

# QDrone 2

## Quanser innovation unleashed in the autonomous vehicle research space

The Quanser QDrone 2 autonomous air vehicle is a midsized indoor quadrotor equipped with a powerful on-board NVIDIA® Jetson Xavier™ NX system-on-module (SOM), multiple high resolution cameras and built-in WiFi. This open-architecture research-grade drone is tuned to accelerate your innovation in multi-agent, artificial intelligence, machine learning, and vision-based applications.

The optimized and robust carbon fiber frame makes the QDrone 2 highly maneuverable and capable of withstanding high-impact collisions without down time for repairs between flights. The powerful on-board processor and multiple accelerated high-resolution cameras enable novel on-board video processing, as well as streaming for real-time monitoring.

### Features



#### NVIDIA System-On-Module (SOM)

NVIDIA Jetson Xavier NX SOM



#### Durable

Robust carbon-fibre frame suitable for advanced applications



#### Open Software Architecture

Design, deploy, and tune your algorithms through QUARC™ for Simulink®



#### Extensive and Expandable

Multiple on-board cameras, additional digital and analog I/O channels for advanced robotics applications.

### Research Studio

The Autonomous Vehicles Research Studio comes with everything you need to jumpstart your research.



#### Vehicles

- QDrone 2
- QBot Platform (optional)



#### Ground Station

- High performance computer: Intel® Core i7
- NVIDIA RTX Graphics card
- 32 GB DDR4 RAM
- Three monitors
- USB flight controller joystick
- High performance router



#### Studio Space

- Natural Point Optitrack Flex 13
- Battery chargers
- Protective net
- Protective floor tiles

## Product Details



## Device Specifications

Dimensions	50 x 50 x 15 cm		
Weight (with batteries)	~1500 g		
Max Payload	~300 g		
Power	4S 14.8V LiPo (3700mAh) with XT60 connector		
Flight time	7-8 minutes for hover per battery charge		
Onboard Computer	NVIDIA Jetson Xavier NX SOM (powered by a 6-Core NVIDIA Carmel ARM v8.2 64-Bit processor) 384-core NVIDIA Volta GPU with 48 Tensor Cores 8 GB 128-bit LPDDR4x RAM		
Expandable I/O	PWM (2x) UART (2x) SPI (2x SS pins) I <sup>2</sup> (2x)	ADC (1x) Encoder Input 2x CPU GPIO 6x	
Intel® RealSense™ (D435)	Depth sensing (3 metre range) RGB (1920x1080 @ 30FPS)		
Omnivision OV9281	Grayscale (1280x800 @ 120 FPS or 640x480 @ 180 FPS)		
Sony IMX219	3x RGB CSI 160 deg FOV wide angle lenses cameras providing side and back view, 21 FPS to 120 FPS		
On board sensors	2x 6-DOF IMU (gyroscope and accelerometer), 1x ToF height sensor		
Connectivity	WiFi 802.11 a/b/g/h/n/ac 867Mbps with dual antennas	1x Micro HDMI port for external monitor support	
Supported Software and APIs	<ul style="list-style-type: none"> <li>• QUARC for Simulink®</li> <li>• Quanser APIs</li> <li>• TensorFlow</li> <li>• TensorRT</li> <li>• Python™ 2.7 &amp; 3</li> <li>• ROS 1 &amp; 2</li> <li>• CUDA®</li> </ul>	<ul style="list-style-type: none"> <li>• cuDNN</li> <li>• OpenCV</li> <li>• Deep Stream SDK</li> <li>• VisionWorks®</li> <li>• VPI™</li> <li>• GStreamer</li> <li>• Jetson Multimedia APIs</li> </ul>	<ul style="list-style-type: none"> <li>• Docker containers with GPU support</li> <li>• Simulink® with Simulink Code</li> <li>• Simulation and virtual training environments (Gazebo and Quanser Interactive Labs )</li> </ul>
			<ul style="list-style-type: none"> <li>• Multi-language development</li> <li>• supported with Quanser Stream</li> <li>• APIs for inter-process Communication</li> <li>• Unreal Engine</li> </ul>

### About Quanser:

For 30 years, Quanser has been the world leader in innovative technology for engineering education and research. With roots in control, mechatronics, and robotics, Quanser has advanced to the forefront of the global movement in engineering education transformation in the face of unprecedented opportunities and challenges triggered by autonomous robotics, IoT, Industry 4.0, and cyber-physical systems.

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# QBOT PLATFORM

## High-performance Autonomous Ground Robot for Indoor Labs

The Quanser QBot Platform is an innovative open-architecture autonomous ground robot, built on a differential mobile platform. This solution is ideal for teaching undergraduate and graduate mobile robotics as it is accompanied by comprehensive courseware and equipped with built-in sensors such as LiDAR, front-facing RealSense camera, downward-facing camera, gyroscope, and accelerometer, all powered by an onboard NVIDIA Jetson Orin Nano computer.

The QBot Platform provides an electromechanical prototyping bay for adding project components. It is also equipped with a reinforced landing pad for drones and additional cargo. The open control architecture allows users to seamlessly integrate off-the-shelf sensors and customize the QBot Platform for their research. The solution is well suited for designing and developing applications related to autonomy, navigation and control, machine learning, computer vision, multiagent heterogenous and swarm robotics, and more.

### Features



Product may not appear exactly as shown  
Product shown with QArm Mini (sold separately)



**Project-ready**  
Electromechanical prototyping bay and fully accessible 40-pin I/O header



**Course-ready**  
Relevant lab content for courses tailored to both mobile & manipulator robotics



**Research-ready**  
Deploy applications via MATLAB®, Simulink®, Python, C++ and ROS

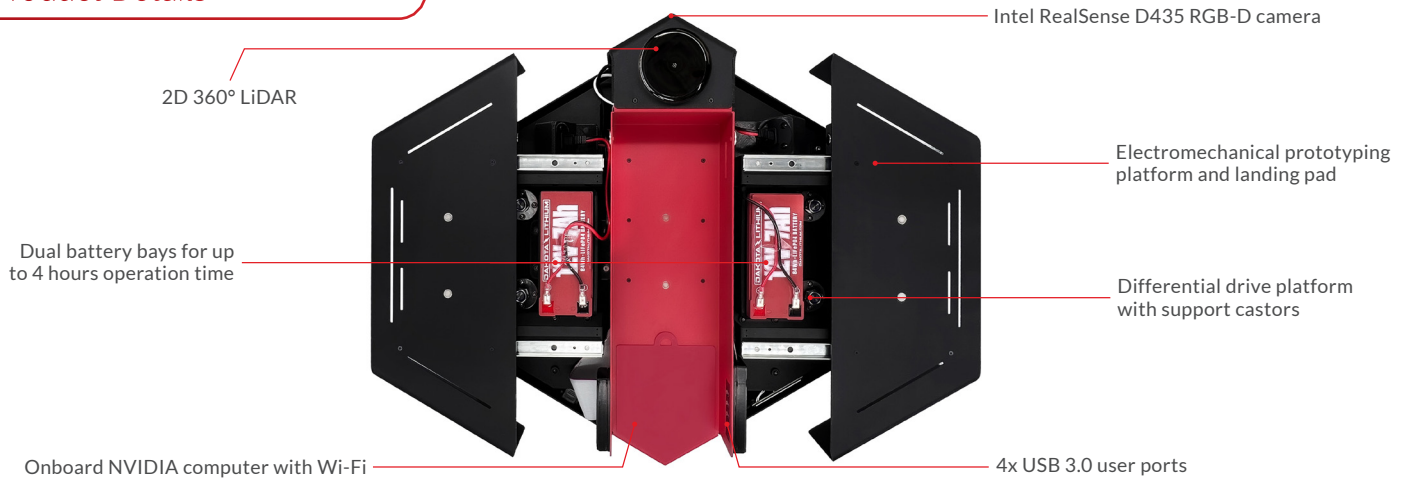


**Swarm-ready**  
Cost-effective pricing and bundle options allow multiple units in a lab

### Suitable Exploration Pathways

- Forward and inverse differential kinematics
- Dead reckoning and odometric localization
- Path planning and obstacle avoidance
- Machine learning and deployment
- 2D mapping and LiDAR localization
- Image acquisition, processing, and reasoning
- Multi-agent control & industrial automation
- Vision-guided vehicle control

## Product Details\*



## QBot Platform System Components

- QBot Platform ground robot
- QUARC Complete License
- Reconfigurable Environment (12' x 12') (3.6m x 3.6m) and Walls
- High-performance router
- QArm Mini sold separately

## Device Specifications\*

Platform	2-wheel differential drive base with 4 support castors
Diameter	570 mm
Height	227 mm
Drivetrain sensing	Current sensing, optical encoders, and digital tachometer per wheel
Maximum motion	1.5 m/s speed and 1 m/s/s acceleration
Nominal motion	0.7 m/s speed and 0.5 m/s/s acceleration
Maximum payload @ maximum motion	20 kg
Operation time	2 hours per battery
Power	Up to 2x 84Wh LFP batteries w/ external charging
On-board computer	NVIDIA Jetson Orin Nano
Downward facing camera	Grayscale w/ global shutter – 640x400 @ 120Hz
Front facing camera	Intel RealSense D435 RGB-D camera
LiDAR	2D 360° lidar w/ 16,800 points per second
IMU	6-axis IMU w/ accelerometer and gyroscope
GPIO	40-pin header including SPI / I2C / UART / PWM
LEDs	User programmable LEDs
LCD	Character display module
Language support	MATLAB / Simulink / Python / ROS 2
USB ports	4x USB 3.0 user ports
HDMI	1 full HDMI port
Connectivity	IEEE 802.11ac Wi-Fi & Gigabit Ethernet port

\* Subject to change

### About Quanser:

Quanser is the world leader in education and research for real-time control design and implementation. We specialize in outfitting engineering control laboratories to help universities captivate the brightest minds, motivate them to success, and produce graduates with industry-relevant skills. Universities worldwide implement Quanser's open architecture control solutions, industry-relevant curriculum, and cutting-edge workstations to teach introductory, intermediate, or advanced controls to students in Electrical, Mechanical, Mechatronics, Robotics, Aerospace, Civil, and various other engineering disciplines.

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