QUANSER
INNOVATE · EDUCATE

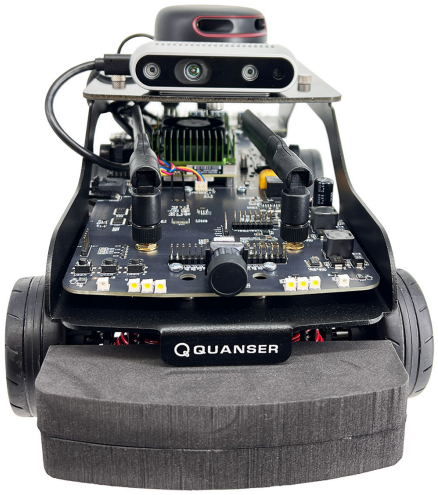
QCAR

Sensor-rich autonomous vehicle for self-driving applications

QCar, the feature vehicle of the Self-Driving Car Research Studio, is an open-architecture, scaled vehicle designed for academic research. It is equipped with a wide range of sensors including LIDAR, 360-degree vision, depth sensor, IMU, encoders, as well as user-expandable IO. The vehicle is powered with an NVIDIA® Jetson™ TX2 supercomputer that gives you exceptional speed and power efficiency.

Working individually or in a fleet, QCar is the ideal vehicle for validating your research concepts such as dataset generation, mapping, navigation, machine learning, artificial intelligence, and many more.

Features



High Performance

NVIDIA® Jetson™ TX2 supercomputer

Dependable

Robust mechanical design

Open Software Architecture

Design and deploy applications using Simulink®, Python™, C/C++, ROS

Extensive & Expandable

Wide range of sensors with user-expandable IO for custom applications

Research Studio

The Self-Driving Car Research Studio comes with everything you need to jumpstart your research.

Vehicles

- QCar
  (single vehicle or vehicle fleet)

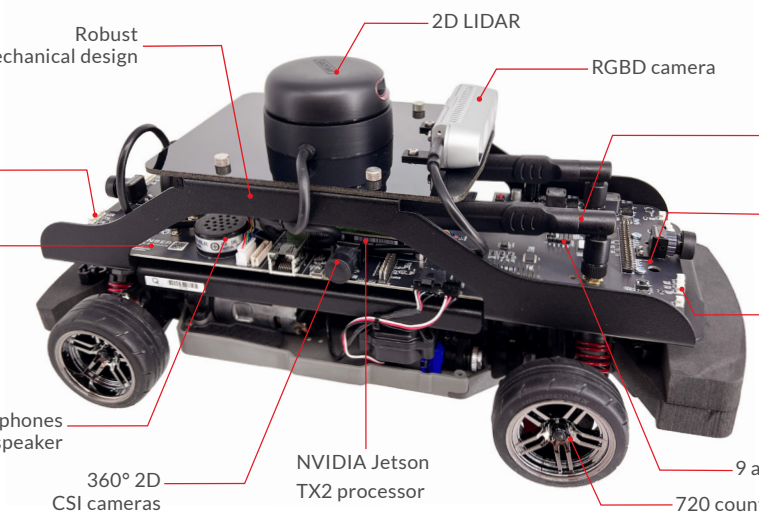
Ground Control Station

- High-performance computer with RTX graphics card with Tensor AI cores
- Three monitors
- High-performance router
- Wireless gamepad
- QUARC Autonomous license

Studio Space

- Driving map featuring intersections, parking spaces, single & double lane roads and roundabouts
- Supporting infrastructure including traffic lights, signs and cones

Product Details



Device Specifications

Dimensions	39 x 19 x 20 cm	
Weight (with batteries)	2.7 kg	
Power	3S 11.1 V LiPo (3300 mAh) with XT60 connector	
Operation time (approximate)	~2 hours 11 m (stationary, with sensor feedback)	30 min (driving, with sensor feedback)
Onboard computer	NVIDIA® Jetson™ TX2 GPU: 2 GHz quad-core ARM Cortex-A57 64-bit + 2 GHz Dual-Core NVIDIA Denver2 64-bit	GPU: 256 CUDA Core NVIDIA Pascal™ GPU architecture, 1.3 TFLOPS (FP16) Memory: 8GB 128-bit LPDDR4 @ 1866 MHz, 59.7 GB/s
Lidar	LIDAR with 2k-8k resolution, 10-15Hz scan rate, 12m range	
Cameras	Intel D435 RGBD Camera	360° 2D CSI Cameras using 4x 160° FOV wide angle lenses, 21fps to 120fps
Encoders	720 count motor encoder pre-gearing with hardware digital tachometer	
IMU	9 axis IMU sensor (gyro, accelerometer, magnetomter)	
Safety features	Hardware "safe" shutdown button	Auto-power off to protect batteries
Expandable IO	2x SPI 4x I2C 40x GPIO (digital) 4x USB 3.0 ports 1x USB 2.0 OTG port	3x Serial 4x Additional encoders with hardware digital tachometer 4x Unipolar analog input, 12 bit, 3.3V 2x CAN Bus 8x PWM (shared with GPIO)
Connectivity	WiFi 802.11a/b/g/n/ac 867Mbps with dual antennas	2x HDMI ports for dual monitor support 1x 10/100/1000 BASE-T Ethernet
Additional QCar features	Headlights, brake lights, turn signals, and reverse lights (with intensity control) Dual microphones Speaker	LCD diagnostic monitoring, battery voltage, and custom text support
Supported Software and APIs	• QUARC for Simulink® • Quanser APIs • TensorFlow • TensorRT • Python™ 2.7 & 3 • ROS 1 & 2 • CUDA®	• cuDNN • OpenCV • Deep Stream SDK • VisionWorks® • VPI™ • GStreamer • Jetson Multimedia APIs	• Docker containers with GPU support • Simulink® with Simulink Coder • Simulation and virtual training environments (Gazebo and Quanser Interactive Labs)	• Multi-language develo ment • supported with Quanser Stream • APIs for inter-process • Communication • Unreal Engine

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.