![routescene LidarPod®]

Technical specification for your turnkey solution

With the Routescene LidarPod® you buy a complete solution. Everything is included so you can start your aerial or ground survey straight away.

Literally the only extras you need are a UAV and batteries to conduct an aerial survey OR a car and roof rack to perform a ground survey. It's that quick and simple.

Revolutionising surveying

What is the Routescene LidarPod®?

The Routescene LidarPod® is cutting edge 3D mapping technology which is transforming the approach to surveys.

Your self contained LidarPod® contains an HDL32 LiDAR scanner, a survey grade GPS/INS, data storage and radio telemetry.

Lightweight and compact, the LidarPod can be fitted onto any mobile platform you require. It has been designed specifically for use on UAVs and can also be used on vehicles.

What is included in the Routescene UAV LidarPod® package

- 1 x Routescene LidarPod
- 1 x Routescene Ground Station
- 1 x GPS Ground Station antenna plus tripod
- 1 x Radio Ground Station antenna plus tripod
- 2 x GPS UAV antennas
- 1 x Radio UAV antenna
- Cables for power, antennas and data
- Wifi adapter for smartphone/tablet control
- 1 x Routescene LidarViewer Pro software license

What is included in the Routescene Vehicle LidarPod® upgrade

Upgrade your Routescene UAV LidarPod package with the following:
- 1 x High resolution Odometer
- 1 x Vehicle frame with roofrack mounting brackets
- 2 x GPS vehicle antennas + cables
- 1 x firmware LidarPod upgrade to support the Odometer
- 1 x firmware LidarPod upgrade to support third party GPS corrections

HYPER-TECH Systems

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Technical details of the Routescene LidarPod®

The Routescene LidarPod contains all you need to collect precise survey data, quality control the data in real-time and create a very dense and accurate georeferenced point cloud. The internal firmware controls the sensors, parses the raw data and transmits data samples to the Routescene Ground Station, it also manages and monitors power consumption of the LidarPod.

Weight: 2.5 kg (including GPS antennas and cables)
Dimensions: 320 mm length x 100 mm diameter
- 65 m x 120 m footprint at 80 m altitude
- Absolute position accuracy of 0.04 m at 20 m range
- Absolute position accuracy of 0.06 m at 40 m range

External power
- Switchable power from UAV to Ground supply
- Supply Voltage: 12-50 vDC, 56 W max, 28 W typical
- Operating temperature: -10° to +40° C

Velodyne HDL-32e
A true 3D mobile LiDAR scanner that delivers unsurpassed image resolution. The HDL-32e collects 700,000 3D points per second.
- 32 laser sensors/ detector pairs
- Class I eye safe
- 905 nm wavelength
- Time of flight distance measurement with intensity
- 700,000 3D points per second

Maximum range: 100 m, with range accuracy of < 20 mm
10 Hz frame rate (user selectable)

Field of View: 360° vertical and 41° horizontal
Angular resolution (vertical): 1.33°

Shock: 500 m/sec2 amplitude, 11 msec duration
Environmental Protection: IP67

Storage
Onboard solid state storage enabling hours of data to be collected.

UAV mounting kit (optional, extra cost)
A specially designed and tested solution for mounting the LidarPod and 2 GPS antennas onto your rotary UAV. The mounting kit includes an equipment plate which is compatible with 12mm diameter UAV equipment rails, the 2 rails being 160mm apart. The equipment plate includes quick release clamps for easy deployment.

Weight: 1.0 kg

GPS \ INS
A state of the art integrated Real-Time Kinematic (RTK) GPS and Inertial Navigation System (INS) that provides accurate position, velocity, acceleration and orientation under the most demanding conditions. The dual antenna moving baseline Real Time Kinematic (RTK) GNSS solution ensures that we can achieve the highest accuracy possible for the lowest weight. The GPS\INS sensor combines temperature calibrated accelerometers, gyroscopes, magnetometers and a pressure sensor with a multi channel RTK GNSS receiver. These are coupled in a sophisticated fusion algorithm to deliver accurate and reliable navigation and orientation.

Triple frequency GNSS receiver that provides up to 1 cm accuracy positioning and supports all of the current and future satellite navigation systems, including GPS, GLONASS, GALILEO and BeiDou. It also supports the Omnistar service for hassle free high accuracy positioning.

Horizontal Position Accuracy (with RTK): 0.008 m
Vertical Position Accuracy (with RTK): 0.015 m
Roll and Pitch Accuracy: 0.15°
Heading Accuracy: 0.07° (with 2 m GPS antenna spacing)
Hot Start Time: 500 ms
Internal Filter Rate: 1000 Hz
Acceleration Limit: 11 g
MTBF: > 50,000 hrs
Shock Limit: 2000 g
Output Data rate: up to 100 Hz

Radio Telemetry
Dual channel UHF data link to provide remote control over the LidarPod, transmit RTK GPS corrections to the LidarPod and enable sampled sensor data to be transmitted back to the ground station for Status and Quality Assurance purposes.

To ensure that the LidarPod can operate legally within your country, the radio frequency is configurable and can be set to a unique channel. A radio licence may be required in certain countries.

Operating Frequency: User configurable between 403 and 470 MHz
Transmitter Power: User configurable between 100 mW, 200 mW, 500 mW and 1 W
Channel bandwidth: 25 kHz
Sensitivity: -113 dBm
- FEC+CRC error detection and correction with reliable packet transmission system
- 50 Ω antenna impedance

Routescene Ground Station

For the Routescene UAV LidarPod® the Ground Station is an essential component of the system, ensuring RTK GPS corrections are transmitted to the LidarPod and Quality Assurance and Status information is returned.

The Routescene Ground Station provides RTK corrections to the LidarPod to ensure millimetre accuracies can be obtained. The corrections are transmitted via radio telemetry to the LidarPod. The Ground Station will also receive the Status and Quality Assurance data from the LidarPod and this is then displayed using the Routescene QC Monitor software.

The Ground Station supports both L1 and L2 frequencies and monitors all the GPS, GLONASS, GALILEO and BeiDou saltellites. This delivers the quickest and most reliable RTK initializations for 1 – 2 centimetre positioning.

To ensure that the LidarPod can operate legally within your country, the radio frequency is configurable and can be set to a unique channel. A radio licence may be required in certain countries.

The Routescene QC Monitor software is supplied with the Ground Station and is accessed using a web browser from a mobile device or laptop which has a wifi connection.

Product conformity

The Routescene LidarPod and Ground Station are available for use in any country worldwide. The products are non-ITAR (International Traffic in Arms Regulations) rated so they are not subjected to export controls.

The LidarPod and Ground Station have been independently CE and FCC certified to ensure they are compliant to electrical and radio transmission standards.

FC CE

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Technical details of the Routescene Ground Station

Weight: 1.3 kg
Dimensions: 220 x 195 x 55 mm

Supply Voltage: 12 – 24 v, 12 W

GNSS receiver
220 Channels:
- GPS: L1 C/A, L2 E, L 2C
- GLONASS: L1 and L2 C/A
- Galileo: E1
- QZSS: L1 C/A, L1 SAIF, L 2C
- SBAS: L1 C/A

High precision multiple correlator for GNSS pseudo-range measurements
- Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multipath error, low time domain correlation and high dynamic response
- Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- Up to 20 Hz raw measurement and position outputs with a <30 ms latency

Single Baseline RTK (<30 km)
0.008 m + 1 ppm Horizontal
0.015 m + 1 ppm Vertical

Radio Telemetry
Operating Frequency: User configurable between 403 and 470 MHz
Transmitter Power: User configurable between 100 mW, 200 mW, 500 mW and 1 W
Channel bandwidth: 25 kHz
Sensitivity: -113 dBm
- FEC+CRC error detection and correction with reliable packet transmission system
- 50 Ω antenna impedance
- 802.11 b/g/n (WiFi) wireless connectivity for control and monitoring

QC Monitor software
- Web based
- Windows 7 or 8, Apple OS X, Linux with a modern web browser
- Android or Windows Phone or Apple iPad or iPhone
- Connection to the ground station via WiFi, USB or Ethernet

Routescene Vehicle LidarPod® upgrade

For your convenience we have developed a Vehicle LidarPod upgrade, which allows the Routescene LidarPod to operate in urban canyons more effectively and ensure a higher accuracy at other times.

For the Routescene Vehicle LidarPod the Ground Station is optional as it depends on the most practical solution through which to receive the RTK GPS corrections: locally using the Routescene Ground Station, or via GPRS modem or satellite. Then there is always the option to post-process the position data and apply the RTK GPS corrections after the survey has been completed.

The Vehicle LidarPod upgrade provides a number of different items to make the LidarPod completely operational for Mobile Mapping surveys. The following is included in the upgrade:

Technical details of the Routescene Vehicle LidarPod upgrade

Odometer
Vehicle odometer which clamps onto one of the rear wheels of the vehicle. The Odometer supplies up to 4000 pulses per second to enable accurate distance travelled and velocity to be calculated. This information will augment the GPS\INS solution considerably and will reduce the drift in urban canyons.
- Odometer adaptor plates for 4 and 5 nut wheels
- Adaptor plate bolts to accept 19 mm wheel hexagonal nuts
- Firmware upgrade to support the Odometer

RTK corrections
Firmware upgrade to support third party RTK GPS corrections.

In the event that using the Routescene Ground Station is not feasible, perhaps because of the range at which you are working and obstructions that will block a radio signal, then the firmware upgrade enables RTK corrections to be supplied by a third party service, via GPRS or satellite connection.

Not including receiver hardware or the service subscription.

Vehicle support frame
- A lightweight and modular support frame that can be easily be shipped
- The support frame can be mounted on the roofrack of any vehicle
- The support frame is isolated from vehicle vibrations using an advanced method of shock mounts
- Total frame length is 2 m, supplied in 2 sections
- Triangular frame with 22 cm sides

QC Monitor software
The QC Monitor software enables you to operate the LidarPod directly from inside the vehicle. The dedicated ground power and data cable supplied with the LidarPod can be used to control and monitor the LidarPod. The QC software enables you to monitor the validity and quality of the data being collected by the LidarPod as it provides Quality Assurance parameters to ensure that the survey is going smoothly.

- Web based
- Windows 7 or 8, Apple OS X, Linux with a modern web browser
- Android or Windows Phone or Apple iPad or iPhone
- Connection to the ground station via WiFi, USB or Ethernet
- Uses a USB connection for direct operation with the LidarPod, e.g. during vehicle surveys

Improved productivity

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routescene®

Routescene® is a global operation. We have a strong cutting edge culture, offering agility and innovation.

We offer authoritative insight across all aspects of data management and have industry recognition as data visualisation experts. With this knowledge we have invented the Routescene LidarPod and LidarViewer, which are robust, easy to use, intuitive products with wide ranging applications. These products will deliver fast geospatial data capture, analysis and visualisation to improve your commercial decisions and performance.

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