QUANSER
INNOVATE·EDUCATE

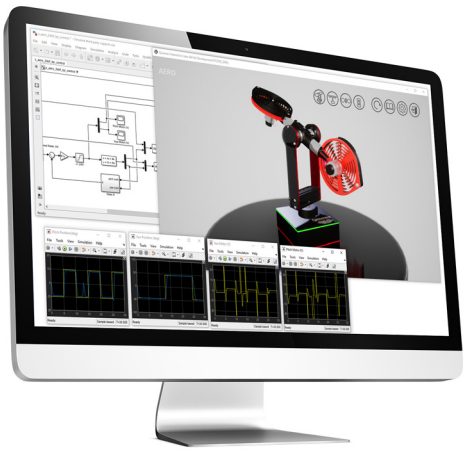
QLABS VIRTUAL QUANSER AERO

Virtual platform for distance and blended undergraduate aerospace and controls courses

Virtual Quanser AERO is a fully instrumented, dynamically accurate virtual twin of a classic Quanser AERO system. It behaves in the same way as the physical hardware and can be measured and controlled using MATLAB®/Simulink® and other development environments. QLabs Virtual Quanser AERO 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, 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, the speed of the motors is measured through a software-based tachometer.

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 runs on Windows 10 (64-bit) and requires MATLAB 2019a or later (not included).