

# NEW RIEGL VMX-1HA



Use the latest advancements in RIEGL LiDAR Technology for your mobile applications:  
**2 MHz effective measurement rate**  
**500 scan lines/sec**



The RIEGL VMX-1HA is a High Speed, High Performance Dual Scanner Mobile Mapping System which provides dense, accurate, and feature-rich data at highway speeds. With 2 million measurements and 500 scan lines per second, this turn-key solution is ideally suited for survey-grade mobile mapping applications.

This powerful technology comprises two RIEGL VUX-1HA High Accuracy LiDAR sensors and a high performance INS/GNSS unit, housed in an aerodynamically-shaped protective cover.

Optional camera systems complement LiDAR data with precisely geo-referenced images.

World Premiere at  
**ILMF 2016**  
February 22-24



## NEW High Speed, High Performance Dual Scanner Mobile Mapping System

### Typical Applications

- Transportation Infrastructure Mapping
- Rail Mapping
- Road Surface Measurement
- Rapid Capture of Construction Sites and Bulk Material
- City Modeling
- Open-Pit Mine Surveying
- GIS Mapping and Asset Management
- As-Built Surveying



Scan this QR code to watch the new RIEGL VMX-1HA video.

[www.riegl.com](http://www.riegl.com)



## Key Features

### • Advanced RIEGL LiDAR Technology for Mobile Mapping

The VUX-1HA – RIEGL’s kinematic high-speed, high-accuracy LiDAR sensor – is the core component of the turnkey, survey-grade mobile mapping system VMX-1HA. To achieve a maximum effective measurement rate of 2 MHz and 500 scan lines/sec with an accuracy of 5mm, two high performance laser scanners are integrated in the VMX-1HA turnkey system.

The 360 degree “full circle” field of view ensures full data capture for transportation infrastructure, facades, overhead structures, power lines, bridges, tunnels, etc. The orientation of the two scanners reduces potential coverage gaps caused by traffic and other obstacles. The simultaneous forward/backward-looking design of the two scanners delivers object scanning from three perspectives in a single pass.

### • Camera Interface

The optional VMX-CS6 camera solution supports triggering of up to 6 cameras for precisely time stamped image capture. A wide range of cameras can be used with the system including 5-megapixel and 9-megapixel cameras, the POINT GREY Ladybug5 spherical imaging system as well as high resolution DSLR cameras up to 36-megapixel.



RIEGL VMX-1HA with (2x) 5 MP and (2x) 9 MP cameras



RIEGL VMX-1HA Highway Mapping



High Resolution City Modeling

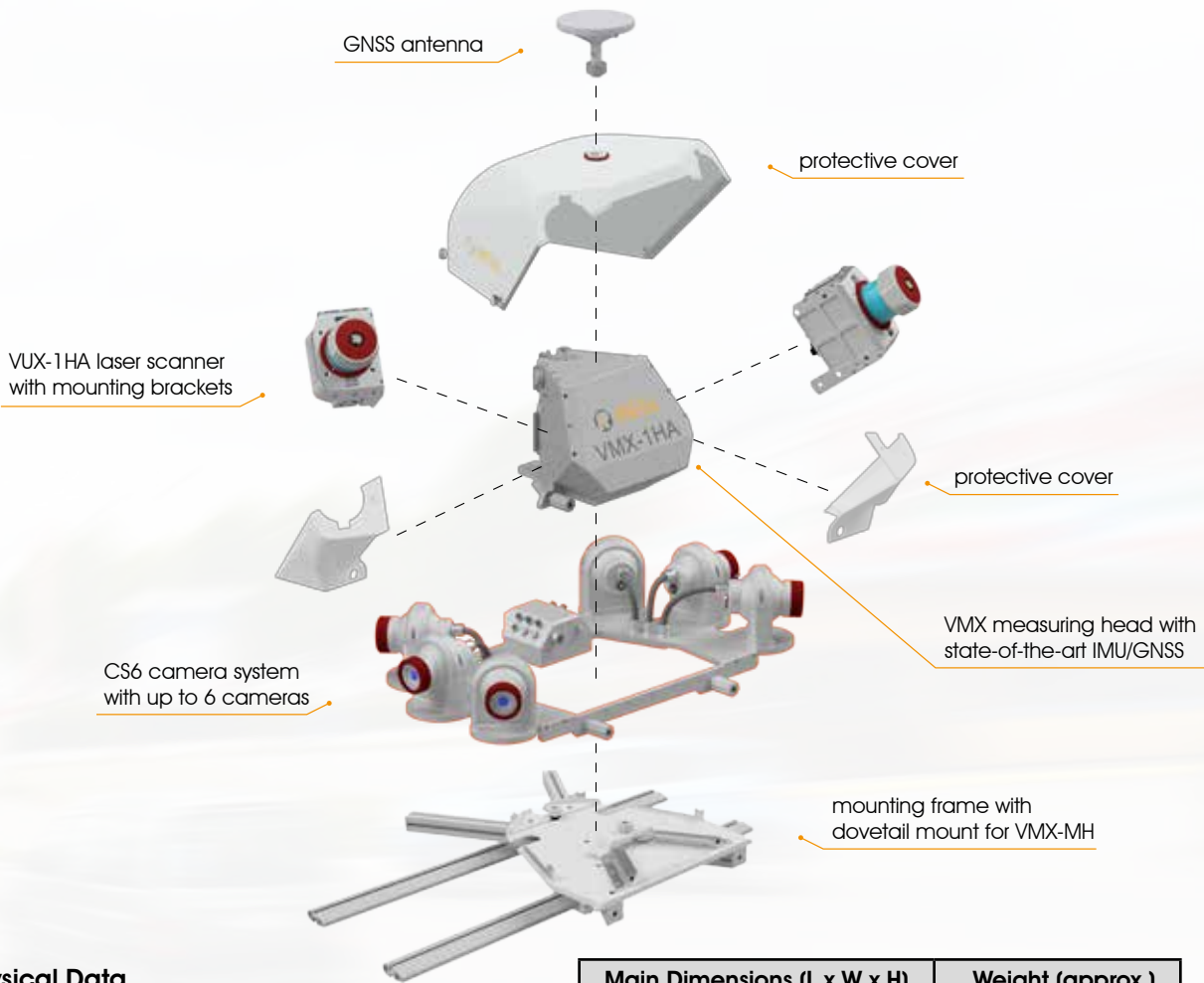


Transportation Infrastructure Mapping at highway speed

### • Seamless RIEGL Workflow

High performance hardware and specific RIEGL software packages distinguish the VMX-1HA as a powerful and efficient turnkey system that provides a seamless workflow from data acquisition to highly accurate 3D point clouds. A compact control unit precisely controls management of power, data acquisition, and operation of the laser scanners, INS/GNSS sensors and the optional camera system. A handy touch-screen and the RIEGL data acquisition software facilitate the operator’s task in the field by providing real-time visualization of acquired scan data and imagery. The RIEGL software packages also offer comprehensive features in data processing. This covers enhanced scan data adjustment to merge overlapping mobile scan data. It further enables the scan data to be fitted to given control objects which results in a consistent point cloud of enhanced precision and increased geo-referencing accuracy. Finally, the precise geo-referenced scan data and high resolution (panorama) images can be exported to well-known file formats, or directly interfaced with third-party software.

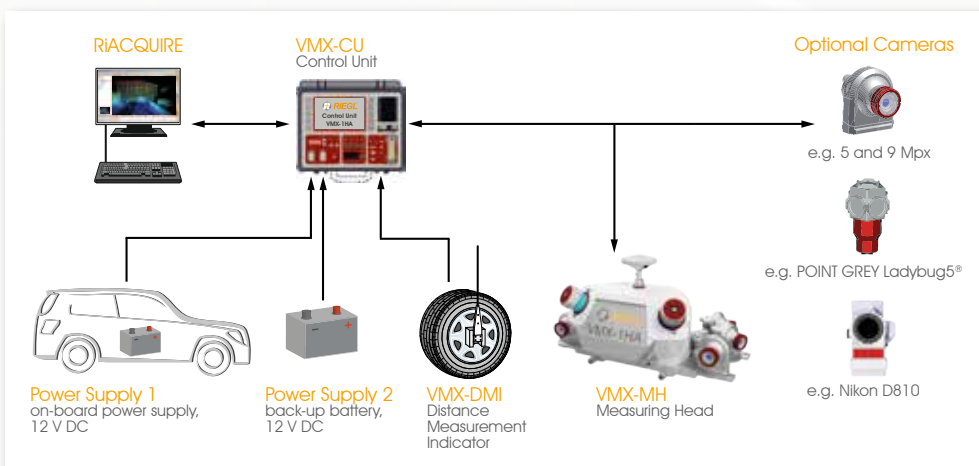
## RIEGL VMX-1HA Setup and Components



### Physical Data

	Main Dimensions (L x W x H)	Weight (approx.)
<b>VMX Protective Cover</b>	620 x 747 x 364 mm	3.6 kg
<b>VMX-MH Measuring Head</b>	737 x 456 x 485 mm	28 kg
<b>VMX-CS6 Camera System (with 4 cameras)</b>	607 x 1038 x 208 mm	19 kg
<b>VMX-RM Roof Mount</b>	778 x 515 x approx. 120 mm	13 kg
<b>VMX-CU Control Unit</b>	560 x 455 x 265 mm	26 kg
<b>VMX-MC Main Cable</b>	standard length 5 m	8 kg

## RIEGL VMX-1HA System Block Diagram



### RIEGL VMX-1HA System Components:

- RIEGL VMX-MH Measuring Head
- RIEGL VMX-CU Control Unit
- VMX-DMI Distance Measurement Indicator
- up to 6 cameras (optional)
- sustainable power supply with back-up battery
- connecting cables



### RIEGL VMX-1HA Technical Data

max. measurement range

pulse repetition rate (peak)

online waveform processing

optional digital camera

multiple target capability

eye safe operation at Laser Class 1

#### VMX-1HA Scanner Performance

<b>Eye Safety Class</b>	Laser Class 1 (Class 1 Laser Product according to IEC60825-1:2007)					
<b>Effective Measurement Rate</b> <sup>1) 3)</sup>	600 kHz	1 MHz	1.5 MHz full power	1.5 MHz reduced power <sup>2)</sup>	2 MHz full power	2 MHz reduced power <sup>2)</sup>
<b>Max. Range, Target Reflectivity <math>\rho \geq 80\%</math></b> <sup>4)</sup>	420 m	330 m	270 m	135 m	235 m	120 m
<b>Max. Range, Target Reflectivity <math>\rho \geq 10\%</math></b> <sup>4)</sup>	150 m	120 m	100 m	50 m	85 m	40 m
<b>Max. Number of Targets per Pulse</b>	practically unlimited (details on request)					
<b>Minimum Range</b>	1.2 m					
<b>Accuracy</b> <sup>5) 7)</sup> / <b>Precision</b> <sup>6) 7)</sup>	5 mm / 3 mm					
<b>Field of View</b>	360° "full circle"					
<b>Scan Speed (selectable)</b>	up to 500 scans/sec					

- 1) Rounded values, selectable by measurement program.
- 2) Laser power optimized (reduced) for measurements of short ranges with high pulse repetition rate.
- 3) In order to reduce MTA ambiguities in mobile mapping applications it is recommended to use measurement programs with reduced laser power for short range applications and programs with reduced pulse repetition rate for long range applications.
- 4) 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.
- 5) Accuracy is the degree of conformity of a measured quantity to its actual (true) value.
- 6) Precision, also called reproducibility or repeatability, is the degree to which further measurements show the same result.
- 7) One sigma @ 30 m range under RIEGL test conditions.

#### IMU/GNSS Performance <sup>8)</sup>

<b>Position Accuracy (absolute)</b>	typ. 20 - 50 mm
<b>Roll &amp; Pitch Accuracy</b>	0.005°
<b>Heading Accuracy</b>	0.015°

<sup>8)</sup> One sigma values, no GNSS outage, with DMI option, post-processed using base station data.

#### Electrical Data

<b>Power Supply Input Voltage</b>	11 - 15 V DC
<b>Power Consumption</b> <sup>9)</sup>	typ. 300 W (max. 350 W)

<sup>9)</sup> typical configuration with 4 cameras

#### Interfaces

Interfaces Measuring Head (VMX-MH)	Interfaces Control Unit (VMX-CU)
6 x trigger pulse, exposure pulse, NMEA data and LAN via CS6 camera system (optional)  power and data interface for optional, additional device 1 x power 24 V 1 x LAN 1 x PPS 1 x NMEA	1 x DMI input (for distance measuring indicator; odometer) 1 x synchronization output NMEA + PPS (for synchronization of additional device) 1 x NAV RS232 (COM port for IMU/GNSS for RTK, SBAS) 1 x LAN, 1000 Mbit/sec (e.g. connect additional computer) 2 x USB 3.0 (e.g. image data transfer from Point Grey Ladybug5®) 1 x touch screen incl. USB (for system operation) 1 x DVI (additional video output of main system PC)
<b>VMX-MC Main Cable (single cable connection between VMX-MH and VMX-CU)</b>	

### Further Information



RIEGL VMX-1HA Data Sheet



RIACQUIRE Data Sheet



RIPROCESS Data Sheet



RIWORLD Data Sheet



RIPRECISION MLS Brochure



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