open your Python compiler and open a console to ensure you have simple-pid installed. You can check by running the command: py -m pip install simple-pid
3. Find the number corresponding to the signal of the variable you would like to target by opening the .proto file (we will use thrust as an example), then scroll until you see the list of input signals. Thrust (FZ) corresponds to number 11, note the number.

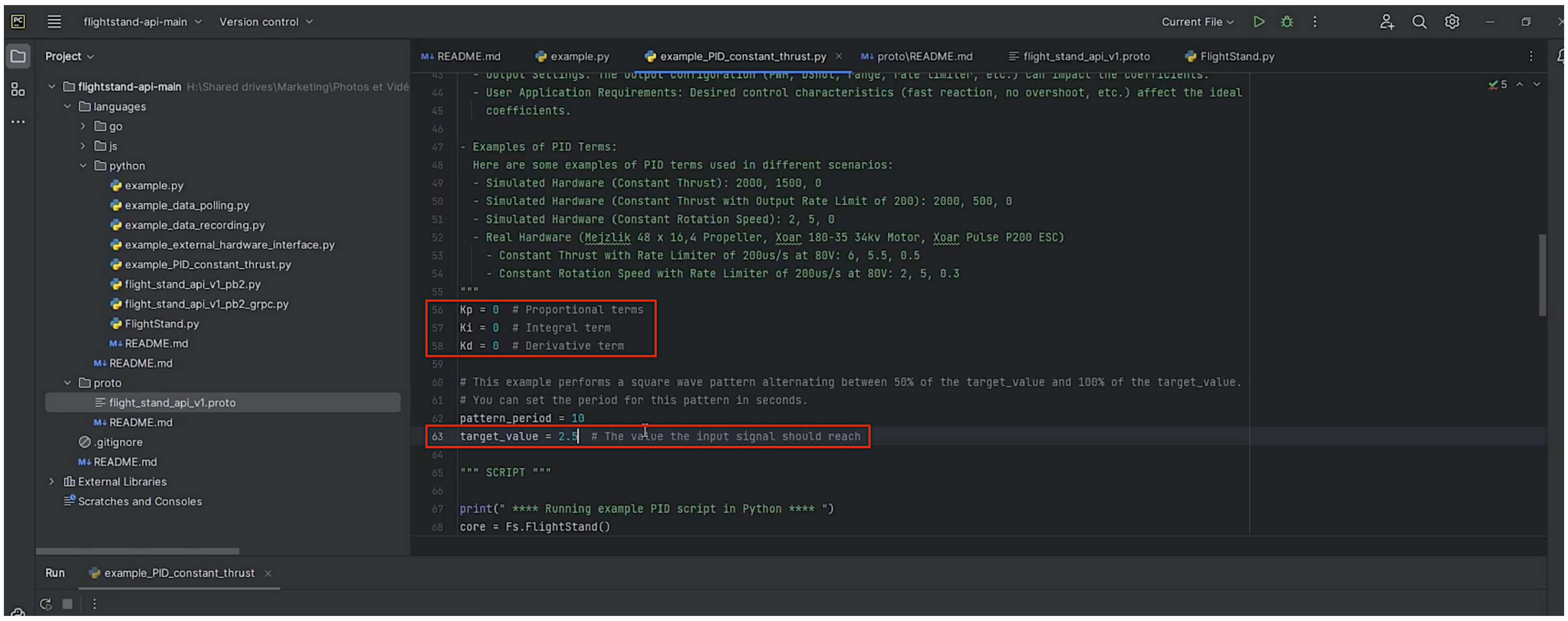


4. Open example 4. Change the input and output signals to match the powertrains in the software. You can find this information in the Flight Stand software's 'Hardware' tab. Click on your powertrain and highlight the first line of text in the 'Identification' tab.

5. Automated Testing

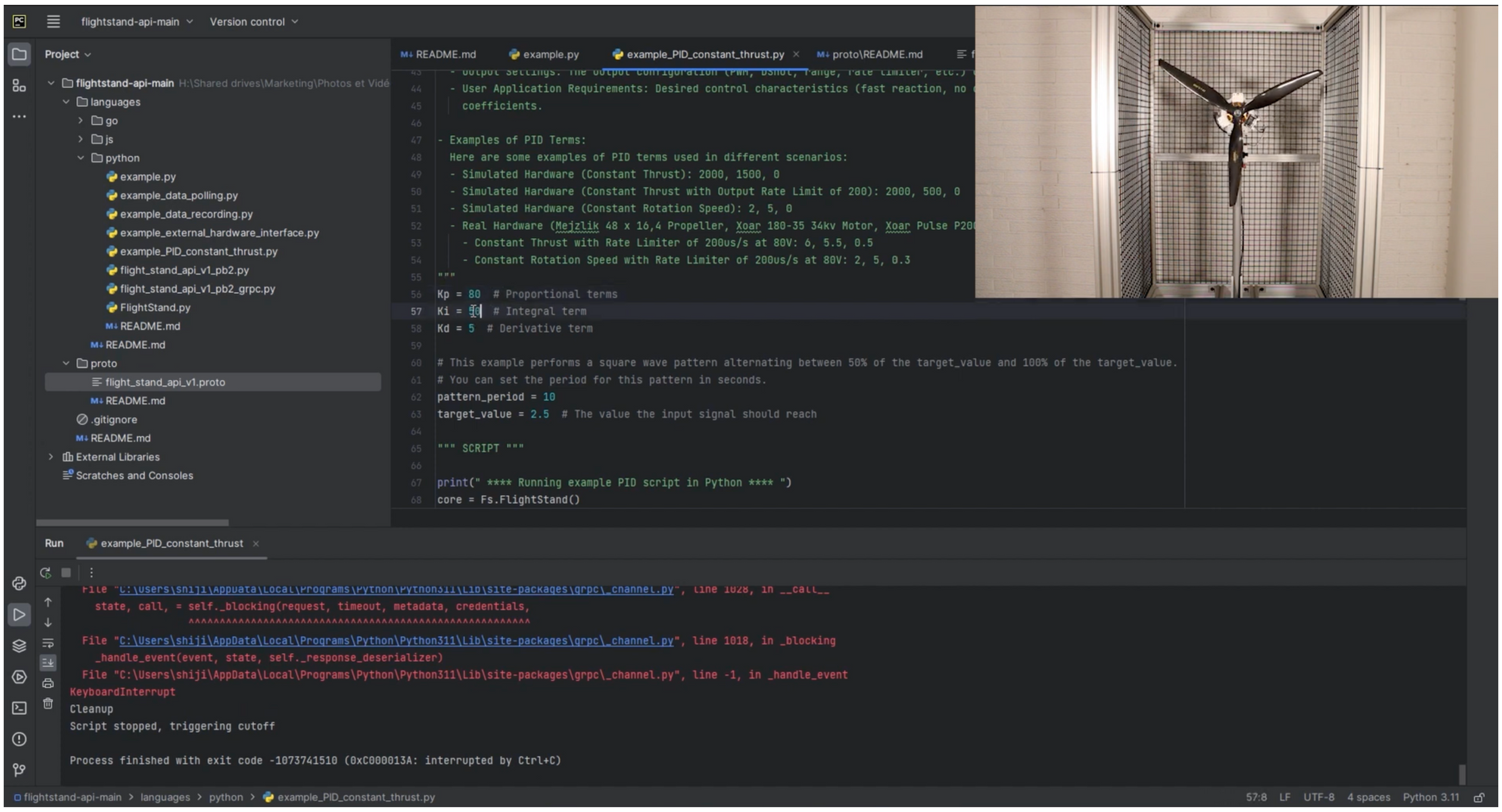


5. Paste this information into the input/output board information in the Python file.
6. Run the Python file. The terminal will output a list of available inputs.
7. Find the input corresponding to your target variable's signal number (#11 for thrust) and enter it in example_PID_constant_thrust.py after the target input board.
8. Scroll down to 'Target value' and enter the value you would like to target in SI units (Newtons for thrust).



5. Automated Testing

9. Check your settings for the length of the period, and set starting values for your PID parameters, Kp, Ki, and Kd.
    a. The Ki term (integral term) is a constant that is multiplied by the integral of the error. The product is then added to offset the error.
    b. The Kd term (derivative term) is a constant that is multiplied by the derivative of the error.
    c. The Kp term (proportional term) is similar to the integral and derivative terms but it's the product of the error and the constant.
10. Run the script and observe the Flight Stand react accordingly.
11. Adjust your Ki, Kd and Kp values as needed until you have a PID response that you are satisfied with.



6. Test Settings and Data Handling

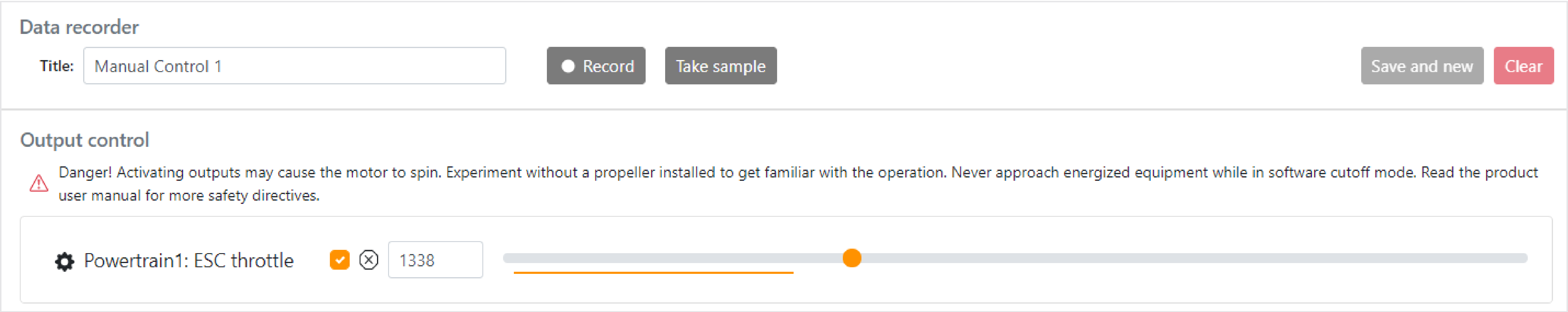
a. Motor rate limiter

Video tutorial: https://youtu.be/JRjxpPYXfaA?si=o8jKjLdUQG9nKL5b

Control the acceleration rate to protect your motor from torque or current overloading.

Steps (manual test):

1. Before activating your ESC, click the gear icon to the left of the throttle slider.
2. In the 'Rate limiter' text box, enter a maximum acceleration value in µs/s.
   a. For example, with a rate of 500 µs/s it will take 2 seconds to reach the maximum throttle of 2000 µs.
3. Activate the ESC and increase your throttle. An orange bar will show you the status of the throttle with the rate limiter applied.



Steps (automated test):

1. If you leave the rate limiter on in the manual control tab, it will apply the limit to automated control tests as well. This is the best option if you would like to apply the same rate limit to the entire test.
2. You can also configure unique rate limits to different stages of the test within the automated control tab. Navigate to the 'Automated Control' tab to start.
3. Select a type of test and input your sequence steps in the 'Sequence form' table.
4. The fourth column is the rate limiter. Enter your desired limit for each step.
5. Scroll down to the Sequence preview to see how this will look when the test is run.
6. Click 'Execute sequence' to run the test with the rate limiter.

6. Test Settings and Data Handling

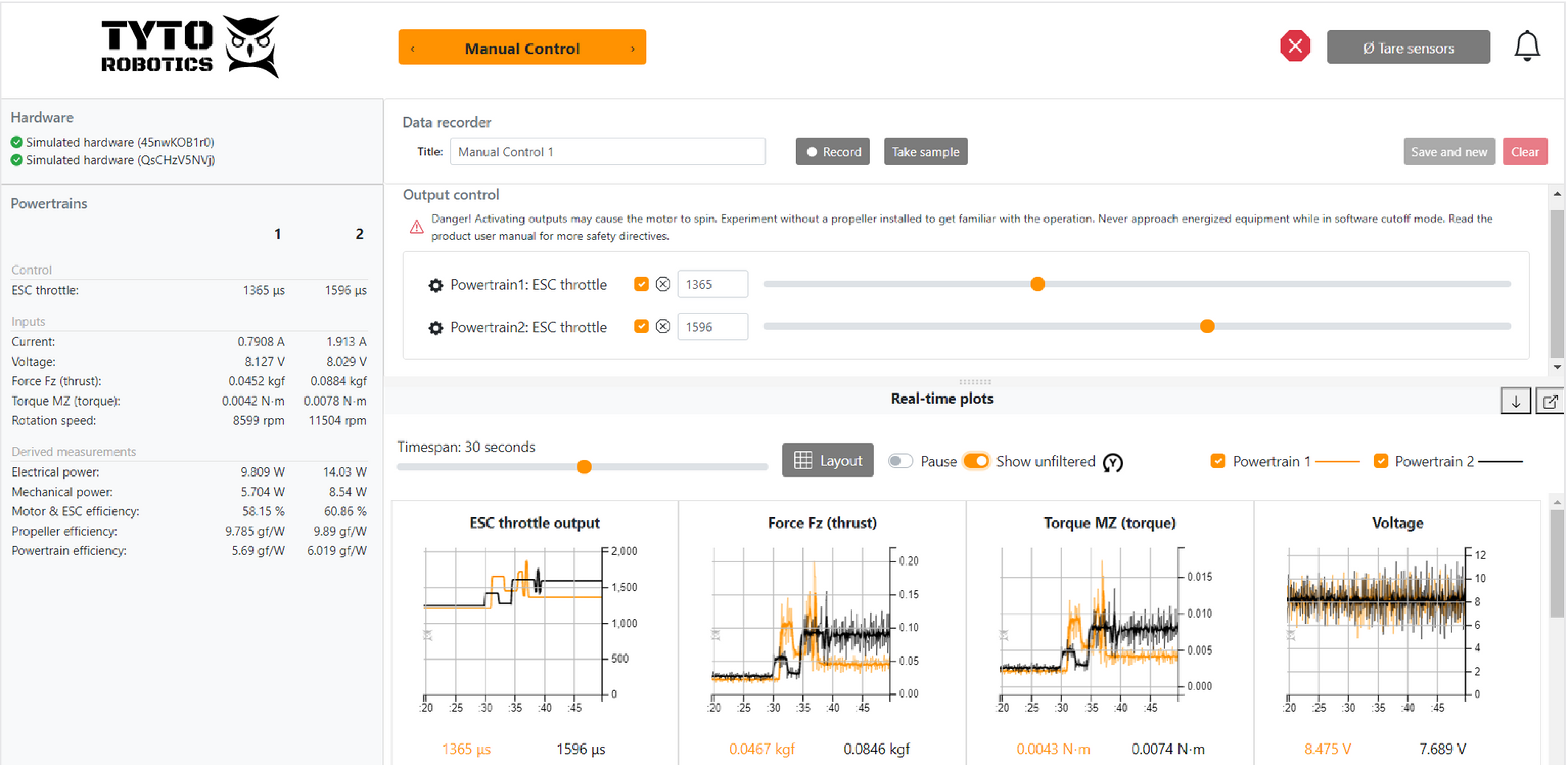
b. Customize live data plots

Video tutorial: https://youtu.be/apKQZ2ikbIA?si=jY44hL1aK1W8Zo3a

Customize how data is displayed in the real-time plots during your test.

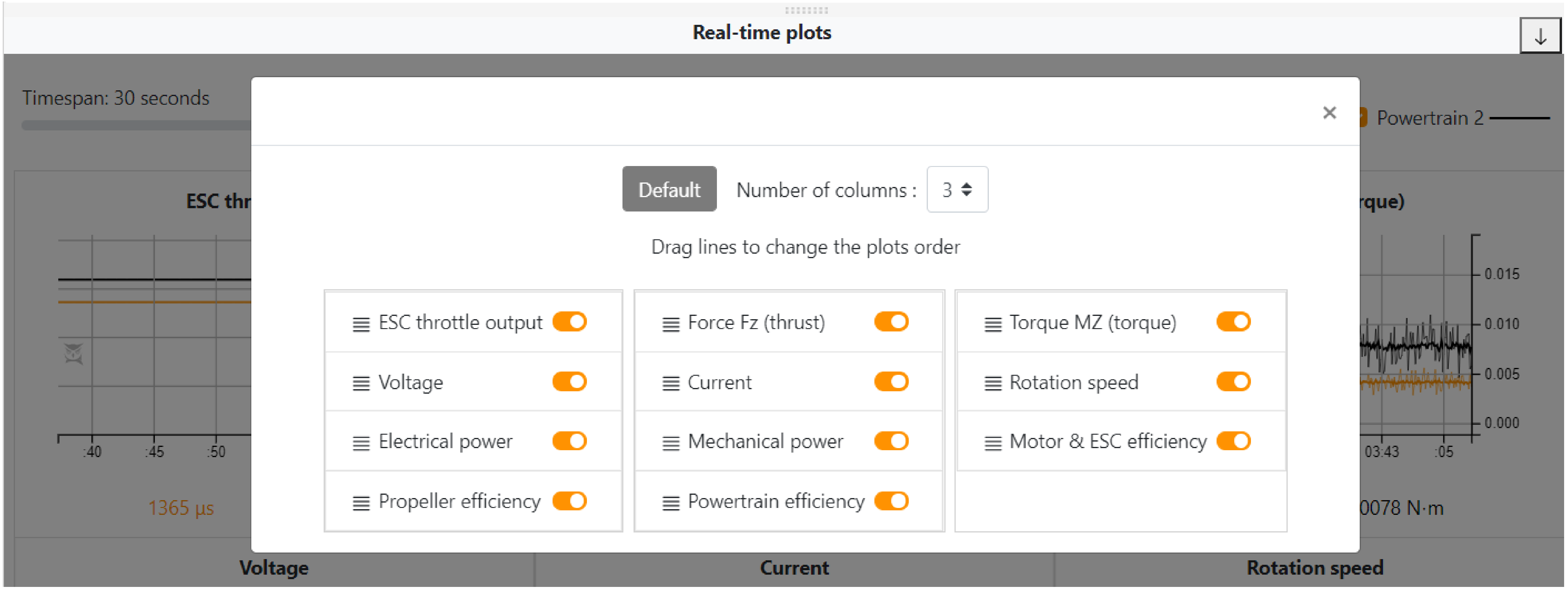
Steps:

1. Enlarge the real-time data plots window by either dragging it up from the bottom or use the arrows on the right side of the 'Real-time plots' window.
2. If you have multiple powertrains, you can select which one(s) you want to display in the plots by checking the box next to each powertrain in the top right corner.



3. Next, use the Timespan slider in the middle to control how much time you see on your x-axis. The default is 30 seconds but you can view more or less time as desired.
4. The 'Layout' button to the right of the slider pulls up a window where you can control how you view the plots. You can change their order, toggle charts on and off, and adjust the number of columns to have bigger or smaller charts.

6. Test Settings and Data Handling



5. The 'Pause' toggle switch pauses the data so you can look at a specific time snapshot. When you toggle it off, it will jump ahead to the live data.
6. The 'Show unfiltered' toggle switch allows you to see your unfiltered data. By default, a 1 Hz low pass filter is applied to smooth out readings, but this switch removes it.

c. Noise removal

Video tutorial: https://youtu.be/avy0mIs2qX0?si=DM2XTDYIilkrDlHh

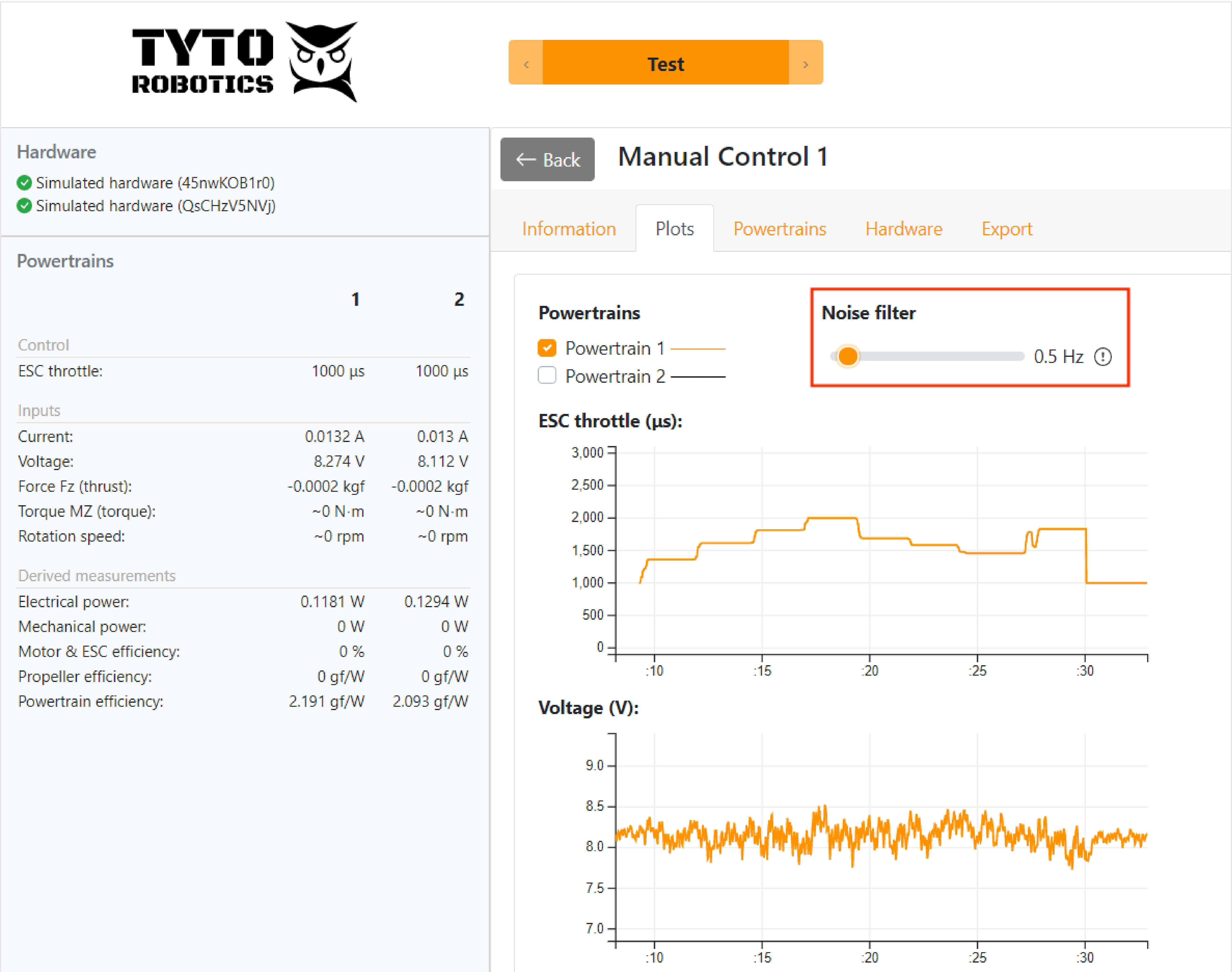
Control the noise filter that is applied to your data. To control the noise filter on the real-time data plots, see point 6 in the previous section.

Note: all the data is recorded without a noise filter. This feature implements a post-test low pass filter with a selectable cutoff frequency.

Steps:

1. Navigate to the 'Tests' tab and open the test you would like to adjust.
2. Go to the 'Plots' tab and use the 'Noise filter' slider to adjust the level of noise removal.
   a. An 1 Hz filter is automatically applied, but you can turn that off or apply a higher or lower filter.

6. Test Settings and Data Handling



d. Resample data

Video tutorial: https://youtu.be/Mc9S9Y9fUxo?si=bzWJC6vo5SsKjMGk

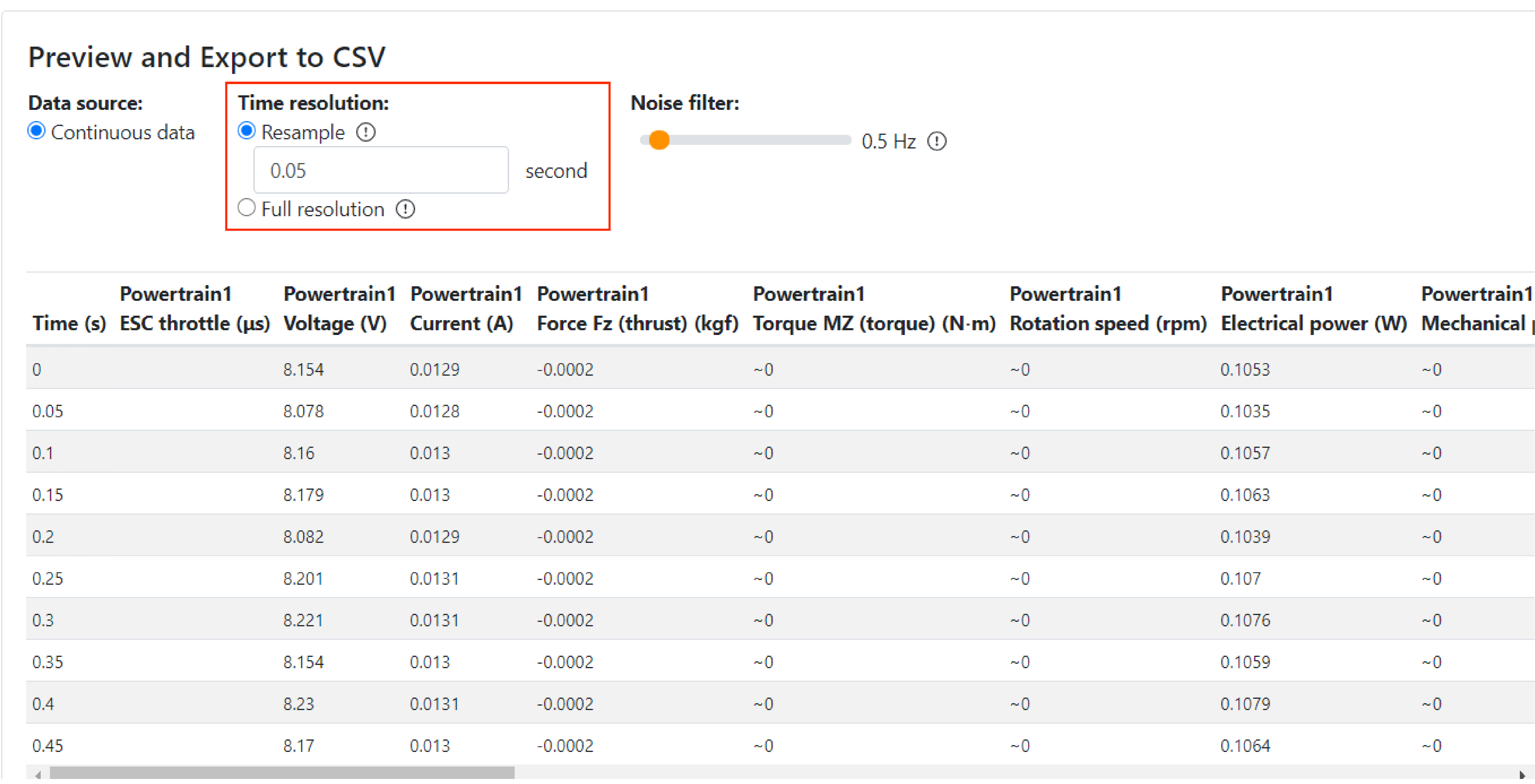
Export your data at a custom sampling rate after your test.

Steps:

1. After completing your test, go to the ‘Tests’ tab and click on your test.
2. Go to the export tab, where you'll see a table with all your data points.

6. Test Settings and Data Handling

3. Under 'Time resolution', check the option next to 'Resample' and type in your desired resolution in the text box that appears. The number you enter is how often you'd like a sample to be given in seconds.
    a. The default resampling rate is 0.1 seconds or 10 samples per second.
    b. The only limitation is that you cannot increase the sampling rate above the limits of your thrust stand (100 samples/ second for Standard Flight Stands and 1000 samples/ second for Pro).



Time (s)	Powertrain1 ESC throttle (µs)	Powertrain1 Voltage (V)	Powertrain1 Current (A)	Powertrain1 Force Fz (thrust) (kgf)	Powertrain1 Torque MZ (torque) (N·m)	Powertrain1 Rotation speed (rpm)	Powertrain1 Electrical power (W)	Powertrain1 Mechanical
0		8.154	0.0129	-0.0002	~0	~0	0.1053	~0
0.05		8.078	0.0128	-0.0002	~0	~0	0.1035	~0
0.1		8.16	0.013	-0.0002	~0	~0	0.1057	~0
0.15		8.179	0.013	-0.0002	~0	~0	0.1063	~0
0.2		8.082	0.0129	-0.0002	~0	~0	0.1039	~0
0.25		8.201	0.0131	-0.0002	~0	~0	0.107	~0
0.3		8.221	0.0131	-0.0002	~0	~0	0.1076	~0
0.35		8.154	0.013	-0.0002	~0	~0	0.1059	~0
0.4		8.23	0.0131	-0.0002	~0	~0	0.1079	~0
0.45		8.17	0.013	-0.0002	~0	~0	0.1064	~0

4. Click 'Export to CSV' to save the test to your computer at the desired sampling rate.

7. Connect a CAN ESC

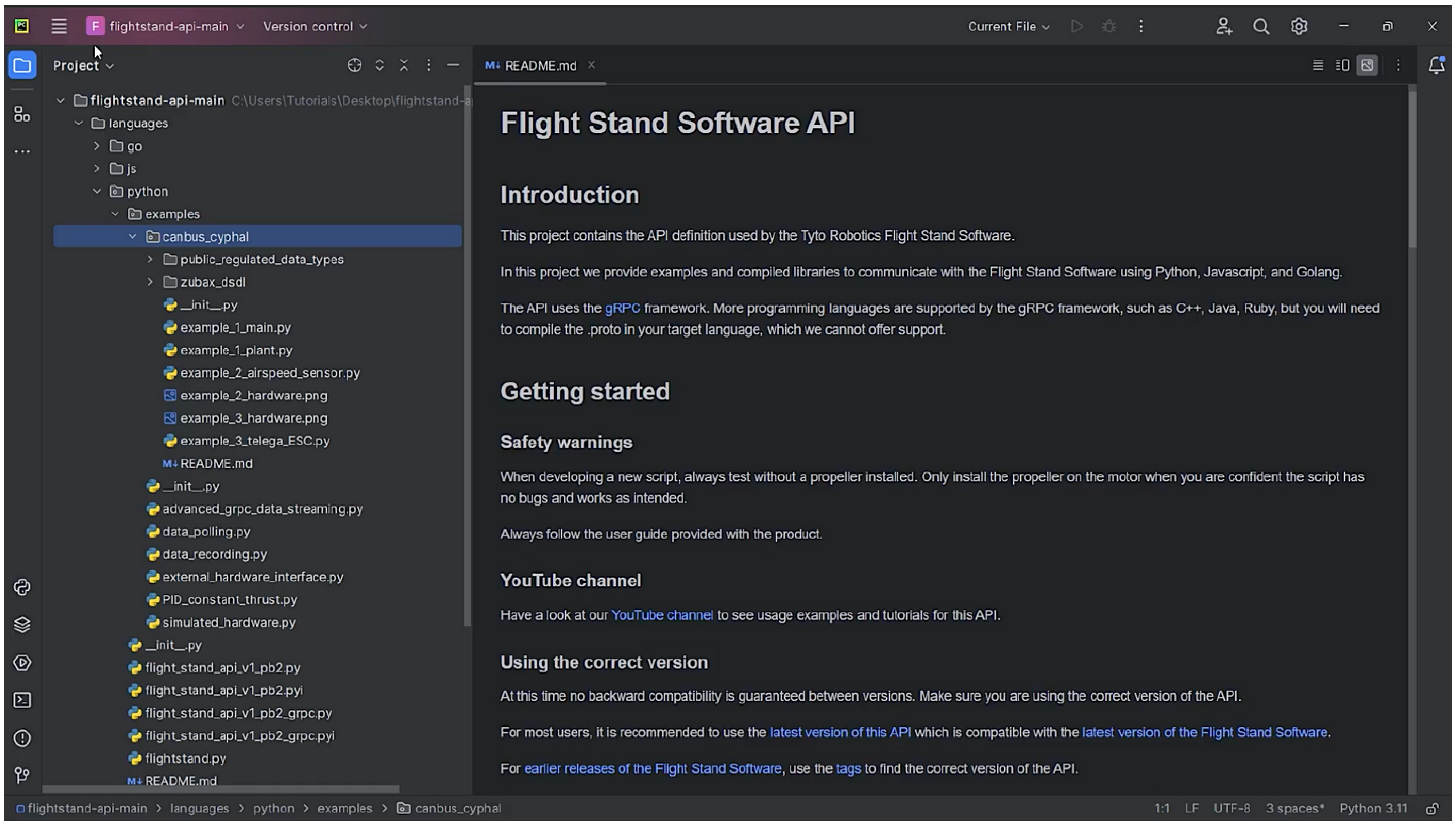
Our Flight Stands support most ESC protocols. These additional steps are required for CAN ESC protocols.

In our example, we are using the Yukon software which works specifically with Zubax devices. Other CAN products may use other third-party software.

Video tutorial: https://youtu.be/BiZuCrVQNnU?si=V2gVWdD7fGlJeMeZ

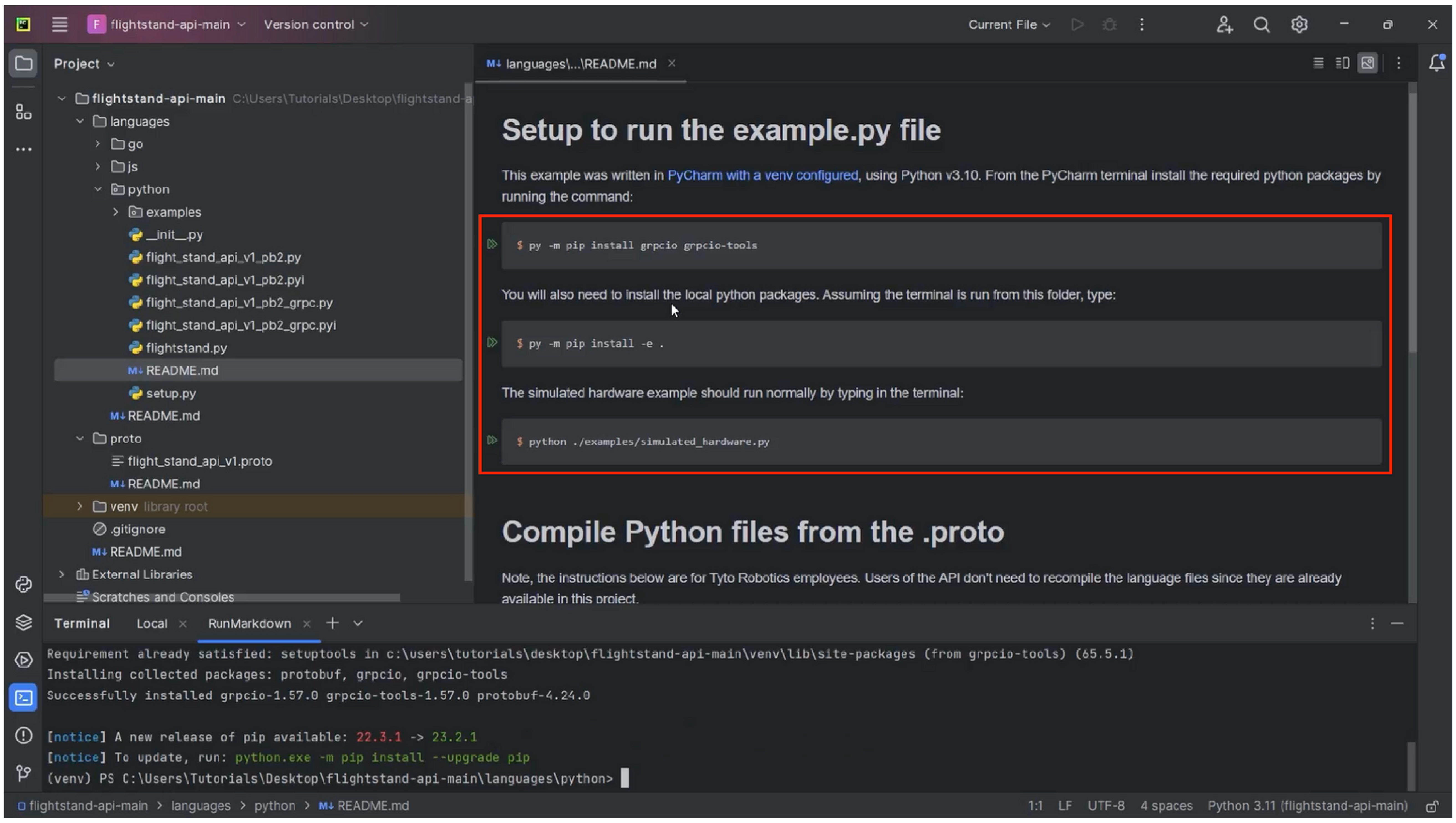
Steps:

1. Download and open the Flight Stand software.
2. Download the repository at https://gitlab.com/TytoRobotics/flightstand-api and extract the repository on your computer.
3. Download the latest version of Python as well as PyCharm Community edition.
4. Open Pycharm and open the downloaded repository.
5. In the downloaded folder, go to 'languages' → 'python' → 'examples' → 'canbus-cyphal'
   a. This is where you'll find the examples that we will be running.



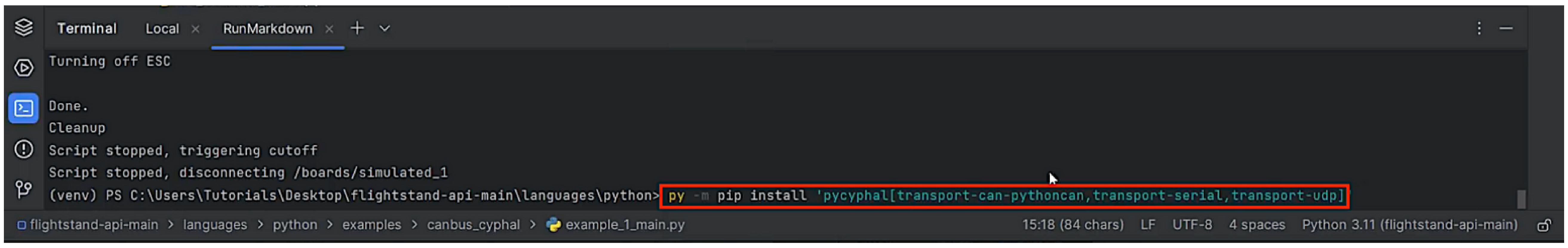
7. Connect a CAN ESC

6. Configure your Python interpreter by going to ‘File’ → ‘Settings’ → ‘Project’ → ‘Python interpreter’ and in the pop-up click ‘Add interpreter’ → ‘Add local interpreter’.
7. Click ‘Apply’ and Pycharm will automatically set up the virtual environment.
    a. To confirm that you have the virtual environment set up correctly, you can either find it in the virtual environment path or open the terminal where you will see the virtual environment before the command line.
8. Open the ‘README’ file under ‘examples’.
9. Run the three commands listed in the README file, which will install the proper packages in order for you to run the Python API.
    a. To verify that the connection is working, open the Flight Stand software. Confirm that a simulated board has been connected under “Hardware” and that it has an ESC throttle input.

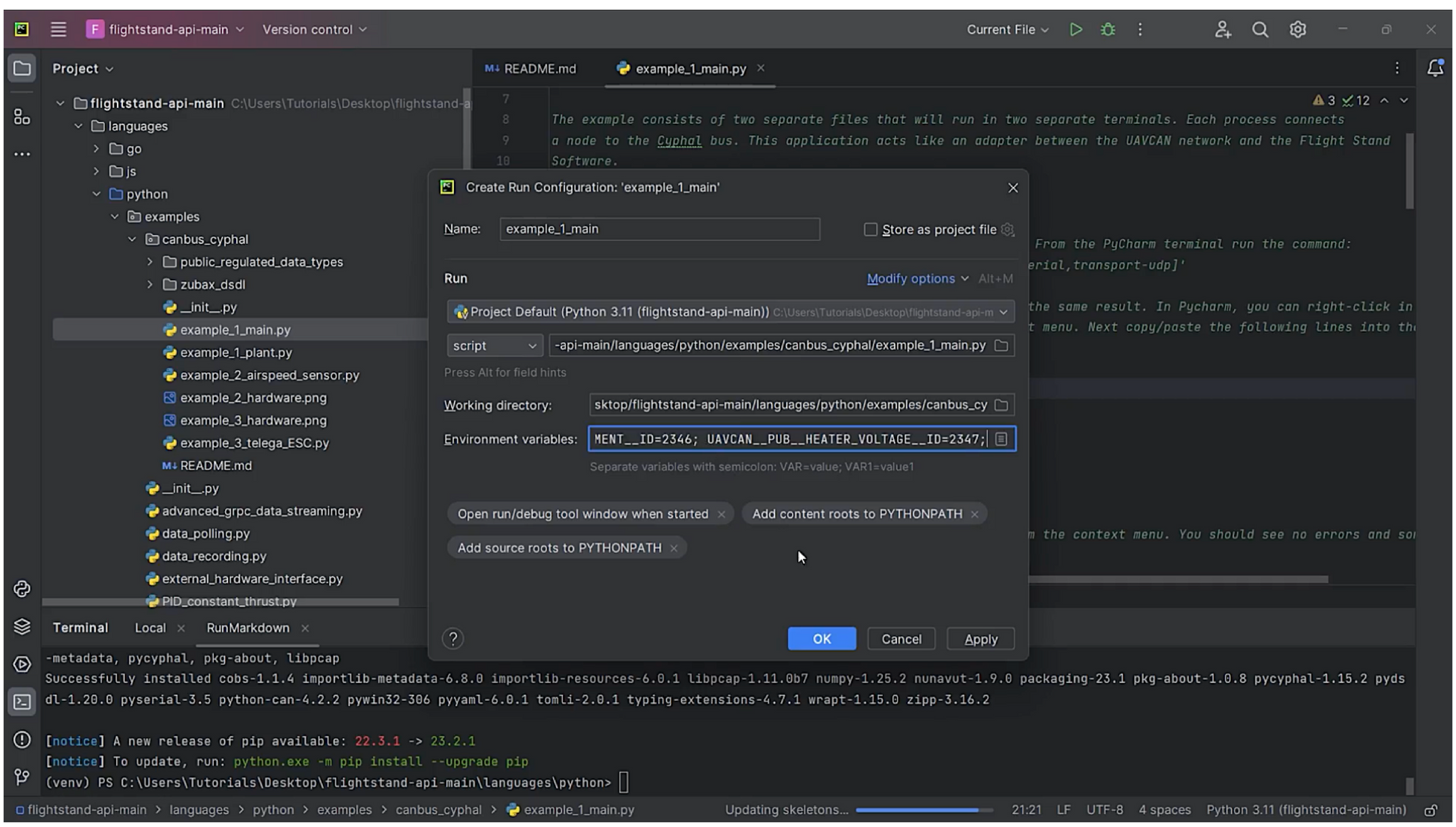


7. Connect a CAN ESC

10. Under ‘examples’, open the canvas.cyphal folder and open example_1_main.
11. Copy and paste the command in line 15 from the code to the console and hit Enter to install an additional package.



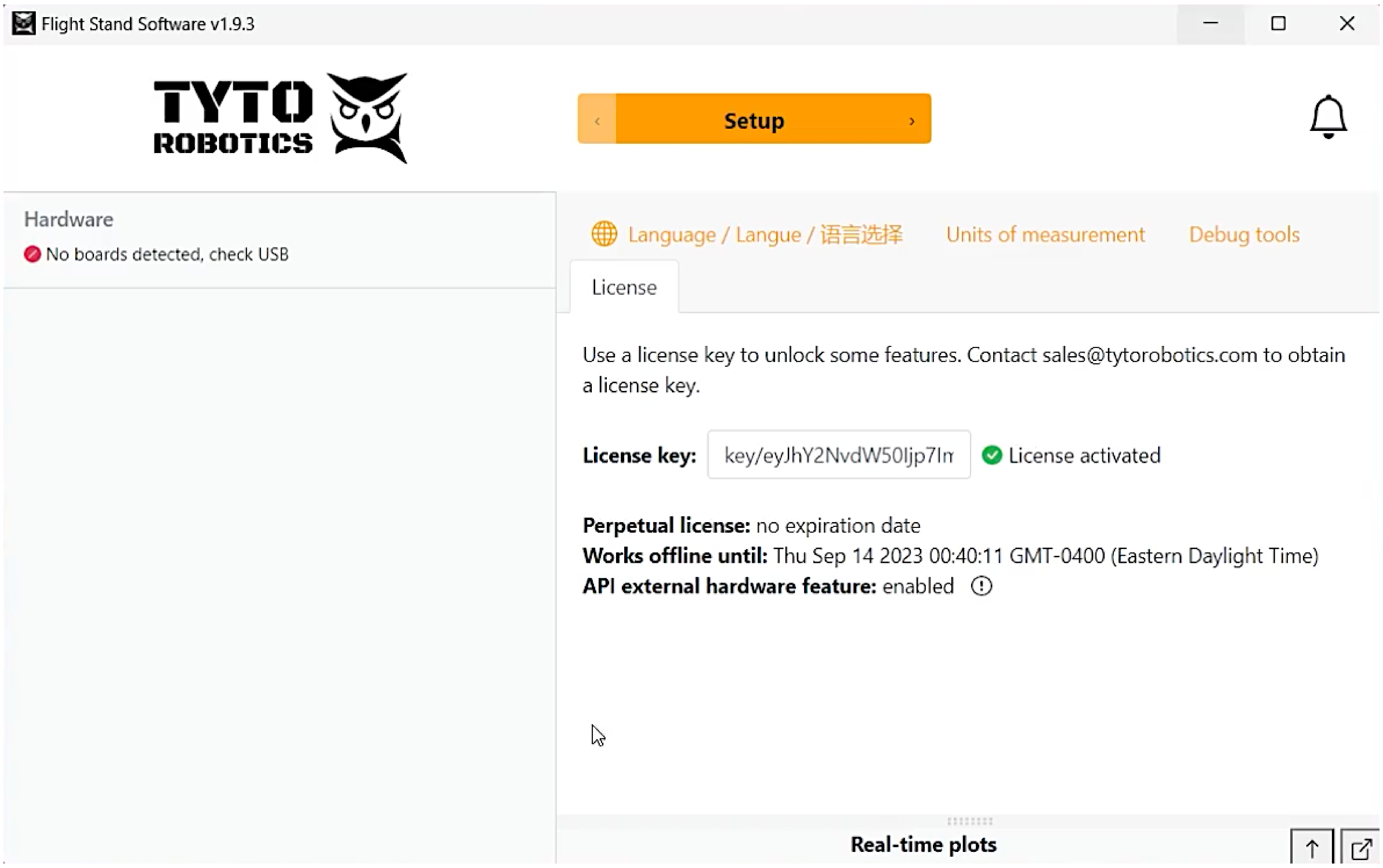
12. Highlight the environment variables from lines 20 - 24, right click, and select ‘Modify Run Configuration’.
13. In the environment variables line, hit Ctrl A then Ctrl V to replace the variables.



14. Click ‘OK’ then right click and click ‘Run example 1 Main’.

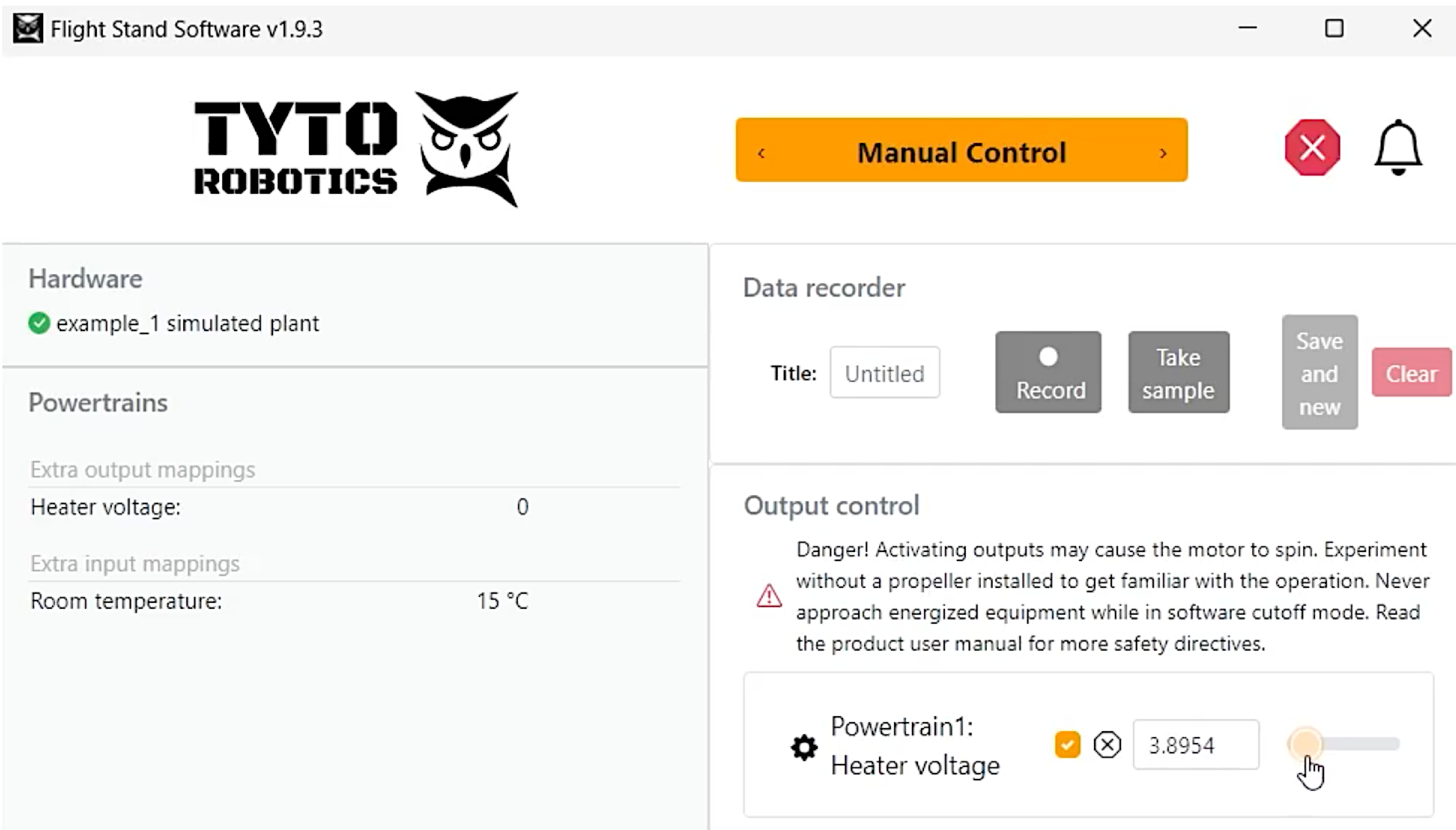
7. Connect a CAN ESC

15. You need a license key to use this feature → simply email support@tytorobotics.com to request the license key associated with your Flight Stand.
16. Once you have the license key, open the Flight Stand software, and on the 'Setup' tab click 'License', enter your license key, and hit Enter.



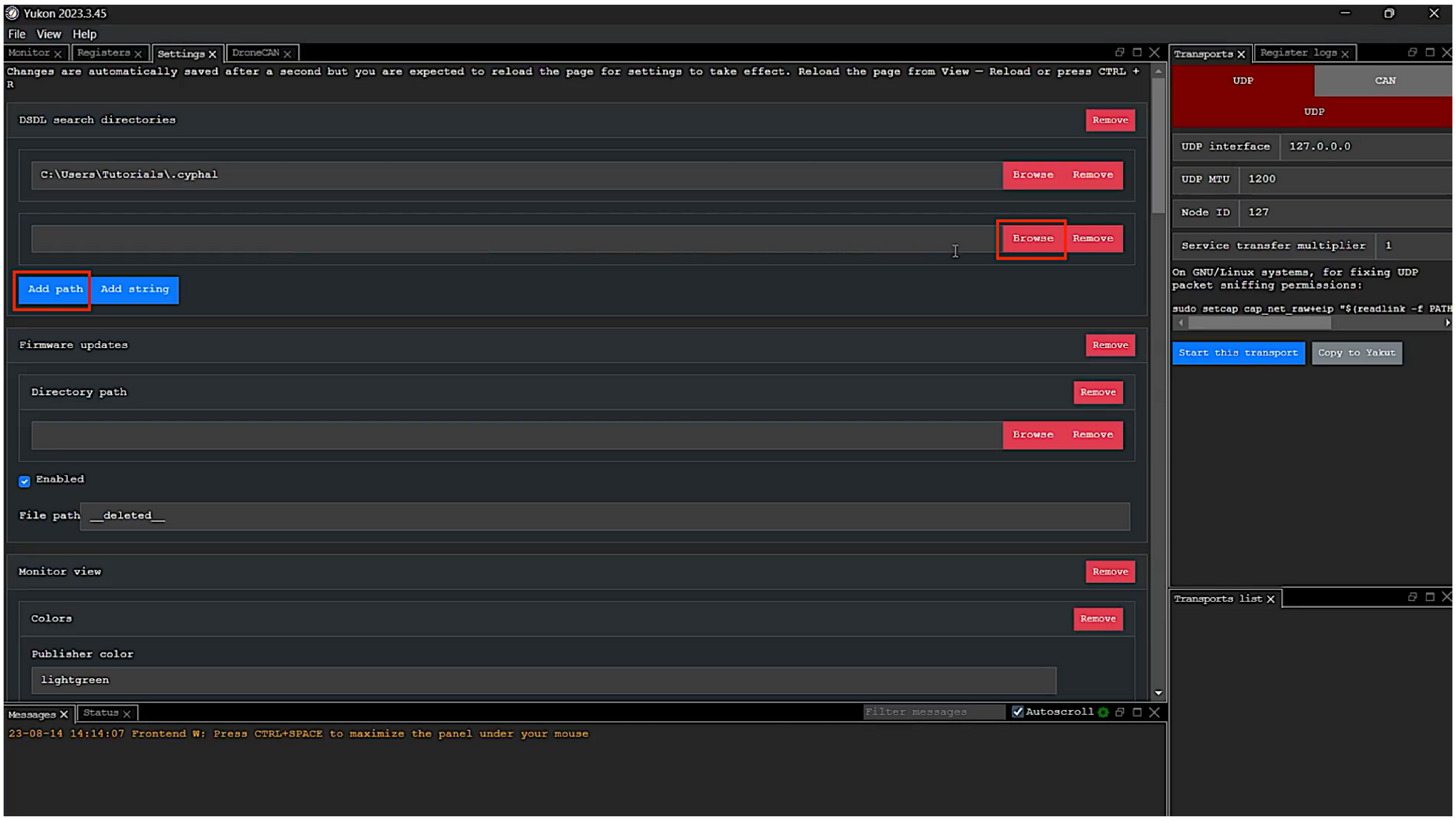
17. The Flight Stand software will restart and the license key tab will then show that the license has been activated.
18. Go to Pycharm and click 'Run example 1 Main'.
19. In the Flight Stand software, confirm that you've connected a simulated heater.
20. In Pycharm, open example_1_plant.py
21. Copy the environment variables into the runtime configuration and hit run.
    a. In the Flight Stand software, you will now see an output control for the heater in the 'Manual control' tab.

7. Connect a CAN ESC

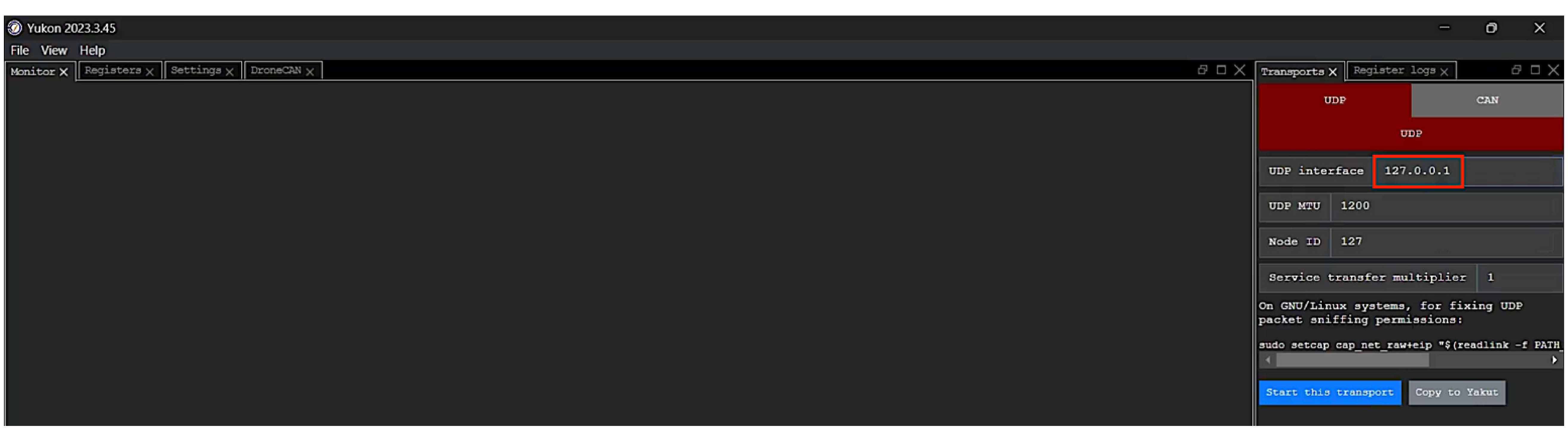


22. Set up the Yukon software, which will allow you to interact with CAN bus Cyphal devices. Go to www.github.com/opencyphal/yukon then scroll down to GitHub releases
    a. Click the hyperlink then scroll down and click to download the Yukon.exe file.
23. Open the Yukon file. Here we will set up the DSDL name space.
    a. Note that the Zubax DSDL files are specific to Zubax Cyphal CAN devices, and other manufacturers may have different DSDL files that you need to import.
24. Click on the 'Settings' tab and click 'Add path' then 'Browse'. Navigate to the downloaded Flight Stand API folder. Go to 'languages' → 'python' → 'examples' → 'canbus_cyphal' and select 'public_regulated_data_types'.

7. Connect a CAN ESC

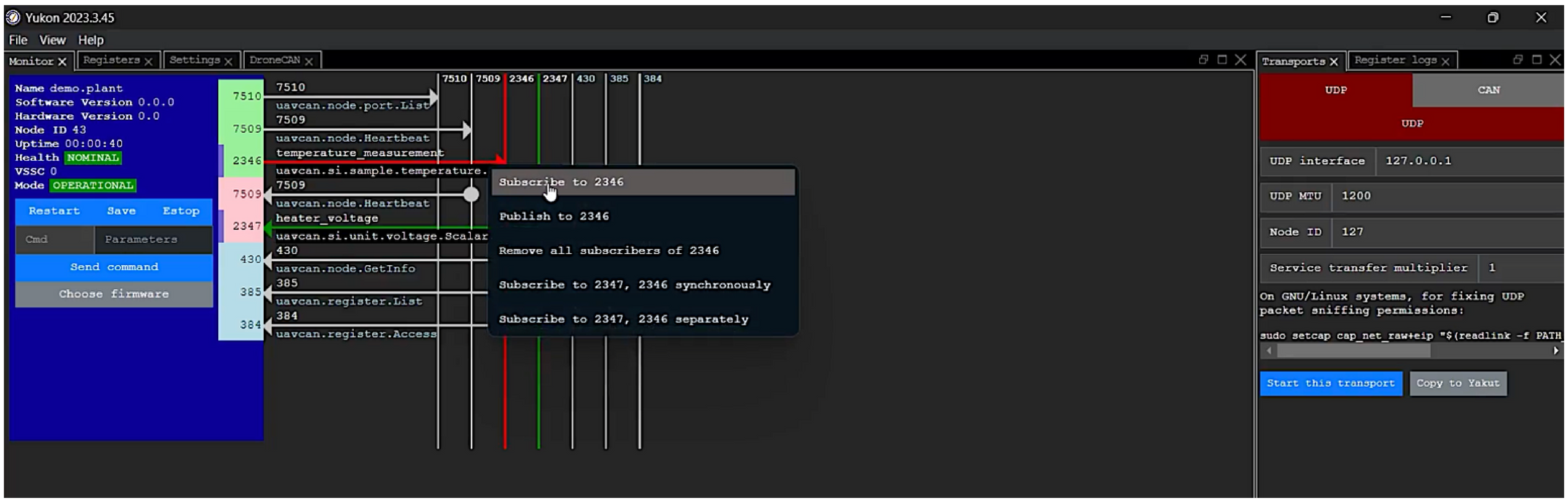


25. Click 'Add path' → 'Browse', then navigate to the same subfolder, but this time select the 'zubax_dsdl' folder. Scroll to the bottom of the page and click 'Save configuration'.
26. Close and restart the Cyphal software.
27. In the 'UDP interface' field in the top right panel, change the value to 127.0.0.**1**

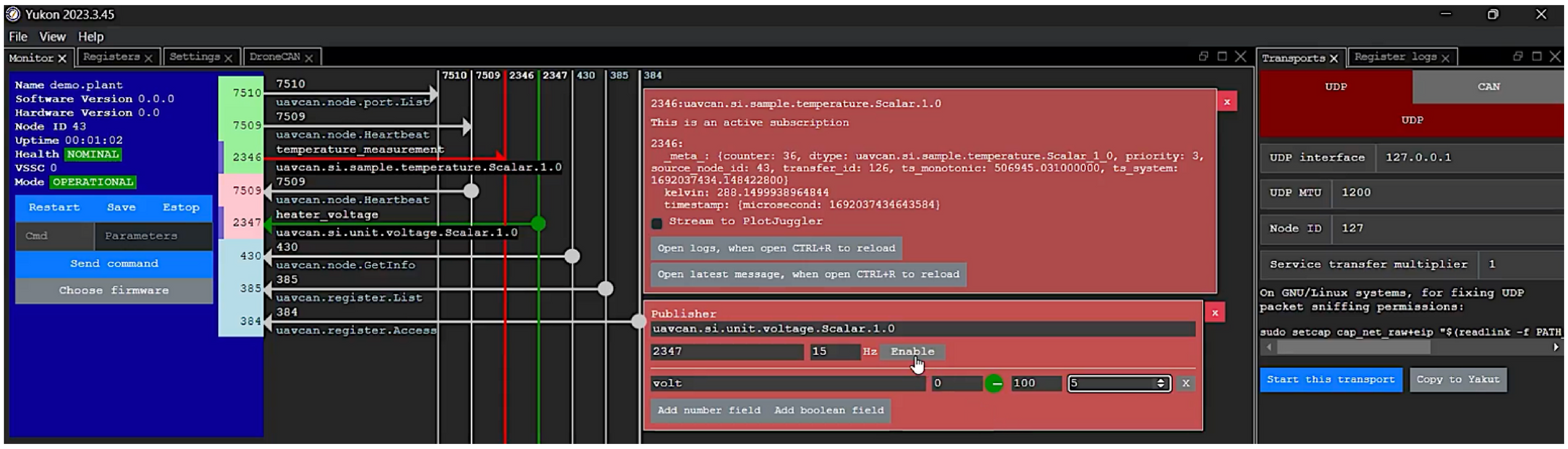


7. Connect a CAN ESC

28. Click ‘Start this transport’.
    a. If you get the error ‘Cannot find wcap.dll library’, you will need to download the Npcap software (free) from www.npcap.com. Scroll down to ‘Downloading and Installing Npcap Free Edition’, and download the Npcap installer, then complete the installation process.
29. Once the installation is complete, go to Yukon and click ‘Start this transport’ again.
30. In Pycharm, ensure only example_1_plant is running, then right click on the line next to 2346 in Yukon. Click ‘Subscribe to 2346’ then ‘Subscribe’ in the pop-up window. This will enable the real time simulated temperature in the Flight Stand Software.

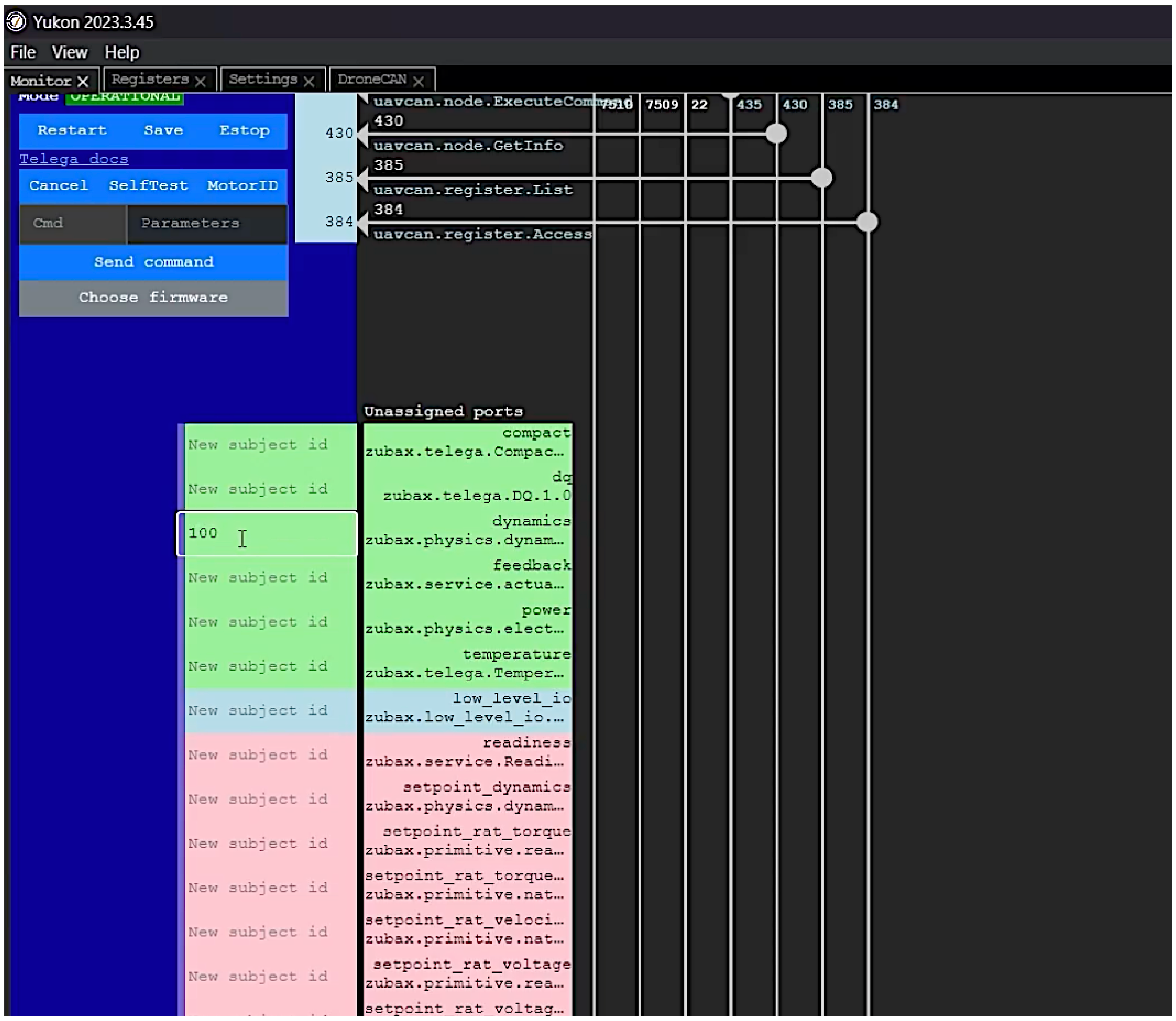


31. Do the same for line 2347, but click ‘Publish to 2347’ and ‘Add number field’. Choose ‘volt’ and in the last text box enter ‘5’ to set the voltage to 5 V.
32. Click ‘Enable’ and you'll see the Kelvin temperature measurement slowly start to increase in the window above.



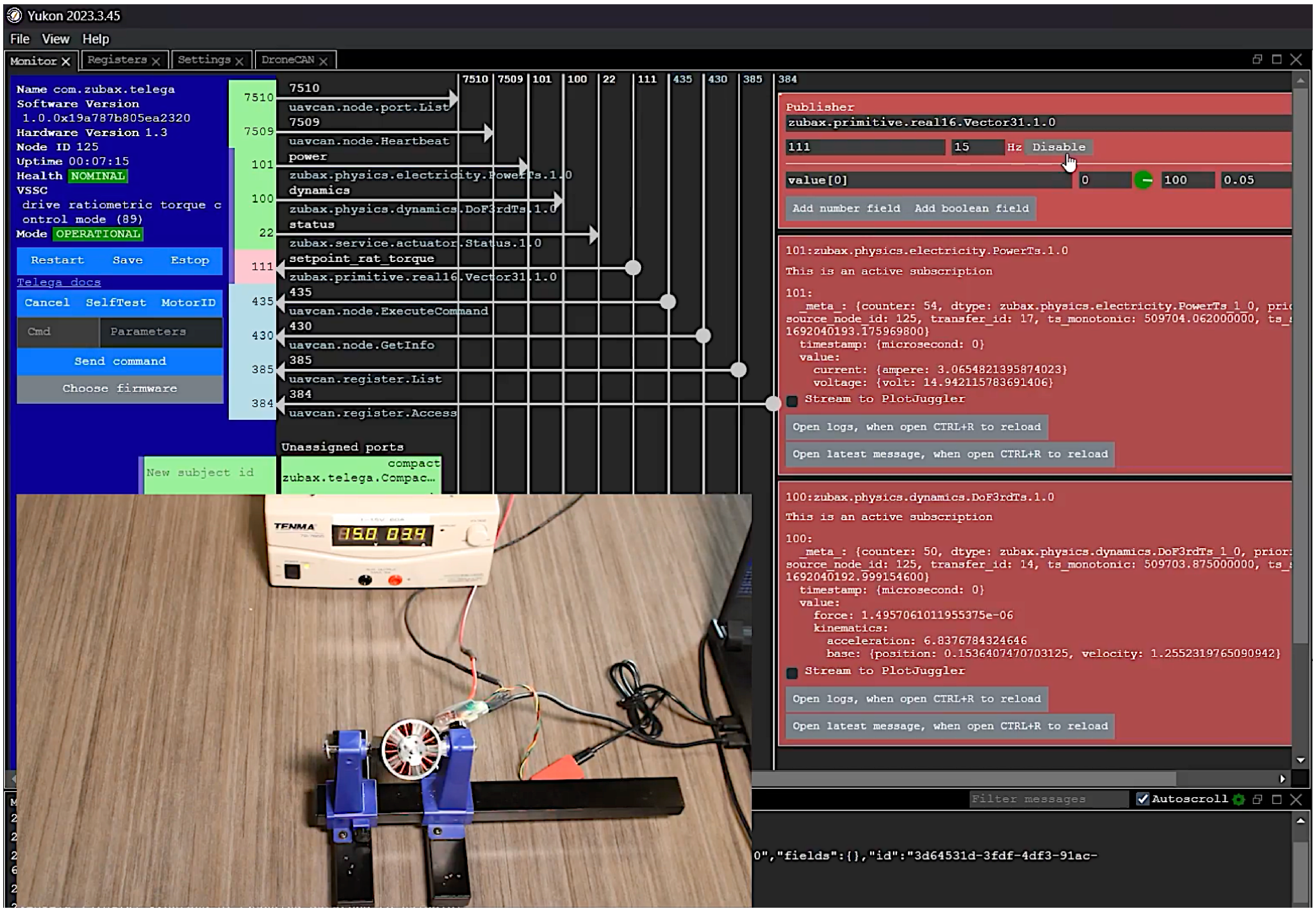
7. Connect a CAN ESC

33. Terminate the previous two examples in Pycharm and open ‘example_3’
34. Connect your ESC to your computer. For the Zubax ESC, connect one USB cable to power the ESC, and the other USB cable to connect the Babel device.
35. Open Yukon and make sure the hardware is set up correctly. Go to ‘Settings’ and make sure that all the required DSDL files are present, like the Zubax DSDL.
36. In the right panel, navigate to ‘CAN’ and ‘SL/CAN’, ensure you are using COM3, then click ‘Start this transport’.
37. Scroll to the ‘Unassigned ports’ table and link the fields to the appropriate ports:
    a. Next to ‘zubax.physics.dynamics’ enter ‘100’.
    b. Next to ‘zubax.physics.electronics’ enter ‘101’.
    c. Next to ‘setpoint_rat_torque’ enter ‘111’.



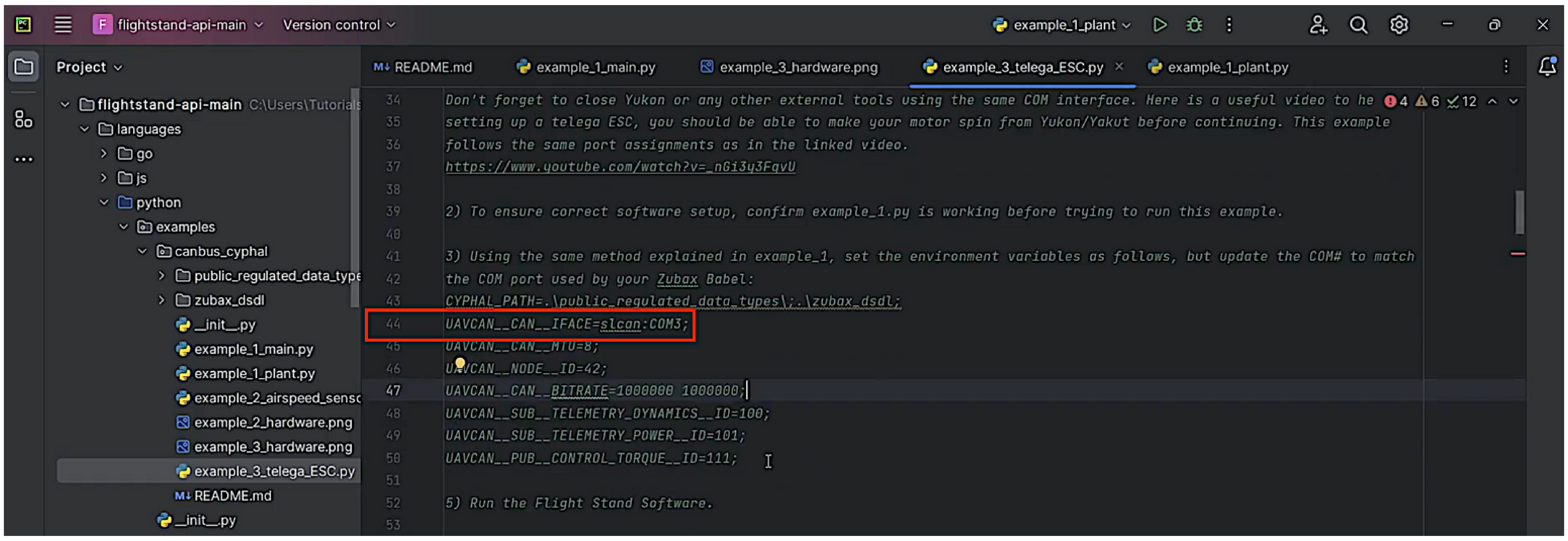
7. Connect a CAN ESC

38. Click ‘Restart’ in the left panel to restart the connection.
39. In the ‘Monitor’ tab, right click on the ‘power’ arrow and select ‘Subscribe to 101’ then right click on the ‘dynamics’ arrow and select ‘Subscribe to 100’. Click ‘Subscribe’ again in both pop-up windows.
40. Right click on ‘setpoint_rat_torque’ and select ‘Publish to 111’. In the ‘Publisher’ window, click ‘Add number field’ and select ‘value (0)’ then enter 0.05 for torque (in Nm) in the right-most text box.
41. Click ‘Enable’ and the ESC will cause the motor to spin. If there was a load on the motor, it would limit the speed to the RPM associated with 0.05 Nm.

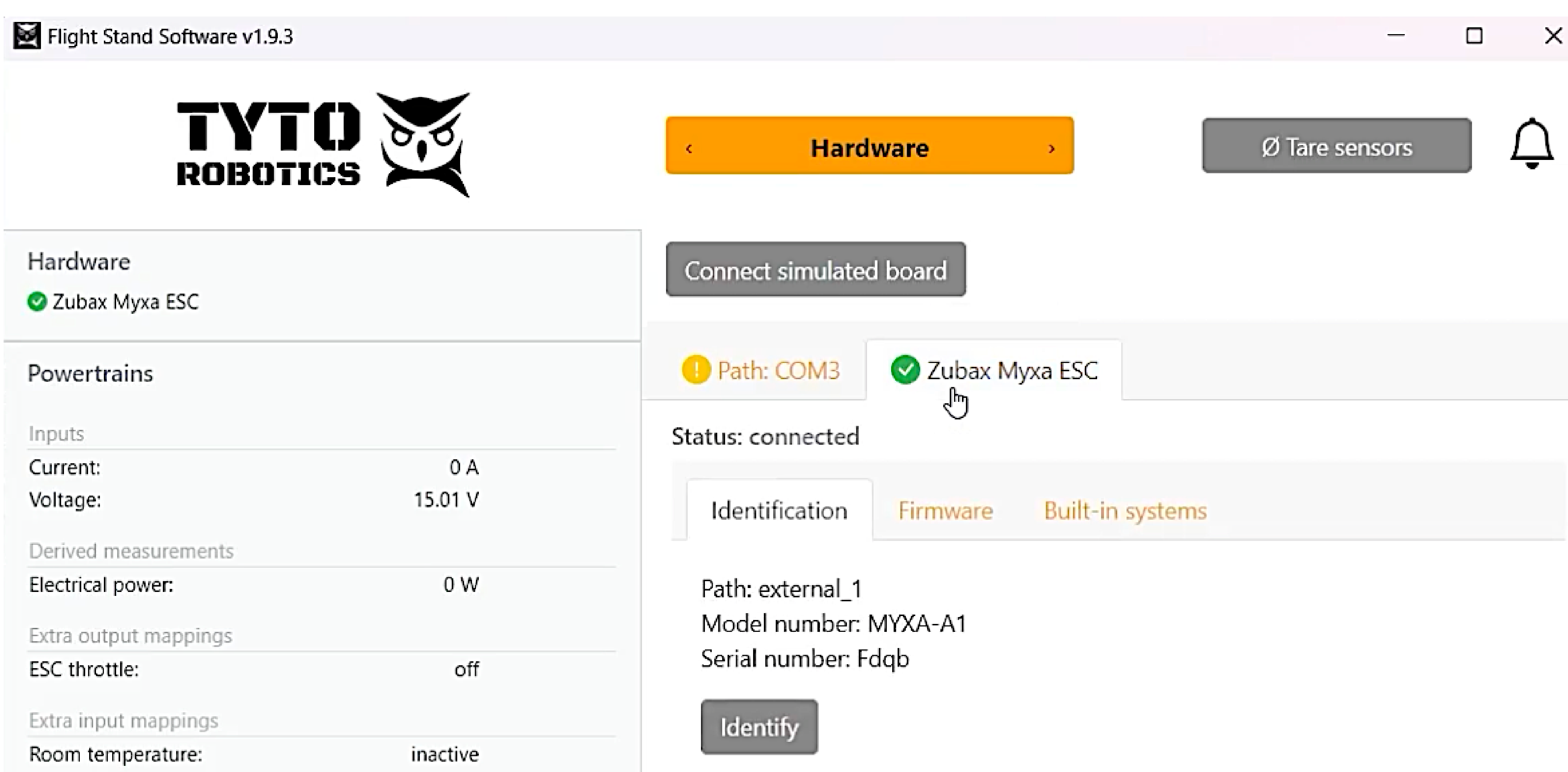


42. Open example_3_telega_ESC.py and change the port in line 44 to COM3 as this is the port the ESC is connected to.

7. Connect a CAN ESC



43. Set up the runtime environment by copy-pasting the runtime variables into the configuration: right click → ‘Modify Run Configuration’. In the environment variables line, Ctrl A then Ctrl V to replace the variables → Apply.
44. With the Flight Stand software open, right click on ‘example_3_telega_ESC.py’ and select ‘Run example_3_telega_ESC.py’.
45. If the ‘Zubax ESC’ appears in the Flight Stand software under ‘Hardware’, then you’ve successfully performed the connection.



46. Under the ‘Powertrain Mappings’ tab, ensure that the Zubax ESC is mapped correctly.
47. Test the connection by activating the ESC in the ‘Manual Control’ tab.

8. Remotely Control the Software

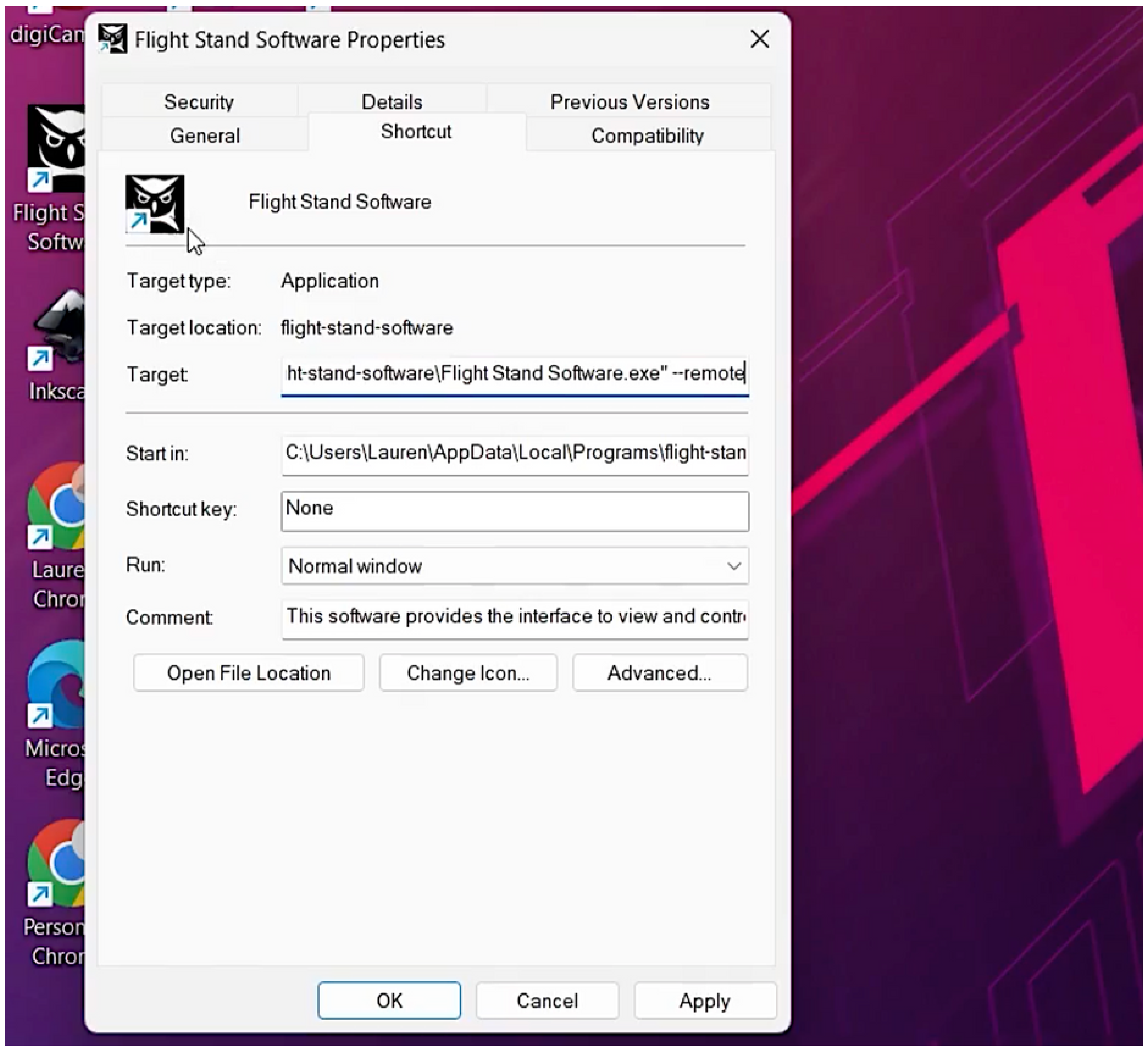
Remotely controlling the software is useful in many situations, i.e. to use a different operating system or to enhance user safety. This section explains how to set up a remote connection using two computers on the same network: one connected to the Flight Stand's sync hub via USB, and a second computer used to control the software remotely.

Be aware that this feature has some safety implications as anybody in the network can activate your motor, so make sure there is good communication within your team, that you have full control of the environment, and that you're on a private network.

Video tutorial: https://youtu.be/kfvCMsBG8mg

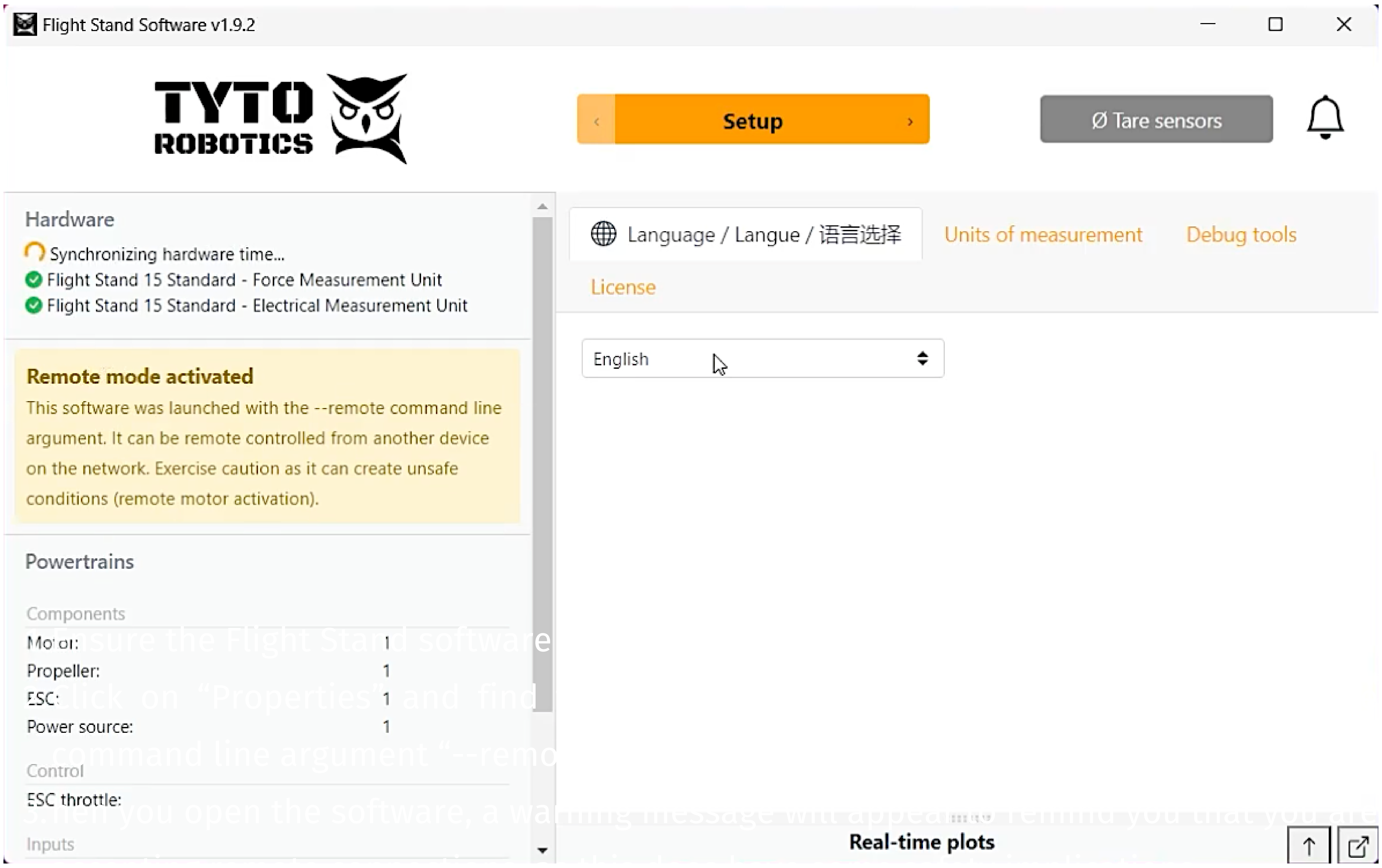
Steps:

1. Ensure the Flight Stand software is closed, then right click on the software's shortcut.
2. Click on "Properties" and find the 'Target' field. At the end of the line, add the command line argument "--remote".
    a. If you get the error: "the name is not valid", add a space before "--remote".



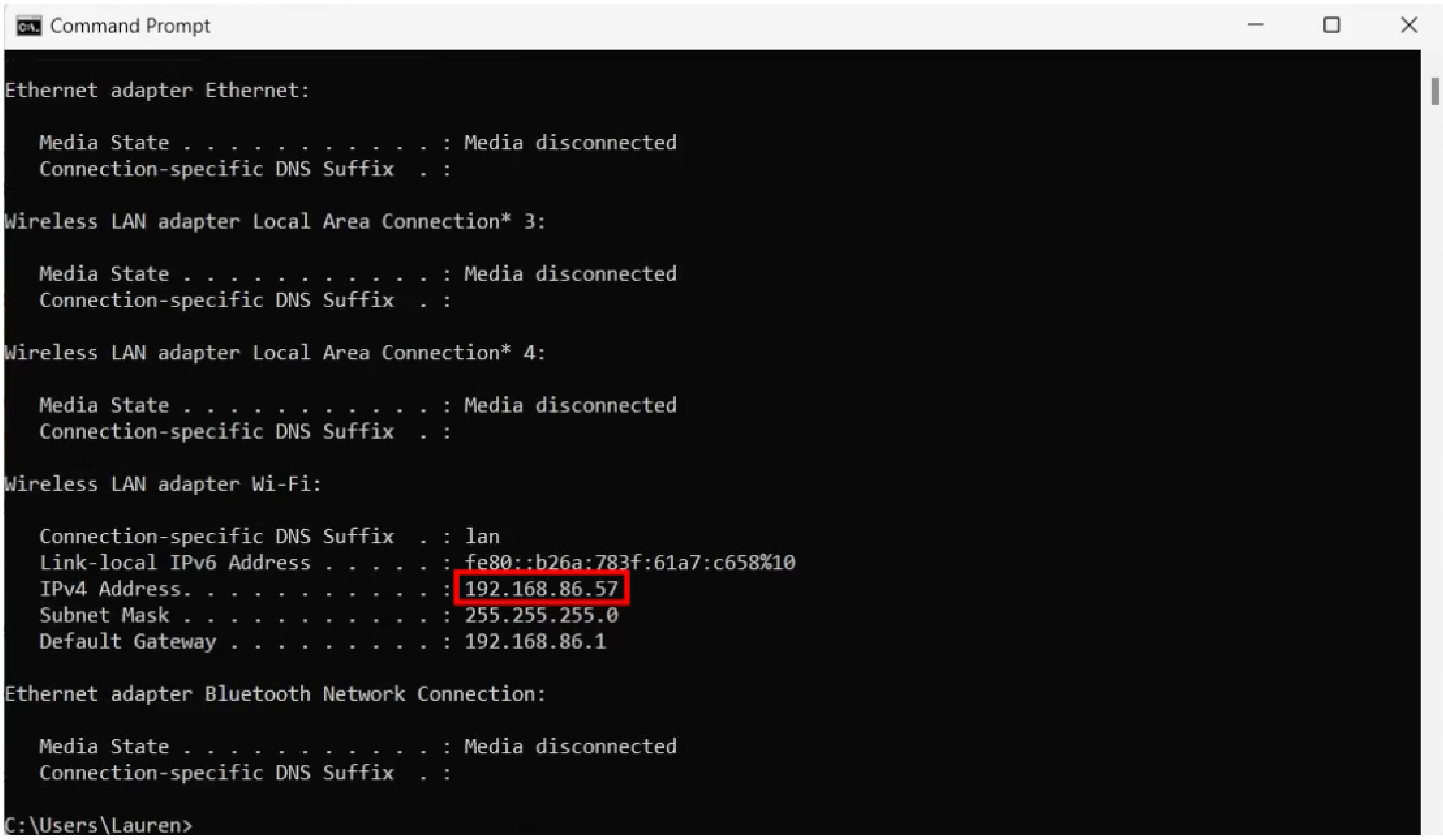
8. Remotely Control the Software

3. When you open the software, a warning message will appear to remind you that you are accepting remote connections from any device on the network.



4. On the same computer, find the computer's IP address. You can do so by entering the command "ipconfig" in Command Prompt.

8. Remotely Control the Software



5. On the second computer, right click on the Flight Stand software shortcut.
6. Click on “Properties” then find the “Target” field and at the end of the line, add the command line argument “--target=192.168.86.57:50051”, the number before the colon being the first computer’s IP address.
7. When you launch the software, you will see the same warning message.
8. To test your connection, go to the “Manual Control” tab, activate the ESC and try increasing the throttle. Your first computer and Flight Stand should mirror your prompts.