

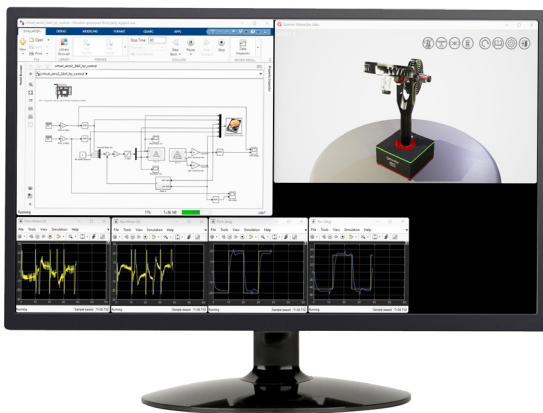
QLABS VIRTUAL QUANSER AERO 2

Virtual platform for distance and blended undergraduate aerospace and controls courses

Virtual Quanser Aero 2 is a fully instrumented, dynamically accurate virtual twin of a classic Quanser aerospace system. It behaves in the same way as the physical hardware and can be measured and controlled using MATLAB®/Simulink® and other development environments. Q Labs Virtual Quanser Aero 2 can enrich your lectures and activities in traditional labs, or bring credible, authentic model-based lab experiences into your distance and online aerospace and control systems courses.

Same as the physical Quanser Aero 2, the virtual system is a dual-rotor helicopter model that can be reconfigured for 1 DOF attitude, 2 DOF helicopter, or half-quadrotor experiments. Rotary encoders measure the angular position of the propeller DC motors, and the pitch and yaw of the body. The system is also equipped with a virtual IMU to estimate pose, locks on the two degrees of rotation, and tachometer signals for the propellers to expand the collection of possible teaching and research activities.

Features



Academically appropriate

High-fidelity, credible lab experiences equivalent to use of physical lab equipment



Comprehensive Resources

Curriculum for 1 DOF attitude, 2 DOF helicopter, and half-quadrotor configurations



Open access

Full access to system parameters through MATLAB®/Simulink®



Scalable

12-month, multi-seat subscription

Courseware

ABET-aligned Instructor and Student Workbooks

- Hardware integration
- Single propeller speed control
- Pole-placement state-feedback balance control
- 1 DOF attitude control configuration
 - PID control
 - Introduction to IMU
 - Modeling and model validation using transfer function
 - System identification
 - Gain scheduling

Laboratory Guides

- 2 DOF helicopter configuration
 - Modeling
 - Linear state-space representation
 - State-feedback control
 - Coupled dynamics
- Half-quadrotor configuration
 - Modeling
 - Simple yaw control
 - Kalman filter

QLabs Virtual Quanser Aero 2 runs on Windows 10/11 (64-bit) and requires MATLAB and Simulink R2021a or later (not included).

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