RiCOPTER
with *RIEGL* VUX®-SYS integrated

ULS

RIEGL VUX-1UAV features

The RiCOPTER is a high-performance unmanned multi-rotor aircraft equipped with *RIEGL*'s VUX-SYS sensor system to offer a fully integrated turnkey solution for professional UAS surveying missions.

The excellent measurement performance of the VUX-1UAV in combination with IMU/GNSS unit, antenna, control unit, and optional digital cameras results in survey grade measurement accuracy.

The RiCOPTER is a complete UAS LiDAR solution from one single manufacturer!

RiCOPTER®

Remotely Piloted Aircraft System for Unmanned Laser Scanning (ULS)

Typical Applications

• Agriculture and Forestry • Topography in Open-Cast Mining • Terrain and Canyon Mapping • Surveying of Urban Environments • Archeology and Cultural Heritage Documentation • Construction-Site Monitoring • Corridor Mapping: Power Line, Railway Track, and Pipeline Inspection

RIEGL®

www.riegl.com
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RiCOPTER Main Features & Key Facts

- robust und reliable airborne scanner carrying platform
- full mechanical and electrical integration of sensor system components with aircraft fuselage
- carbon fibre main frame, foldable propeller carrier arms, and shock-absorbing undercarriage for stable flight, landings and comfortable transportation
- **RiCOPTERControl (RiCC)**: redundant flight control system developed and produced by *RIEGL*
- optimized for operation of VUX-SYS Sensor System including camera(s)
- remote control Graupner MC32 (2.4 GHz; telemetry supported)
- 433, 868 or 915 MHz command and control link (details on request); 5.8 GHz live video downstream
- UN 38.3 certified batteries

easy to carry with integrated handle

Remote Control Graupner MC32

RiCOPTER ready for take off

Transportation Case: foldable arms facilitate easy transportation and storage

RiCOPTER Aircraft Technical Data

Specifications and Performance:

Main Dimensions ready to fly arms folded for transportation & storage	 1,920 mm x 1,820 mm x 470 mm 624 mm x 986 mm x 470 mm
MTOM (Maximum Take-Off Mass)	25 kg
Max. Sensor Load	up to 6.5 kg
Empty Weight	11 kg
Max. tested and permitted Operating Altitude AMSL [1]	up to 4000 m (13,100 ft) [2] [3] [4] (under ISA[5] conditions)
Max. Flight Endurance	up to 30 min [6]
Cruise Speed	typ. 6 - 8 m/sec
Productivity (area coverage) per flight [7]	up to 2 km² @ 8 m/s, 100 m AGL [8]
Take-off / Landing	VTOL (Vertical Take-off and Landing)
RiCOPTER Transportation Case dimensions empty weight	 1,220 mm x 810 mm x 540 mm approx. 20 kg
RiCOPTER Ground Control Unit weight components	 approx. 1.2 kg • integrated datalink interface • integrated receiver of video signal for FPV camera • powered via USB connection • status display

1) AMSL – Above Mean Sea Level
2) depending on rotor blade configuration
3) For flight altitude above ground level, operational limits for civil unmanned aircraft according to national regulations have to be observed.
4) For flights above 3000 m AMSL pilots require a specific training. For further information concerning the "RiCOPTER altitude flight rating" please contact info@ricopter.com
5) ISA – International Standard Atmosphere
6) with 6.5 kg sensor load
7) operation over flat terrain, flight lines all in the same operating altitude AGL (100m)
8) point density resulting in 90 pts/m² (single strip) @ 20% side overlap

Limitations:

Max. Ground Speed	14 m/sec [1]
Max. Tolerable Wind Speed	8 m/sec
Max. Climb Rate	5 m/sec [1]
Max. Descent Rate	2 m/sec [1]

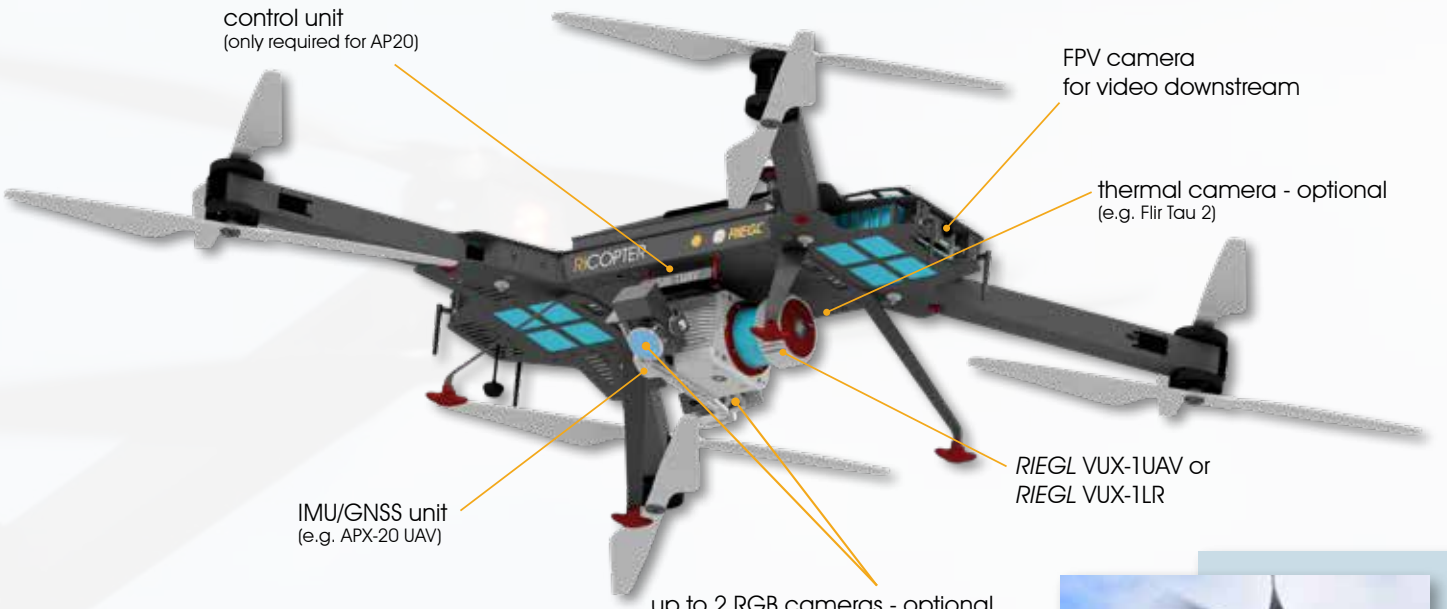
1) electronically limited

Hot / Cold Weather Operation:

Min. Operating Temperature	-5°C OAT (Outside Air Temperature)
Max. Operating Temperature	+40°C OAT (Outside Air Temperature)

RiCOPTER Setup with Integrated *RIEGL* VUX-SYS Sensor System

The VUX-SYS fits the dedicated mounting bay of the RiCOPTER directly without any adaptations. The system is supplemented by two digital cameras, covering a field of view of approximately 160 degrees. The low weight of the VUX-SYS enables the RiCOPTER to operate up to half an hour at a gross weight of 25 kg.



RIEGL VUX-SYS Sensor System Technical Data

System Components	• *RIEGL* VUX-1UAV • IMU/GNSS unit (APX-20 UAV) with antenna • up to 3 cameras (optional), e.g. 2x oblique RGB cameras (or 1x nadir RGB camera), and 1x nadir thermal camera
***RIEGL* VUX-1UAV Scanner Performance when integrated in RiCOPTER** Field of View (FOV) max. effective measurement rate max. range @ target reflectivity 20 % minimum range range accuracy Laser Safety Class according to IEC 60825-1:2014	 230° up to 350,000 meas./sec 550 m 3 m 10 mm Laser Class 1 (eye safe)
IMU/GNSS Unit (Applanix APX-20 UAV) accuracy Roll, Pitch / Heading IMU sampling rate position accuracy (typ.)	 0.015° / 0.035° 200 Hz 0.05 m - 0.3 m
Camera Interfaces	up to 4 x trigger and event marker

The VUX-SYS Sensor System can also be equipped with the *RIEGL* VUX-1LR (details on request).
Details to be found in the latest *RIEGL* VUX-1UAV, VUX-1LR & VUX-SYS data sheets.


RIEGL VUX-1UAV
Data Sheet


RIEGL VUX-1LR
Data Sheet


RIEGL VUX-SYS
Data Sheet


infrastructure mapping


power line mapping


open-cast mining

RIEGL VUX-1UAV Technical Data

- max. measurement range
- pulse repetition rate PRR (peak)
- online waveform processing
- optional digital camera
- multiple target capability
- eye safe operation at Laser Class 1

RIEGL VUX-1UAV LiDAR Sensor

Optional RiCOPTER Components / Accessories

RiCOPTER Ground Control Unit

The Ground Control Unit comes with accoring tripod mount.

- integrated datalink interface (433, 868 or 915 MHz)
- integrated receiver of video signal for FPV camera (5.8 GHz)
- powered via USB connection
- status display
- rugged PC for flight planning and configuration of the mission (optional)

RiCOPTER Ground Control Unit

RiCOPTER Charging Control Unit

- professional PELI-Carrying-Case for easy and safe transportation
- equipped with all required connectors and cables
- Power Supply: 100 – 240 VAC / max. 1.200 Watt
- 2 charging slots for max. 10 A each (2 Charging Control Units are recommended)
- charging time: approx. 1 hour for 1 set (4 batteries; 2 Charging Control Units)

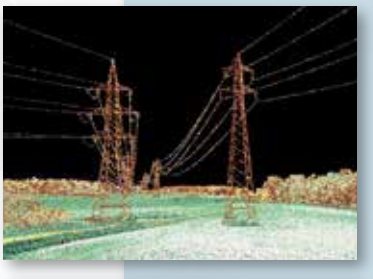
Further accessories available (more information on request).

RiCOPTER Charging Control Unit

Further Information & Scan Data Projects

For receiving more information about the scope of delivery, pricing, and availability of sample data, please get in contact with info@ricopter.com.

Reference projects have already been carried out successfully in applications like power line & infrastructure mapping, forestry & agriculture, environmental monitoring, flood analysis, and many more.



Scan Data Examples

Executive Summary Power Line Project

Executive Summary Environmental & Flood Analysis

Watch our videos! **youtube.com/riegllms**

The RiCOPTER is a high performance unmanned multi-rotor aircraft, designed & manufactured by *RIEGL* Laser Measurement Systems GmbH. It is distributed, supported and serviced by RiCOPTER UAV GmbH, also a *RIEGL* company.

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