This new 3D VZ-Line Laser Scanner offers superior and unrivaled long range measurement performance of more than 6,000 m, reflectorlessly.

RIEGL’s unique V-Line technology is based on echo digitization and online waveform processing. The VZ-6000 operates even in poor visibility and demanding multi target situations caused by dust, haze, rain, snow.

Due to its laser wavelength the instrument is exceptionally well-suited for measuring snowy and icy terrain.

Modes of Operation:

- stand-alone operation with integrated graphical user interface via 7" touchscreen
- remote control via VNC Viewer with any standard tablet PC or other mobile device via WiFi
- remote operation with RISCAN PRO on a notebook via LAN or WiFi connection
- customized operation by third party tools / applications based on RIEGL’s well documented interfaces and scanner libraries, e.g. RiVLib

Typical applications include:

- Topography & Mining
- Glacier Mapping
- Snow Field Monitoring
- Long Range Monitoring
- Civil Engineering
- Archaeology

Visit our website
www.riegl.com
Ultra Long Range Performance

The High-Speed, High-Resolution 3D Laser Scanner RIEGL VZ-6000 offers an ultra long range of more than 6,000 m and a wide field of view of 60° vertical and 360° horizontal.

High accuracy and reliability of range measurement is based on RIEGL’s unique V-Line technology of echo digitization and online waveform processing. Extreme long range measurements can be achieved even with poor visibility and demanding multi target situations caused by dust, haze, rain, snow, etc.

Built-in Camera

A built-in calibrated 5-Megapixel camera capturing images deflected by the laser mirror allows coverage of the whole field of view with an appropriate number of high resolution images automatically stitched together to create a high resolution panorama image. This panorama image, in combination with precise 3D measurements produced by the VZ-6000, enables the creation of photorealistic virtual models for geological and geotechnical investigations, avalanche research, geomorphology, and geological features.

Waveform Data Output (optional)

The digitized echo signals, acquired by the RIEGL VZ-6000 - also known as waveform data - are the basis for waveform analysis. This data is provided via the optionally available waveform data output and accessible with the associated RIEGL software library RIAWELib for investigations and research on multi target situations based on the digital waveform data samples of the target echoes.

Designed for Demanding Fieldwork

3D profiling of the narrow infrared laser beam is realized with a light-weight vertically oscillating/rotating mirror which is mounted on a stable 360 degree horizontally rotateable mechanism.

This compact and rugged design with a dust- and splash-proof housing is the basis for long-term and reliable operation even under adverse environmental conditions.

Compatible Software Packages

The RIEGL VZ-6000 is compatible with the well-proven RIEGL software package RiSCAN PRO for terrestrial laser scanning, RIEGL’s interface library RiVLib, as well as the workflow-optimizing software packages RI passive and RIMINING. The software plugin RiMTA-3D provides automatic assignment of the correct MTA zones in multiple time around processing.

Stand-alone Registration

- Integrated GPS receiver (L1) or external high-end GNSS receiver connected
- Integrated compass, accuracy typ. 1° (one sigma value, available for vertical scanner setup position)
- On-board inclination sensors (tilt range ±10°, accuracy typ. ±0.008°)

Registration via Control Points

- Fast fine scanning of reflectors for precise determination of scanner position using control points

Totalstation-like-Registration

- Setup above well known point (integrated laser plummet)
- On-board inclination sensors
- Precise fine scanning of well known remote target (reflector)
- Backsighting
Communication and Interfaces

- LAN port 10/100/1000 MBit/sec within base
- integrated WLAN interface with high-gain antenna
- USB 2.0 for connecting an external digital camera
- connector for GPS antenna
- two external power supply ports
- connector for external GPS synchronization pulse (1PPS)
- connector for external GNSS receiver

Scan Data Storage

- internal 80 GByte SSD (Solid State Disc) (2 GByte reserved for the operating system)
- external storage devices (USB flash drives or external hard drives) via USB 2.0 interface
Max. Measurement Range  RIEGL VZ®-6000

50 kHz PRR

100 kHz PRR

200 kHz PRR

300 kHz PRR

The following conditions are assumed:
- flat target larger than footprint of the laser beam
- perpendicular angle of incidence
- average brightness
- ambiguity resolved by post processing with RiMTA-3D

MTA zones:
- **MTA 1**: no ambiguity / 1 pulse „in the air”
- **MTA 2**: 2 pulses „in the air”
- **MTA x**: x pulses „in the air”
User-Friendly and Efficient Operation and Acquisition Workflow

Operation is easy with the integrated graphical user interface via 7” touchscreen, or by remote control of the scanner via VNC Viewer with any tablet PC or mobile device via WiFi connection. Highly efficient scan data acquisition and global registration is supported by on-board inclination sensors, integrated L1 GPS receiver, an interface for a high-end external GNSS receiver on top of the scanner, a digital compass and built-in SSD data storage media. With a visual project overview of acquired scan data, it is possible to ensure complete data coverage or check the progress of a project.

Add-on Rechargeable Battery

- optional add-on rechargeable battery pack (high power, high capacity NiMH cells)
- compact thin cylinder design, short-circuit-proof and protected connection pins
- rechargeable during standard scan operation via external power supply
- integrated micro-controller based charging electronics
- easily attachable to base of the laser scanner by central locking screw

Power Supply

- intelligent power supply management, up to three independent external power sources can be connected simultaneously for uninterrupted operation
- reliable under- and over voltage protection
- wide external voltage supply range 11-32 V DC
- power consumption typ. 75 W (max. 90 W)
- LED indicators for power status
### Laser Product Classification

Class 3B Laser Product according to IEC60825-1:2007

### Range Measurement Performance

**Measuring Principle**

- time of flight measurement, echo signal digitization, online full waveform analysis, full waveform export capability (optional)
- single pulse ranging

**Mode of operation**

**Pulse repetition rate PRR (peak)**

<table>
<thead>
<tr>
<th>50 kHz</th>
<th>100 kHz</th>
<th>200 kHz</th>
<th>300 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 kHz</td>
<td>100 kHz</td>
<td>200 kHz</td>
<td>300 kHz</td>
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</tbody>
</table>

**Effective Measurement Rate**

<table>
<thead>
<tr>
<th>50 kHz</th>
<th>100 kHz</th>
<th>200 kHz</th>
<th>300 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>37000 meas./sec</td>
<td>74000 meas./sec</td>
<td>147000 meas./sec</td>
<td>222000 meas./sec</td>
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</tbody>
</table>

**Max. Measurement Range**

<table>
<thead>
<tr>
<th>50 kHz</th>
<th>100 kHz</th>
<th>200 kHz</th>
<th>300 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000 m</td>
<td>4800 m</td>
<td>3800 m</td>
<td>3300 m</td>
</tr>
</tbody>
</table>

**Max. Number of Targets per Pulse**

- Practically unlimited (4)

**Accuracy (R)**

- 15 mm

**Precision (R)**

- 10 mm

**Minimum Range**

- 5 m

**Laser Wavelength**

- Near infrared

**Laser Beam Divergence**

- 0.12 mrad

**Laser Beam Footprint (Gaussian Beam Definition)**

- 15 \( \text{mm} \) at exit, 60 \( \text{mm} \) at 500 \( \text{m} \), 120 \( \text{mm} \) at 1000 \( \text{m} \), 240 \( \text{mm} \) at 2000 \( \text{m} \)

**Laser Beam Divergence**

- 0.12 mrad

**Laser Wavelength**

- Near infrared

**Range Measurement Performance**

- Accuracy is the degree of conformity of a measured quantity to its actual (true) value.

**Precision**, also called reproducibility or repeatability, is the degree to which further measurements show the same result.

**Typical values** for average conditions. **Maximum range** is specified for flat targets with size in excess of the laser beam diameter, perpendicular angle of incidence and for atmospheric visibility of 23 km. In bright sunlight, the maximum range is shorter than under overcast sky.

**Scanner Performance**

**Scanning Mechanism**

- Field of View (selectable)
- Scan Speed (selectable)
- Angular Step Width \( \Delta \theta \) (vertical), \( \Delta \phi \) (horizontal)

**Angle Measurement Resolution**

- Inclination Sensors
- GNSS Receiver
- Compass
- Laser Plummets
- Internal Sync Timer
- Scan Sync (optional)

**Waveform Data Output** (optional)

**Communication Interfaces**

- LAN port 10/100/1000 Mbit/sec in the base
- Integrated WLAN interface with high-gain antennas
- Connector for external GNSS antenna
- 2 connectors for external power supply
- Connector for external GNSS-timing signals
- Connector for external high-end GNSS receiver
- Internal 80 GByte SSD, external storage devices (USB flash drives or external hard drives) via USB 2.0 interface

**General Technical Data**

- Power Supply Input Voltage
- Current Consumption
- Main Dimensions / Weight
- Humidity
- Protection Class
- Temperature Range

**Integrated Digital Camera**

- Field of view 7.2” x 5.5” (v x h)
- Resolution 2560 x 1920 pixels (5 Mpixel), automatic exposure control
- 7” WVGA (800 x 480) color capacitive touchscreen, full operation control for stand alone usage

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**Note:** The information contained herein is believed to be accurate and reliable. However, no responsibility is assumed by RIEGL for its use. Technical data are subject to change without notice.