

# RIEGL VUX-SYS<sup>®</sup>

- *complete miniaturized ALS System*
- *RIEGL VUX-1 lightweight airborne laser scanner integrated*
- *inertial measurement unit and GPS/GLONASS receiver integrated*
- *compact control unit with various interfacing options*
- *various mounting options for highly flexible aircraft installation*
- *prepared for remote control via low-bandwidth data link*
- *operates up to 4 digital cameras*

The *RIEGL VUX-SYS* is a complete on-board airborne laser scanning system of low weight and compact size for flexible use in UAS/UAV/RPAS, helicopter, gyrocopter and ultra-light aircraft installations.

The system comprises the *RIEGL VUX-1* airborne laser scanner, an IMU/GNSS system and a dedicated control unit. The excellent measurement performance of the VUX-1 in combination with a precise inertial measurement unit and GPS/GLONASS receiver results in survey-grade measurement accuracy over its full range of applications.

The system is specifically designed for seamless installation in the *RIEGL VP-1* helicopter pod as well as to equip the *RIEGL RiCOPTER* unmanned aerial system.

Its small size, low weight and a minimum of required cables accounts for short set-up time of the system.

Well defined mechanical and electrical interfaces enable easy integration in custom-made mounts on any type of lightweight aircraft.

The VUX-SYS is delivered with the necessary software tools for processing scan data as well as IMU/GNSS data.

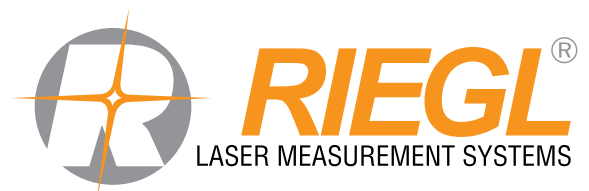
Based on the software bundle RiPROCESS and its associated software tools, scan data is geo-referenced, calibrated and exported fully automatically.

#### Typical applications include

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



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## RIEGL VUX<sup>®</sup>-SYS for RiCOPTER

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 for about half an hour at a gross weight of 25kg.



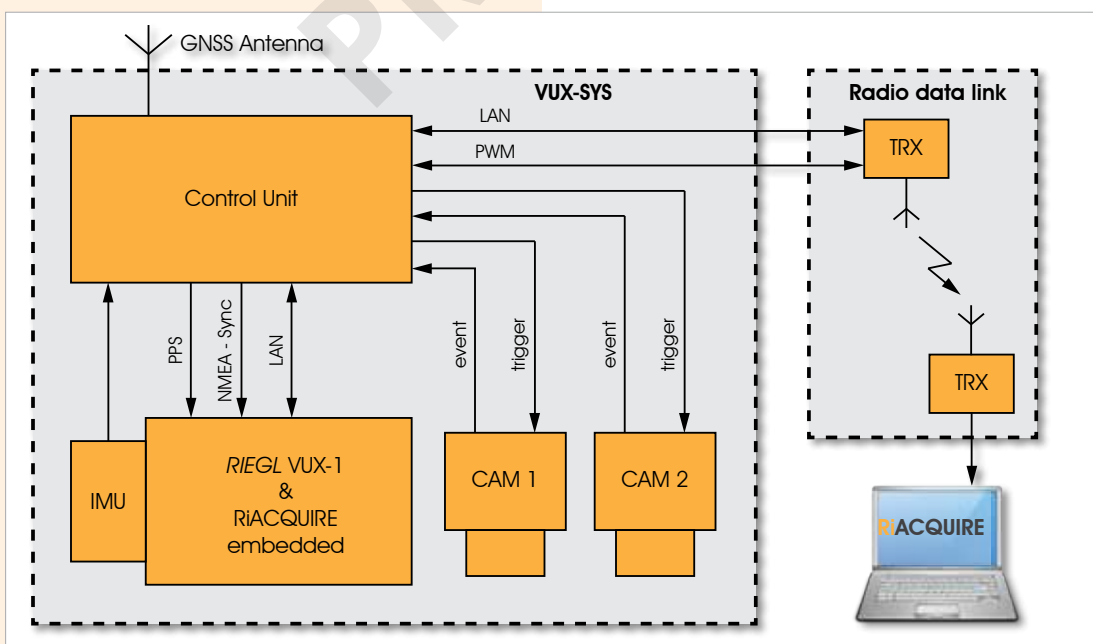
### RIEGL VUX-SYS for RiCOPTER System Components:

- RIEGL VUX-1 UAS LiDAR sensor
- IMU/GNSS unit
- GNSS antenna
- Control Unit
- 2 x SONY alpha 6000
- connecting cables

## RIEGL VUX<sup>®</sup>-SYS - Block Diagram Remote Control Setup

Accounting for the integration in unmanned remotely piloted systems, a dedicated TTL interface for receiving and emitting pulse-width modulated signals enables full control as well as system status feedback. Based on a predefined set of commands and associated pulse widths the system can be controlled easily via a standard remote-control radio channel of low bandwidth.

It is possible to adjust the data rate of scan data for streaming monitoring data even in real-time via suitable radio channels of sufficient bandwidth.



## RIEGL VUX<sup>®</sup>-SYS for VP-1

The VUX-SYS fits the small and lightweight RIEGL VP-1 pod, to be mounted on standard hard points and typical camera mounts of manned helicopters. Quick release adapter brackets and a minimum of external cabling (i.e. power supply, LAN, GPS antenna) allow quick system installation and removal.



### RIEGL VP-1

#### System Components:

- RIEGL VUX-1 UAS LiDAR sensor
- IMU/GNSS unit
- GNSS antenna
- Control unit
- digital camera
- connecting cables

### RIEGL VP-1

#### Technical Data:

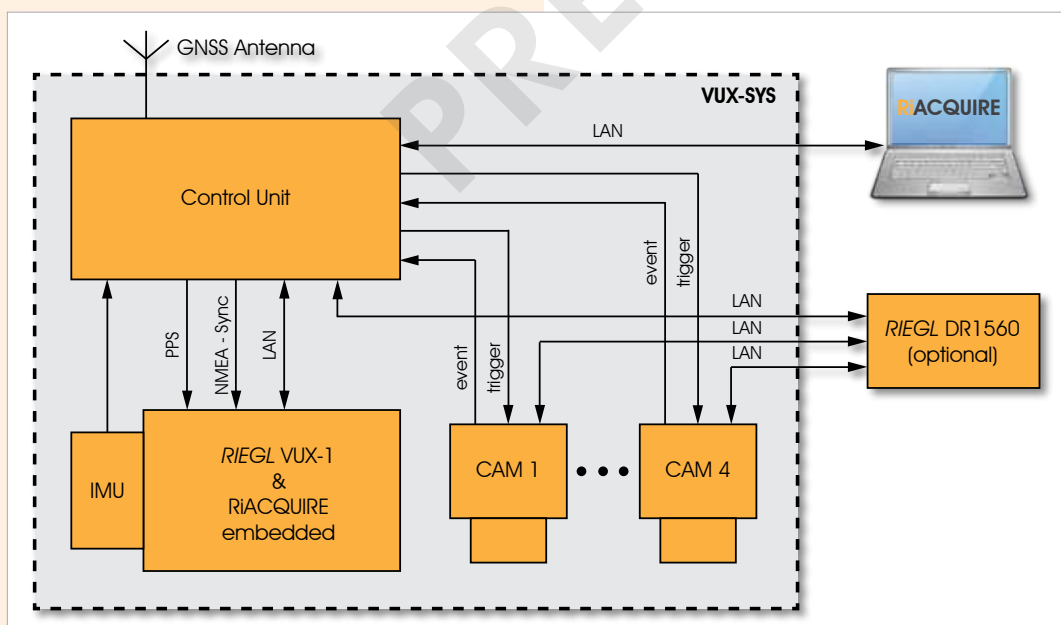
- quick installation & removal with standard brackets (e.g. AirFILM, etc.)
- total weight 21 kg
- area exposed to wind 0.114 m<sup>2</sup>

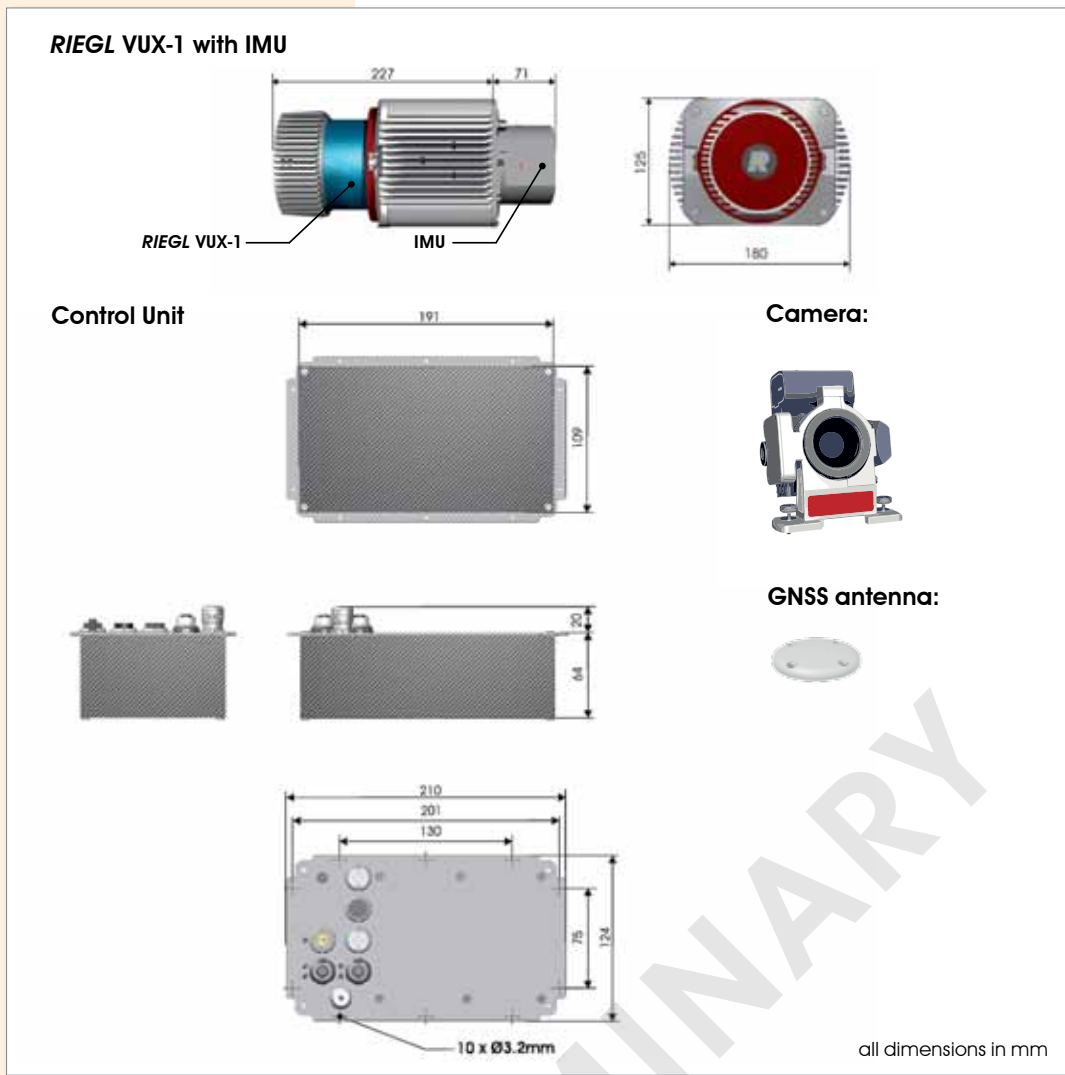
## RIEGL VUX<sup>®</sup>-SYS - Block Diagram Conventional Control Setup

The VUX-SYS contains a LAN interface for direct control from an operator's working station running the RiACQUIRE. RiACQUIRE is fully compatible with the VUX-SYS and enables full control over the laser scanner, the IMU/GNSS system, and optionally up to 4 digital cameras.

Scan data and image data can be directly stored on the particular sensors internal storage, or can be directly stored on an optional data recorder DR1560.

The control unit contains trigger and event marker interfaces for each camera. Precise time stamps of the camera's release-events are stored in the raw scan data stream enabling combination of point cloud data and imagery in subsequent data processing.





## Technical Data RIEGL VUX®-SYS

### Scanner Performance (for details refer to the VUX-1 data sheet)

Minimum Range	3 m
Accuracy	10 mm
Precision	5 mm
Laser Pulse Repetition Rate	up to 550 kHz
Max. Effective Measurement Rate	up to 500 000 meas./sec. (@ 550 kHz PRR & 330° FOV)
Scanning Mechanism	rotating mirror
Field of View (selectable)	up to 330° (full range measurement performance)
Scan Speed (selectable)	10 - 200 revolutions/sec, equivalent to 10 - 200 scans/sec
Angle Measurement Resolution	0.001°

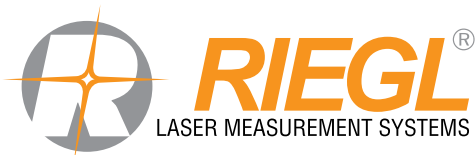
### Data Interfaces

Configuration	LAN 10/100/1000 Mbit/sec or TTL PWM
Scan Data Output	LAN 10/100/1000 Mbit/sec or USB 2.0
GNSS Interface	Serial RS232 interface for data string with GNSS-time information, TTL input for 1PPS synchronization pulse
	4x trigger and event marker

### Camera

### IMU & GNSS

IMU Accuracy	0.015°
Roll, Pitch	0.035°
Heading	200 Hz
IMU Sampling Rate	0.05 m - 0.3 m
Position Accuracy (typ.)	



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