RIEGL Timeline

Pulsed Laser Radar and Laser Scanning

Since 1968
Pulsed Laser Radar Distance Measurement and Scanning

The nowadays internationally operative RIEGL group was established in 1978 by Dr. J. Riegl, based on his R&D work at Vienna University of Technology from 1968 to 1978:

1968

Development of high performance Avalanche Pulse Generators; up to today they are used - in principle unchanged - in thousands of RIEGL instruments for driving the semiconductor laser transmitter.

1970 - 1972

Development of the worldwide first miniaturized semiconductor pulsed laser radar device for the Austrian company Eumig.

Laser Range Finder LD 151
first national and international patent applications
since 1972

first publications on the subject of optical short-range pulsed radar

first publications on the subject of optical short-range pulsed radar
Pulsed laser radar rangefinder
Eumig LARA 10 for hydrographic surveying applications – at a time nobody could imagine GPS!
RIEGL’s first laboratory equipment:

- An old 1 GHz sampling scope from around 1963
- At that time modern 200 MHz analog oscilloscope
- First “Computer Terminal” – an old telex machine from around 1950
1978
Worldwide first pulsed laser radar distance sensor for industrial applications

1979
Experimental setup of a pulsed semiconductor laser radar with digital echo signal processing

first RIEGL trade-fair appearance in Salzburg
Delivery of first, even at that time microprocessor-based distancemeters for profile measurement.
RIEGL Timeline - since 1968
1982

“Laser Binoculars” LR90 for hydrographic use

1984

Mutation: RF90 with trigger handgrip
Development of an „add-on“ rangefinder module for sniper use

**TELERANGER TYPE A**

We help you to hit the target at the first round.

The laser rangefinder TELERANGER has been designed to achieve an essential improvement of the combat efficiency of shoulder arms, especially of snipers.

The rangefinder has been conceived as small as possible and yet lightweight and easy mounting on the weapon.

A remote release key can be connected to the TELERANGER and mounted on the weapon in any place whatsoever necessary.

The measured range to target can be read from a LED display at the rear of the rangefinder. Automatic brightness control of the display ensures visibility of the sniper in bright or dark conditions. This rangefinder is powered by an easily detachable battery unit fitted out with standardised cells.

**CONTROL PANEL**
- MAIN SWITCH: ON/OFF and selection of the target range
- RELEASE KEY: LASER/ON: starts ranging by triggering the laser pulse
- POWER SUPPLY: The TELERANGER is powered by an easily detachable battery unit. These units require no standard rechargeable or alkaline battery cells (pre-cells).

**DISPLAY:**
- 4-digit 7-segment LED display ready for measurement (stand-by)
- Measured range to a target, no target detected
- Measured range to 1st target, no target detected
- Target out of range
- < 50 m, > 1000 m, batteries nearly discharged

**MOUNT:**
The rangefinder can be combined with any type of day and/or night vision sights. An attachment threaded guide is introduced for alignment purposes (with metric or ISO-threaded screws) to a mount, with jaws and precision clamping elements.
Participation in numerous international trade fairs and exhibitions

1985:
First international presentation of RIEGL products at LASER'85 in Munich

2008:
RIEGL booth at INTERGEO Bremen

2011:
RIEGL Intergeo booth in Nuremberg met interest
DM90
Highly-accurate microprocessor-based industrial distance meter

Automated 3D laser profilometer for tunnel cross section measurements
1986

**LD90-2**

*Industrial laser distance meter*

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1987

**LD90-2-GF:** *First industrial laser distance meter with glass-fiber coupled optical head*

*3D profile measuring equipment for high-temperature applications in steel plants*
LARA90-2; LR90-2

Next generation of „Laser-Binoculars“ providing reduced size and upgraded performance

since 1990

Miniaturized 2D-Laserscanner for Robotics and Automatic Cruise Control (ACC)
Lasertape: Worldwide first "pocket size" Laser-Binoculars
for non-professional use (hunting, sporting, etc.)

General
At the push of a button the new lasertape Laser-binoculars® FG-1 displays the range of a target in large easily legible digits within the field of view of the 8 x 30 sighting optics. It is not much larger or heavier than a conventional pair of folding binoculars.

During daylight hours the measuring range is 300 - 900 m and at dawn and dusk and at night up to 1000 m. The short measuring time – typically 1 second – easily enables the instrument to be operated by hand.

Applications
- Rangefinding for hunters, surveying of hunting grounds or shooting grounds etc.
- Position-finding in yachting, regattas etc.
- Height-finding of gliders, motor-giders, free balloons etc.

Operation
By pushing the measuring button, very short laser pulses which are invisible to and harmless for the human eye are generated. These are collimated through the lens of the sighting optics and emitted in the direction given by the centre of the crossed hairs or the superimposed target marker.

The target - either the game under observation or a nearby tree, bush, embankment or similar - reflects the impinging laser pulse, and a small part is collected by the instrument's receiver optics. With the help of the built-in microprocessor, the range of the target is accurately calculated from the time between transmission and reception, and is displayed in large easily legible digits.

According to the distance and reflectivity of the target, the number of laser pulses necessary for an unambiguous range measurement varies. The measuring time therefore lies between 0.5 and a maximum of 5 seconds.
Not everybody’s darling: Laser „Speed Gun” for traffic law enforcement
**LD90-3**
Next generation of distance and speed sensors for industrial use

**LD90-3GF**
Next generation of industrial distance and level sensors with glass-fiber coupled optical head
1994

Development of the world’s first eyesafe „Laser Rifle Scope” for hunting purposes

1996

LASERTAPE FG21-HA
„Two in One“ rangefinder & distance meter

www.riegl.com
1996

LMS-Q140
RIEGL's first Airborne Laser Scanner for corridor mapping

1996

ESA-Project „DEAL“ (Demonstrator of Advanced Laser Sensors); definition, manufacturing, and testing of an advanced 3D laser sensor tailored for demonstration in short-range applications (20° x 5° scan range)

1997

ESA-Project „ASIS“ (Active Surface Imaging System); definition, manufacturing, and testing of an advanced 3D laser sensor with a wide field of view (60° x 60°), first RIEGL 3D scanner with rotating polygon mirror
RIEGL FG21-P
Miniaturized, digital
Laser Traffic speed meter
– 1000 m range!
Dr. A. Ullrich, then Technical Director, and Dr. J. Riegl, President, with RIEGL's first commercially available 3D scanner LMS-Z210 for surveying and for industrial applications.
ESA-Project „LRF” (Laser Rangefinder for RV Sensor): development of a space qualified laser rangefinder for docking applications (ATV and HTV), manufacturing of engineering models, flown in April 2008.

LPM-25HA
Laser profile measuring system
LMS-Z420i
High accuracy & long range 3D laser imaging sensor

LMS-Q280i
Medium range airborne laser scanner

LPM-i800HA
High-accuracy & long range laser profile measuring system
2004

LMS-Q240
Airborne laser scanner, successor to the LMS-Q140i

LMS-Q560
The world's first commercially available digitizing and Full Waveform processing airborne laser scanner

2005

LMS-Q120
2D laser scanner for industrial applications

LMS-Q160
Lightweight anti-collision sensor for UAV's
2006

RIEGL BP560

Airborne laser scanner system, belly-pod mounted on Diamond DA42 MPP twin engine plane
LPM-321
Extremely long range 3D profile measuring system

LMS-Z620
Very long range 3D terrestrial laser scanner optimized for long range topography and mining applications
LMS-Z210ii-S
Rugged 3D imaging sensor for industrial applications
RIEGL VZ-400
The world's first online waveform processing 3D terrestrial laser scanner

LMS-Q680
World's first airborne laser scanner offering RIEGL's unique MTA (“Multiple-time-around”) processing technology to benefit from the high laser pulse repetition rate (PRR) of up to 400 kHz also from high flight altitudes, thus achieving up to 266,000 points on the ground per second.
RIEGL VMX-250
Intergeo 2009 in Karlsruhe: RIEGL launches the VMX-250 Mobile Laser Scanning System – a compact, innovative high-performance platform for high-speed mobile 3D data acquisition reducing the complexity of integration, installation, and post processing to a minimum.
RIEGL NP680i
In cooperation with Diamond Aircraft Industries RIEGL develops an innovative „turnkey“ solution for surveying missions by directly integrating the LMS-Q680i airborne scanner into the „Universal Nose“ of the twin-engine DA42 MPP.

RIEGL VZ-1000
With the VZ-1000, a terrestrial 3D scanner providing online waveform-processing for long range applications (1400 m) is available.
RIEGL VMX-450
With the Mobile Laser Scanning System VMX-450 up to 1.1 million measurements and up to 400 scans are feasible per second in passing by. Using the optional camera system with up to 6 high resolution cameras the records are complemented with precisely time-stamped images.

RIEGL VZ-4000
Specially designed for applications in open pit mining and topography the VZ-4000 providing a measurement range of up to 4,000 m sets new standards in terrestrial laser scanning.
RIEGL VQ-820-G
Combined with new and innovative RIEGL software packages for calibration, data acquisition and processing RIEGL’s first hydrographic airborne laser scanner is excellently suited for combined land and hydrographic survey of coastlines and shallow waters.

Innovative RIEGL software packages
RIEGL has always been dedicated to deliver powerful solutions for multiple fields of application in surveying. Therefore, state-of-the-art RIEGL hardware is combined with appropriate, equally innovative RIEGL software package for data acquisition and processing.
In addition to the constant development of already well-proven software for terrestrial, mobile, and airborne laser scanning, RIEGL launched the convincing software solutions RiPRECISION, RiSOLVE, and RiMTA offering completely new tasks.

RIEGL VZ-6000
Providing ultra high speed, high resolution, and high accuracy laser scanning at ranges of more than 6000 m the terrestrial laser scanner RIEGL VZ-6000 sets new standards in topography.
Due to its laser wavelength the scanner is especially suited for mapping of glaciers and snowfields.
**RIEGL LMS-Q780**

This airborne laser scanner is the first one providing up to 10,000 feet flight altitude and up to 400 kHz laser pulse repetition rate. Unique features of this instrument include the automated resolution of range ambiguities, typically occurring at large measurement ranges and high repetition rates.

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**New CNC / Machining Center**

Increasing output figures require an extension of production facilities. For high-quality manufacturing the new hall in the Riedenburgstrasse offers state-of-the-art machinery on a 700m² area.
RIEGL LMS-Q1560 Dual LiDAR Channel System
Ultra high performance, fully integrated and calibrated Airborne Mapping System for large scale, high altitude, complex environment mapping

RIEGL VMX-450-RAIL
The well proven, fully integrated high speed Mobile Laser Mapping System RIEGL VMX-450 as optimized package for railway applications
RIEGL VUX-1 UAS LiDAR Sensor
The World’s first airborne laser scanner meeting the challenges of emerging surveying solutions by UAS, UAV, gyrocopters, and ultra-light aircraft, both in measurement performance and in system integration.

Hybrid Mobil Laser Mapping System
RIEGL VMZ
A fully integrated IMU/GNSS unit supports RIEGL 3D Laser Scanner types VZ-400 and VZ-1000 for mobile (kinematic) data acquisition.

Fast transition from tripod to mobile mount without the necessity of boresight calibration after re-mounting for mobile scanning enables an efficient workflow in the field.
Numerous awards and distinctions

1973 “Technikpreis der Wiener Wirtschaft”
awarded by the advisory board of the association
„150 Years Technical University of Vienna“

1983 “Plansee-Preis”
awarded by Metallwerke Plansee, Reutte (Tyrol),
presented by the Austrian Federal Minister of Science and Research

1987 „Jungunternehmer-Preis“
awarded by Forschungsförderungsfonds der Gewerblichen Wirtschaft

1989 Encouragement Award „Innovative Technik“
awarded by the authorities of Lower Austria

1989 „Innovationspreis des Landes Niederösterreich“
First Place

2004 „Wilhelm-Exner-Medaille“
awarded by Wilhelm-Exner-Stiftung, Österr. Gewerbeverein

2007 „Karl Ritter von Ghega-Preis“
„Innovationspreis des Landes Niederösterreich“
First Place, shared with Diamond Aircraft Sensing GmbH, Wiener Neustadt
2012  “INVENTUM 2011” - Award for the “Patent of the Year”
awarded by the Austrian Department for Traffic, Innovation and Technology, the Austrian Patent Office, and the publishing company Bohmann

2012  “Leopold” - Award, Category “Economy”
awarded by NÖN (Niederösterreichische Nachrichten)

2012  MAPPS Geospatial Excellence Award
in the Technology Innovation category
for the RIEGL VQ-820-G hydrographic airborne laser scanner

“INVENTUM 2011”
Award for the „Patent of the Year“

“Leopold” Award 2012

MAPPS Geospatial Excellence Award 2012
2013  Geospatial World Innovation Award
in the Technology Innovation category
for the RIEGL VQ-820-G topo-hydrographic airborne laser scanner

2014  Geospatial World Innovation Award
in the Technology Innovation LiDAR category
for the RIEGL LMS-Q780  airborne laser scanner