The RIEGL miniVUX-3UAV is an extremely lightweight airborne laser scanner, designed specifically for integration with UAS/UAV/RPAS. The sister type of the proven RIEGL miniVUX-2UAV and RIEGL miniVUX-1UAV sensor offers a selectable 100 kHz, 200 kHz, and 300 kHz laser pulse repetition rate (PRR). With 300 kHz PRR, the sensor provides up to 100,000 measurements per second at 120° FoV and thus a dense point pattern on the ground for UAV-based applications that require the acquisition of small objects.

The small and sophisticated design of the stable aluminum housing offers various integration possibilities with platforms that offer restricted space or payload capabilities. The 360° field of view allows complete acquisition of the environment.

An easy-to-remove SD card for data storage, and/or the option for streaming the scan data via LAN-TCP/IP interface, in combination with the modest power consumption of the scanner, enable straightforward integration with most UAS/UAV/RPAS types.

The RIEGL miniVUX-3UAV makes use of RIEGL’s unique Waveform-LiDAR technology, allowing echo digitization and online waveform processing. Multi-target resolution is the basis for penetrating even dense foliage. As a further special feature, the wavelength is optimized for the measurement of snowy and icy terrains.

In addition to the stand-alone version of the miniVUX-3UAV, RIEGL also offers fully-integrated system solutions.

Typical applications include
- Agriculture & Forestry
- Glacier and Snowfield Mapping
- Archeology and Cultural Heritage Documentation
- Construction-Site Monitoring
- Landslide Monitoring
**Maximum Measurement Range vs. Target Reflectance**

RIEGL miniVUX®-3UAV

**Example:** miniVUX-3UAV at 100,000 pulses/second, range to target = ~90 m, speed = 4 m/s  
Resulting Point Density ~ 45 pts/m²

**Example:** miniVUX-3UAV at 200,000 pulses/second, range to target = ~85 m, speed = 4 m/s  
Resulting Point Density ~ 95 pts/m²

**Example:** miniVUX-3UAV at 200,000 pulses/second, range to target = ~90 m, speed = 4 m/s  
Resulting Point Density ~ 90 pts/m²

---

**PRR = 100 kHz**

**Target Reflectance (%)**

- Visibility 25 km
- Visibility 15 km
- Visibility 9 km

**Speed (m/s)**

- 2
- 4
- 6
- 8
- 10
- 12
- 14
- 16

**Max. Measurement Range (m)**

- 0
- 50
- 100
- 150
- 200
- 250

**PRR = 200 kHz reduced power**

**Target Reflectance (%)**

- Visibility 25 km
- Visibility 15 km
- Visibility 9 km

**Speed (m/s)**

- 2
- 4
- 6
- 8
- 10
- 12
- 14
- 16

**Max. Measurement Range (m)**

- 0
- 50
- 100
- 150
- 200

---

**PRR = 200 kHz**

**Target Reflectance (%)**

- Visibility 25 km
- Visibility 15 km
- Visibility 9 km

**Speed (m/s)**

- 2
- 4
- 6
- 8
- 10
- 12
- 14
- 16

**Max. Measurement Range (m)**

- 0
- 50
- 100
- 150
**RIEGL miniVUX-SYS System Integration Options**

Besides of the stand-alone miniVUX-3UAV LiDAR engine, RIEGL offers also system solutions, combining the miniVUX-3UAV with IMU/GNSS systems of different performance and of different form factors as well as optional RGB camera systems. Additionally, a special add-on to the miniVUX-SYS allows for straight forward integration with your multi-rotor UAV, e.g. a DJI Matrice M600.

### RIEGL miniVUX-3UAV with APX-15 UAV

- IMU/GNSS unit integrated with LiDAR engine
- total weight approx. 2 kg
- interfaces for up to 2 cameras
- suited for integration into fixed-wing UAVs

### RIEGL miniVUX-3UAV with APX-20 UAV

- higher-grade IMU/GNSS unit partly integrated with LiDAR engine
- total weight approx. 2.5 kg
- interfaces for up to 2 cameras
- suited for integration into fixed-wing UAVs

### RIEGL Integration Kit 600

- add-on to the miniVUX-SYS coming with shock-absorbing mounting-kit, power supply module and cabling
- total weight approx. 0.7 kg (without sensor and camera)
- suited for integration into multi-rotor UAVs

Please contact sales@riegl.com to get more detailed information.

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**RIEGL miniVUX®-3UAV Camera Options**

### RIEGL miniVUX-3UAV LiDAR Sensor equipped with APX-15 UAV

- with two Sony Alpha 6000 cameras (oblique mount)
- with nadir-looking camera e.g. Sony Alpha 6000 camera or Sony Alpha 7R III

### RIEGL miniVUX-3UAV LiDAR Sensor equipped with APX-20 UAV

- with two Sony Alpha 6000 cameras (oblique mount)
- with nadir-looking camera e.g. Sony Alpha 6000 camera or Sony Alpha 7R III

1) See technical details in the corresponding Applanix datasheet
**Laser Product Classification**
Class 1 Laser Product according to IEC 60825-1:2014

**Range Measurement Performance**
Measuring Principle: time of flight measurement, echo signal digitization, online waveform processing

### Laser Pulse Repetition Rate PRR

<table>
<thead>
<tr>
<th>PRR</th>
<th>100 kHz</th>
<th>200 kHz (reduced power)</th>
<th>200 kHz</th>
<th>300 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Measuring Range 2)</td>
<td>170 m</td>
<td>150 m</td>
<td>170 m</td>
<td>170 m</td>
</tr>
<tr>
<td>natural targets ρ ≥ 20 %</td>
<td>290 m</td>
<td>250 m</td>
<td>290 m</td>
<td>290 m</td>
</tr>
<tr>
<td>natural targets ρ ≥ 60 %</td>
<td>330 m</td>
<td>280 m</td>
<td>330 m</td>
<td>330 m</td>
</tr>
<tr>
<td>Typ. Operating Flight Altitude AGL 3)</td>
<td>100 m (330 ft)</td>
<td>85 m (280 ft)</td>
<td>100 m (330 ft)</td>
<td>100 m (330 ft)</td>
</tr>
<tr>
<td>natural targets ρ ≥ 20 %</td>
<td>160 m (525 ft)</td>
<td>140 m (460 ft)</td>
<td>160 m (525 ft)</td>
<td>160 m (525 ft)</td>
</tr>
<tr>
<td>natural targets ρ ≥ 60 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Number of Targets per Pulse 4)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

1) Rounded values.
2) 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 max. range is shorter than under overcast sky.
3) Flat terrain assumed, scan angle ±45° FOV
4) If more than one target is hit, the total laser transmitter power is split and, accordingly, the achievable range is reduced.

### Interfaces

**Technical Data**

RIEGL miniVUX®-3UAV

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**PRELIMINARY**

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1)胃肠不化

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1) Pillow content.
2) 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 max. range is shorter than under overcast sky.
3) Flat terrain assumed, scan angle ±45° FOV
4) If more than one target is hit, the total laser transmitter power is split and, accordingly, the achievable range is reduced.

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### General Technical Data

- **Power Supply Input Voltage / Consumption**
  - 11 - 34 V DC / typ. 18 W @ 100 scans/sec
  - 243 x 111 x 85 mm / approx. 1.6 kg
  - 243 x 99 x 85 mm / approx. 1.55 kg
  - max. 80 % non condensing @ 31°C
  - IP64, dust and splash-proof
  - -10°C up to +40°C (operation) / -20°C up to +50°C (storage)

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1) Continuous operation at ambient temperature of ≥ 30°C (≥ 86°F) requires a minimum amount of air flow of approx. 3 m³. For applications where a 3 m³ air flow along the cooling fins cannot be guaranteed, the cooling fan has to be used.