QUANSER
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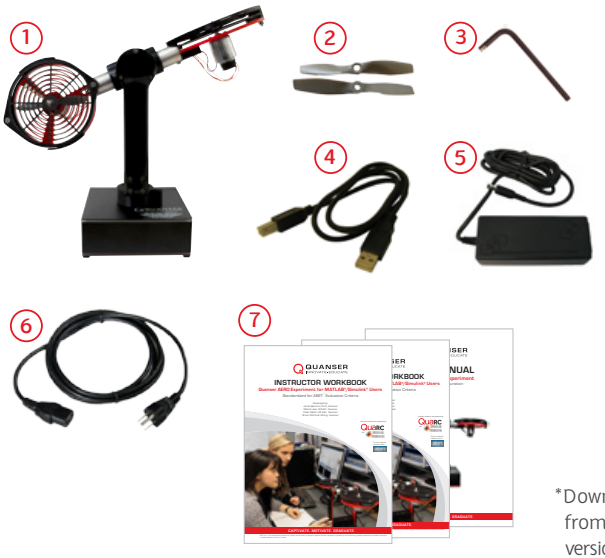
Quick Start Guide: Quanser AERO USB

MATLAB SIMULINK

STEP 1 Check Components and Details

Make sure your Quanser AERO USB interface experiment includes the following components:



1. Quanser AERO with QFLEX 2 USB interface panel
2. APC 5X4.6E and 5x4.6EP high-efficiency propellers
3. 3/16" hex key (stored in the base)
4. USB 2.0 A/B cable
5. 24V, 2.71A power supply
6. Power cable
7. Quanser AERO Workstation Resources*
(include controllers, User Manual, Quick Start Guide, Instructor and Student Workbooks, Laboratory Guide, and other files)

NOTE: If you also received a QFLEX 2 Embedded interface panel, please refer to its data sheet and the Quanser AERO User Manual for instructions on how to replace the panel, and how to connect to an external controller.

*Download the Student version of the Workstation Resources from www.quanser.com/courseware. For the full Instructor version with problem solutions, contact instructors@quanser.com

STEP 2 Additional Components Required for Set Up

To complete the Quanser AERO USB set up, you will also need the following:

1. QUARC Real-Time Rapid Control Prototyping Software Installation DVD (QUARC software must be purchased separately)

STEP 3 Install and Test QUARC

QUARC v2.5.1637 or later is required for this product. See Step 3C in the QUARC Installation Guide for update instructions.

A. Make sure you have all required software, as listed in the QUARC Compatibility Table document located in the QUARC DVD folder.

B. See the QUARC Installation Manual for details on how to install the software.

C. Make sure you test the system using the Sine and Scope demo. You can access this by typing **qc_show_demos** in the Matlab prompt.

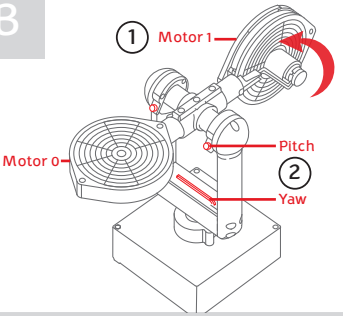
STEP 4 Set Up the Hardware

The steps below outline the instructions for a setup of Quanser AERO with QFLEX 2 USB panel. If you are using the Quanser AERO with the QFLEX 2 Embedded panel, please refer to its own data-sheet or the Quanser AERO User Manual for instructions on connecting to an external controller.

A

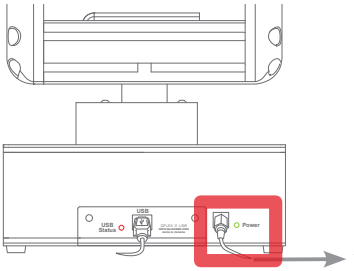
Place the Quanser AERO on a flat surface with enough space so that the body can pivot freely in both degrees of freedom.

B



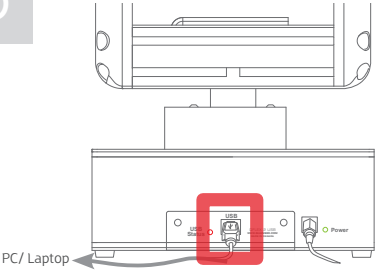
1. Rotate the thruster modules so that **Motor 0** thrusts vertically and **Motor 1** thrusts horizontally.
2. Ensure that both the **Pitch** and **Yaw** locks are disengaged. Refer to the Quanser AERO User Manual for information on how to adjust the thrusters and attitude locks.

C



Connect the supplied 24V power supply to the *Power* connector on the Quanser AERO and to a wall outlet using the supplied power cable. The *Power* LED on the Quanser AERO should light up green, and the *USB Power* LED on the QFLEX 2 USB panel should light up red.

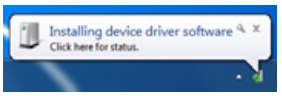
D



Using the supplied USB cable, connect the Quanser AERO USB connector on the QFLEX 2 USB panel to an enabled USB 2.0 (or higher) port on your desktop PC or laptop.

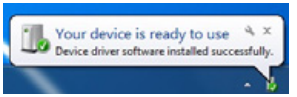
E

Windows[1] should automatically detect the presence of the Quanser AERO and attempt to install the driver.



F

Upon completion, Windows will notify you that the device is ready for use.



G

The *USB Power* LED on the QFLEX 2 USB panel should change from red to green.

[1]Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

STEP 5 Testing the Quanser AERO

Follow the procedure below to test your Quanser AERO experiment.

A

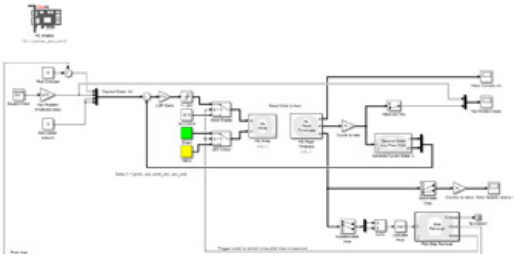
Make sure your PC is powered ON.

B

Download the Quanser AERO Workstation Resources from www.quanser.com/courseware and locate the **Quick Start** folder: Quanser AERO\Quick Start.

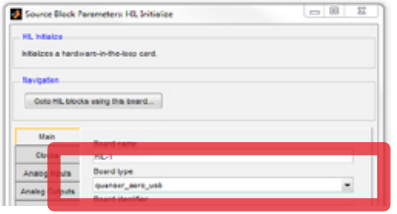
C

Open the Simulink model file (.mdl) found under the **Quick Start** folder on your hard drive.



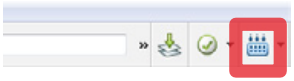
D

Double-click on the HIL Initialize block and choose the panel that is installed in your system (e.g. quanser_aero_usb).



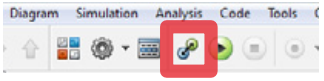
E

Click on the **Build Model** button on the Simulink model toolbar.



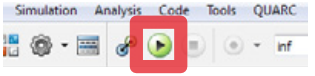
F

Once the model code has been compiled, click on the **Connect To Target** button.



G

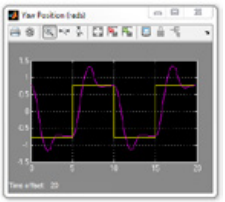
Click on the **Run** button to start the QUARC real-time model.



H

The LED strip around the base of the Quanser AERO should turn yellow for one second while the IMU measures the pitch offset. After one second the LED strip should turn green and the AERO should begin to yaw between two angles while maintaining approximately level pitch.

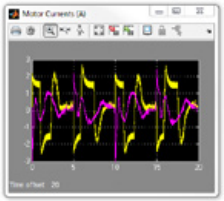
I



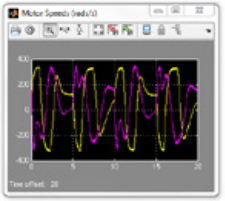
Yaw Position (rads)

The **Yaw Position (rads)** scope should look similar to that shown here. The measured yaw angle (in purple) should be tracking the commanded yaw angle (in yellow). If not consult the Troubleshooting section at the end of this guide.

J



Motor Currents (A)

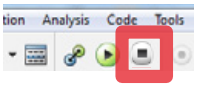


Motor Speeds (rads/s)

The **Motor Currents (A)** and **Motor Speeds (rads/s)** scopes should looks similar to those shown here. If either scope shows consistent zero values, contact Quanser technical support.

K

Click on the Simulink **Stop** button to stop the running model



TROUBLESHOOTING

Review the following recommendations before contacting Quanser's technical support engineers.

1. Check the connections outlined in Step 4 of this guide.
2. Make sure cables are firmly connected.

Getting an error when trying to build or run the Quick Start Simulink model (.mdl)	**A.** Type ver in the *Matlab Command Window* and verify that QUARC is on the list. If not, then go through the QUARC Quick Installation Guide to install QUARC. If it is listed, run *mex -setup* as described in the the QUARC Installation Guide.
You get an 'An operating system specific kernel-level driver for the specified card could not be found' message.	**A.** Make sure the Quanser AERO is connected to your PC/laptop with the supplied USB cable to an enabled USB port. **B.** Ensure the green *Power* LED on the Quanser AERO is lit. If not, check that the power supply is operational and properly connected. **C.** Ensure the *quanser_aero_usb* has been selected as the board type in the HIL Initialize block, as outlined in Steps 5D. **D.** Verify that the Quanser AERO USB item appears in Device Manager under the *Universal Serial Bus controllers* item. **E.** Ensure the USB *Power* LED on the QFLEX 2 USB panel is lit green.
The Motor is not responding.	**A.** Ensure the green *Power* LED on the Quanser AERO is lit. If not, make sure the power supply is operational and properly connected.
The AERO does not move as expected.	**A.** Ensure that both the pitch and yaw locks have been disengaged and that the thrusters are positioned according to the instructions in step 4B.
Thrusters emit a clicking or buzzing sound.	**A.** Ensure that the propeller hubs are seated all the way down on the motor shafts. Refer to the Quanser AERO User Manual for instructions on how to assemble the thrusters properly.

STILL NEED HELP?

For further assistance from a Quanser engineer, contact us at tech@quanser.com or call +1-905-940-3575.

LEARN MORE

To browse and download the latest Quanser AERO resources, visit www.quanser.com/courseware