LMS-Q160

The *RIEGL* LMS-Q160 is a compact and extremely lightweight 2D scanning laser radar optimized for detecting even low-cross-section targets such as wires, thin branches etc.

The instrument is designed for operation as an anti-collision sensor for unmanned airborne vehicles but can also be advantageously used for land vehicles and surveillance applications. It is based on the time-of-flight measurement principle using short infra-red laser pulses and opto-mechanical scanning to provide on-line range and angle data of targets within the scanner´s field-of-view (FOV).

The instrument needs only one power supply and provides scan data online via an integrated TCP/IP Ethernet interface. The binary data stream can easily be decoded and processed using the available software library.

The mechanical structure of the LMS-Q160 is extremely lightweight but on the other hand robust enough to withstand the shock and vibration load of land based or airborne vehicles.
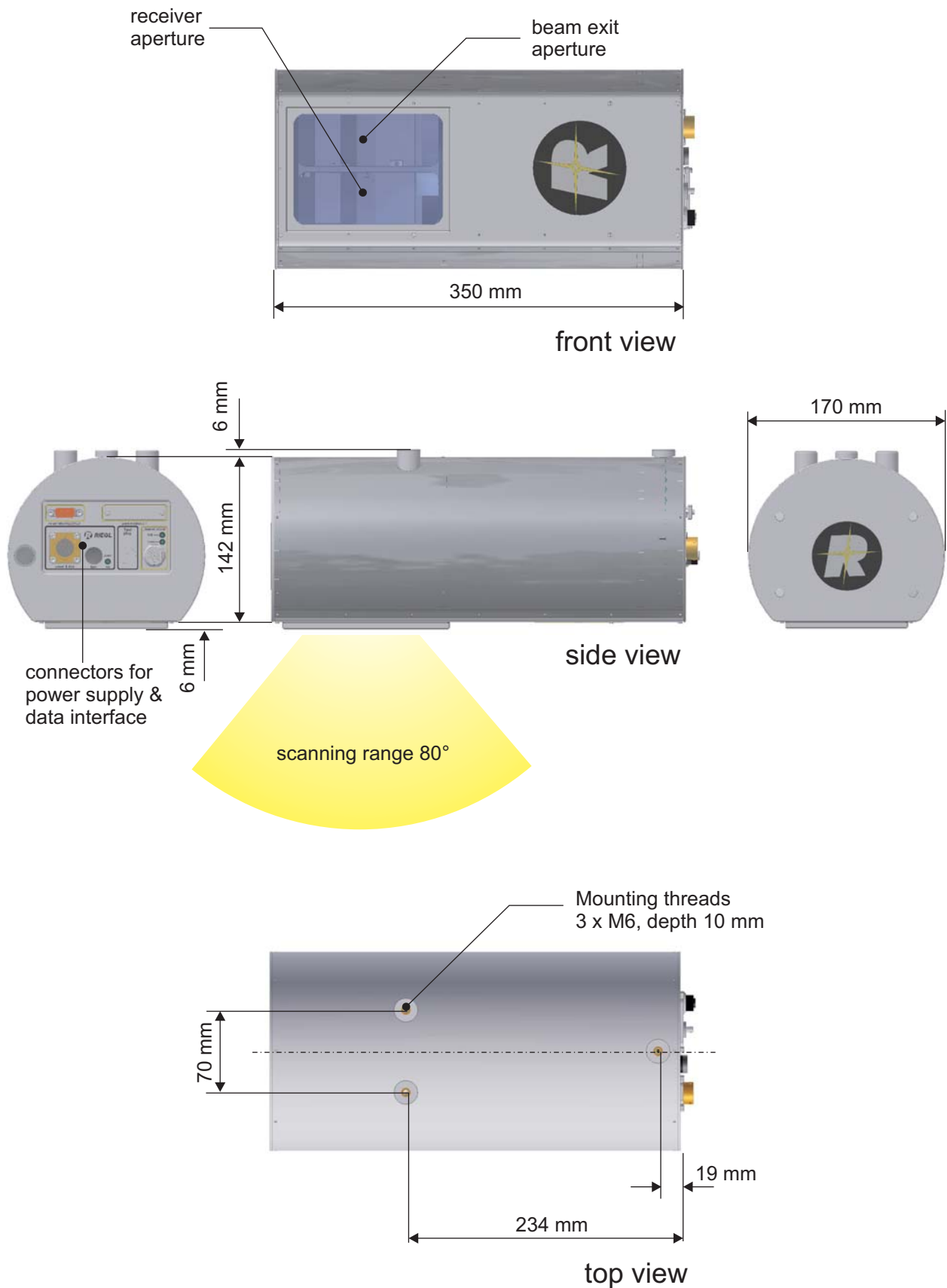
Main applications include:

- *Collision avoidance*
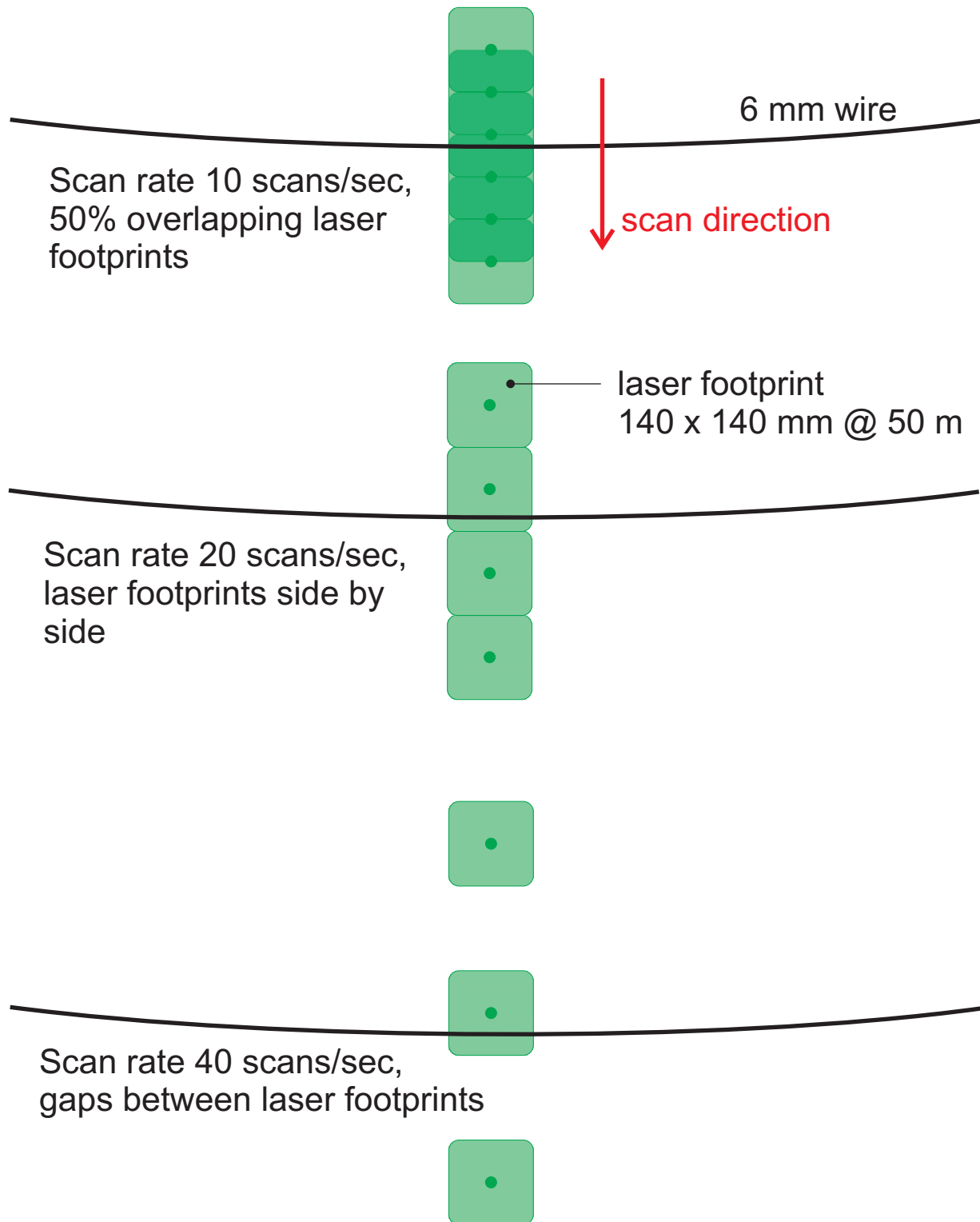- *Surveillance*

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RIEGL
LASER MEASUREMENT SYSTEMS

receiver aperture

beam exit aperture

350 mm

front view

6 mm

142 mm

6 mm

connectors for power supply & data interface

170 mm

side view

scanning range 80°

Mounting threads
3 x M6, depth 10 mm

70 mm

19 mm

234 mm

top view

The graphics show examples of laser footprint patterns for different scan rates at a target distance of 50 m, the target object is a horizontally orientated wire, the scanning direction is vertical.

6 mm wire

scan direction

Scan rate 10 scans/sec, 50% overlapping laser footprints

laser footprint
140 x 140 mm @ 50 m

Scan rate 20 scans/sec, laser footprints side by side

Scan rate 40 scans/sec, gaps between laser footprints

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Technical Data LMS-Q160 Anti-Collision Laser Sensor

Rangefinder performance [1]

Laser product classification	Class 1 for the scanned laser beam

according to IEC60825-1:2007
The following clause applies for instruments delivered into the United States:
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

CLASS 1
LASER PRODUCT

Maximum measurement range	
for wire targets [2]	up to 60 m
for natural flat targets [3]	up to 200 m
Minimum range	2 m
Accuracy [4] [6]	20 mm
Precision [5] [6]	15 mm
Effective measurement rate	10 000 measurements/sec
Multi target resolution	8 m
Laser wavelength	near infrared
Beam divergence [7]	2.7 mrad

1) First or last target mode selectable. Maximum measurement range and accuracy is defined below for a visibility >1km, overcast sky or night.
2) Diameter of wire in excess of 6 mm. Diffuse reflectivity of wire surface in excess of 15%. Beam incidence perpendicular to wire. The maximum measurement range to the specified target drops to 50 m in case of an angle of incidence of 45 deg, provided that the surface of the wire is reflecting strictly diffusely.
3) Diffuse reflectivity in excess of 10%. Beam incidence perpendicular to target. Size in excess of laser beam diameter.
    Max. measurement range for an extended flat target of 15% reflec-tivity will drop to 160m for an angle of incidence of 45°.
4) Accuracy is the degree of conformity of a measured quantity to its actual (true) value.
5) Precision, also called reproducibility or repeatability, is the degree to which further measurements show the same result.
6) One sigma @ 50 m range under *RIEGL* test conditions.
7) 2.7 mrad correspond to 27 cm increase of beam width per 100 m of range.

Scanner performance

Scan angle range	+/- 40° = 80°
Scanning mechanism	rotating polygon mirror
Scan speed [8]	5 scans/sec to 60 scans/sec
Angle measurement resolution	0.01°
Measurements per line	500 @ 20 scans/sec, 1000 @ 10 scans/sec
Internal Sync Timer	Option for real-time synchronized time stamping of scan data
Scan Sync	Option for synchronizing scan lines to external timing signal

8) Scanning parameters can be set via TCP/IP configuration interface.

General technical data

Interface	TCP/IP Ethernet, 10/100 MBit/sec
Power supply input voltage	18 - 32 V DC
Power consumption	typ. 48 W
Current consumption	typ. 2.0 A @ 24 V DC
Temperature range	-10°C to +50°C (operation)
	-20°C to +60°C (storage)
Main dimensions	⌀ 170 x 350 mm (diameter x length)
Weight	approx. 4.6 kg
Protection class	IP 54

Information contained herein is believed to be accurate and reliable. However, no responsibility is assumed by *RIEGL* for its use. Technical data are subject to change without notice.

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