

# PHENIX LIDAR SYSTEMS

**AEROMEDIA**  
ESPECIALISTAS EN DRONES  
DISTRIBUIDORES EN ESPAÑA Y PORTUGAL

## THE RANGER-LR

**The Ranger Series Ranger-LR** is designed for the most demanding mapping applications, no compromises made. With a 1350 meter laser range, this system produces photorealistic 3D point clouds of very large regions. The Ranger is a true universal payload in that it's designed for manned and unmanned aircraft as well as ground vehicles.



## FEATURES

- » Survey-grade (cm-level) accuracy with 1000m+ laser range and outstanding intensity calibration
- » IMU and dual-GPS upgrade options for increased accuracy
- » Fully autonomous, can be mounted on any drone, car, boat and/or even backpacks
- » Modular upgrade options: Dual LiDAR Sensors, DSLR, GeniCam, GigEVision, thermal, multispectral, hyperspectral and custom sensors
- » Designed by surveyors for surveyors



AUTOMOTIVE MOUNT



AERIAL MOUNT

## QUICK SPECS

Absolute Accuracy  
25 / 35 mm RMSE @ 250m Range

PP Attitude Heading RMS Error  
0.007 / 0.009° IMU options

Weight  
5.3kg / 11.7lb

Dimensions  
30.8 L x 18 W x 12.9 H (cm)

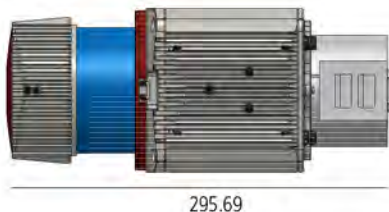
Laser Range  
1350m @ 60% Reflectivity

Scan Rate  
up to 750k shots/s, up to 7 returns

Ranger LiDAR Sensor | Front View



Ranger LiDAR Sensor | Side View



## PLATFORM

OVERALL DIMENSIONS (Sensor)	308 x 180 x 129 mm
OVERALL DIMENSIONS (Nav Box)	161 x 118 x 96 mm
OPERATING VOLTAGE	12 - 28 V
POWER CONSUMPTION	90 W
WEIGHT (incl. sensor + cabling)	5.44 kg (12 lbs)
OPERATING TEMPERATURE	0° - +40° C

## NAVIGATION SYSTEM

CONSTELLATION SUPPORT	GPS, GLONASS
SUPPORT ALIGNMENT	Static, Kinematic, Dual-Antenna
OPERATION MODES	Real-time, Postprocessing optional
ACCURACY POSITION	1cm + 1ppm RMS horizontal

## LiDAR SENSOR



LASER PROPERTIES	Class 1 (eye safe), 1550 nm
RANGE MIN	5 m
LASER BEAM FOOTPRINT	50mm @ 100m, 150mm @ 250m, 250mm @ 500m
MAX EFFECTIVE MEASUREMENT RATE	750,000 meas./s
FIELD OF VIEW	360°
ACCURACY	15 mm one Sigma @ 150m

## SCANNER PERFORMANCE

SCANNING MECHANISM	Rotating Mirror
MIRROR SPEED	10-200 scans/sec
ANGULAR STEP WIDTH $\Delta\theta$	$0.004^\circ \leq \Delta\theta \leq 1.5^\circ$ between consecutive laser shots
ANGLE MEASUREMENT RESOLUTION	0.001°
INTERNAL SYNC TIMER	for real-time synchronized time stamping of data

Source: RIEGL Laser Measurement Systems. All specifications are subject to change without notice

Ranger Nav Box | Inputs



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Ranger Nav Box | Side Profile

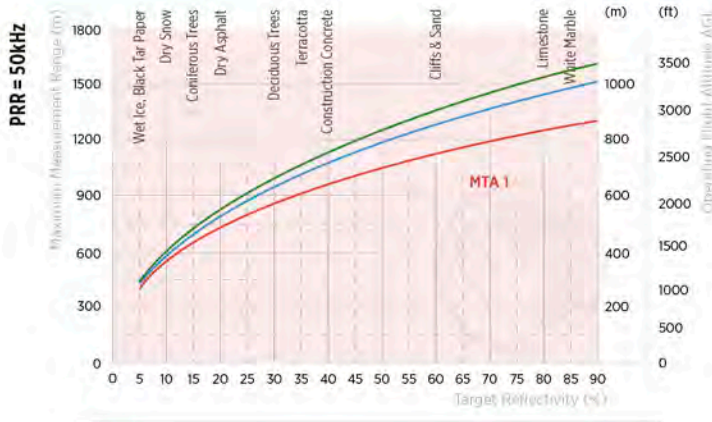


161

Values in millimeters

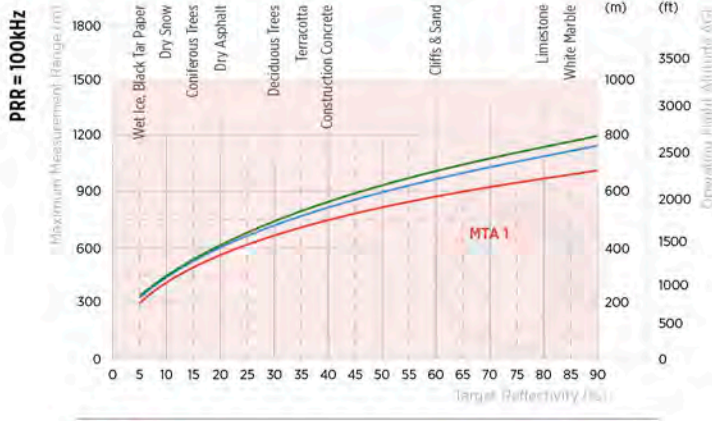
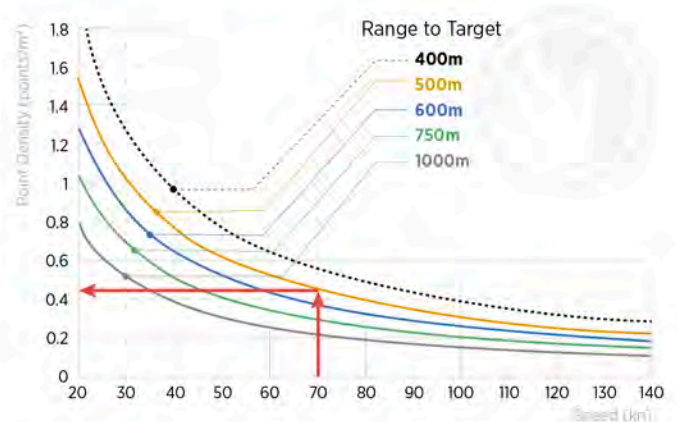


# MAX MEASUREMENT RANGE & POINT DENSITY RANGER-LR



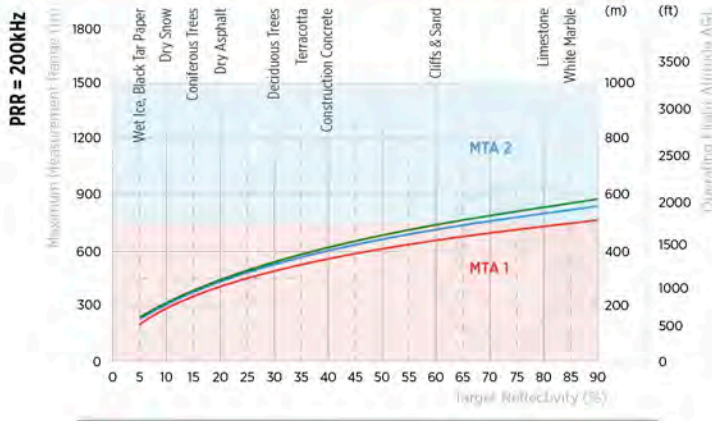
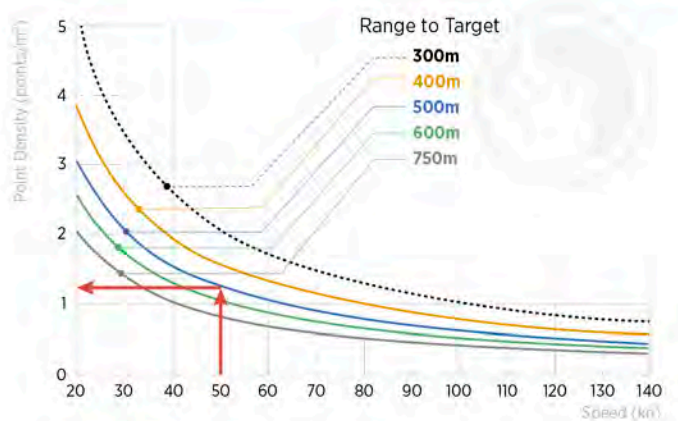
**MTA 1**  
No ambiguity / one transmitted pulse "in the air"

- @ visibility 23km
- @ visibility 15km
- @ visibility 8km



**MTA 1**  
No ambiguity / one transmitted pulse "in the air"

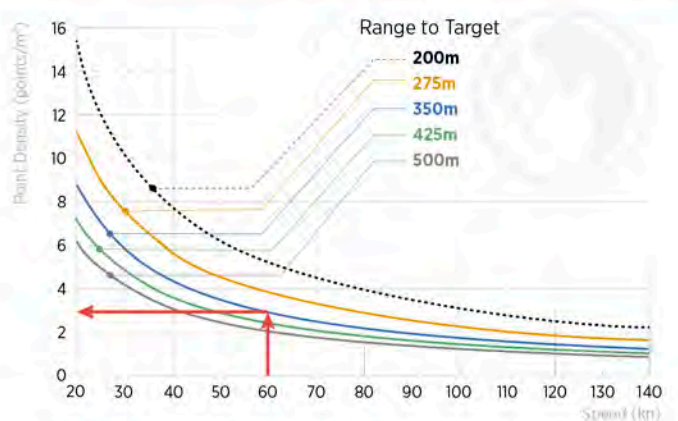
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- @ visibility 15km
- @ visibility 8km



**MTA 1**  
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- @ visibility 15km
- @ visibility 8km

**MTA 2**  
Two transmitted pulses "in the air"

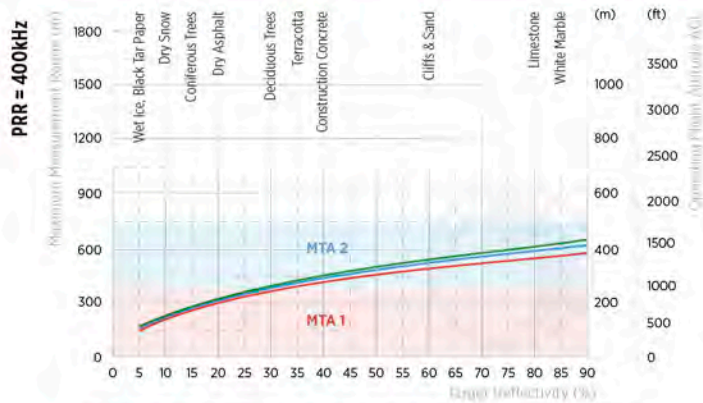


**The following conditions are assumed for the Operating Flight Altitude AGL**

- ambiguity resolved by multiple-time-around (MTA) processing & flight planning
- target size ≥ laser footprint

- average ambient brightness
- operating flight altituded given at a FOV of +/-45°

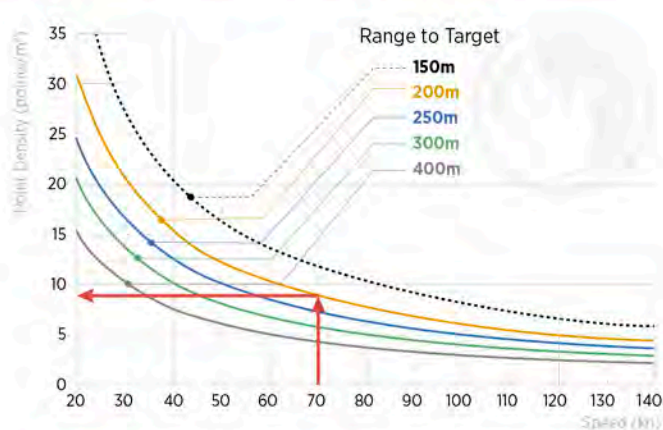
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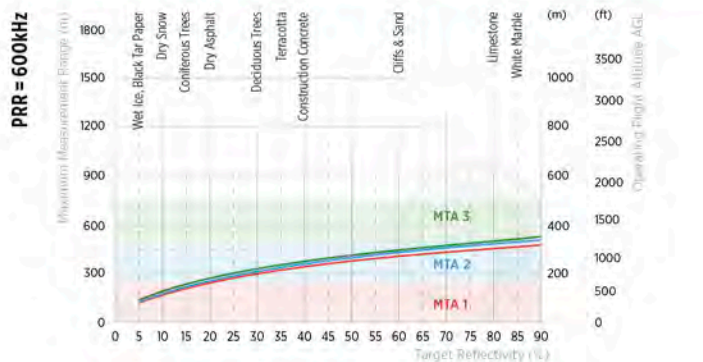
**MTA 1**  
No ambiguity / one transmitted pulse "in the air"  
@ visibility 8km

**MTA 2**  
Two transmitted pulses "in the air"  
@ visibility 15km

**MTA 3**  
Three transmitted pulses "in the air"  
@ visibility 23km



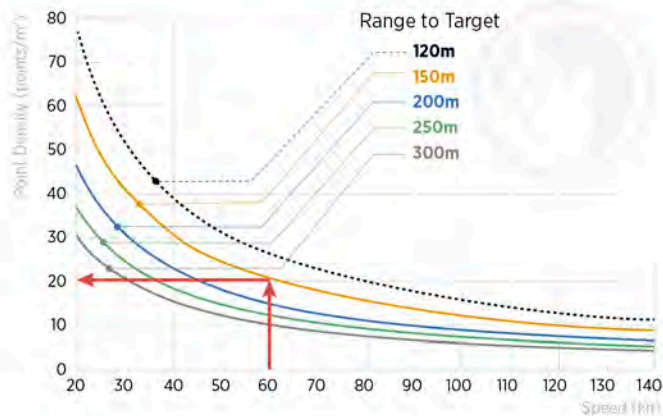
**EXAMPLE**  
Ranger-LR at 400k pulses/s  
Range to target = 200m, speed 70kn  
Resulting Point Density 8.8 pts/m<sup>2</sup>



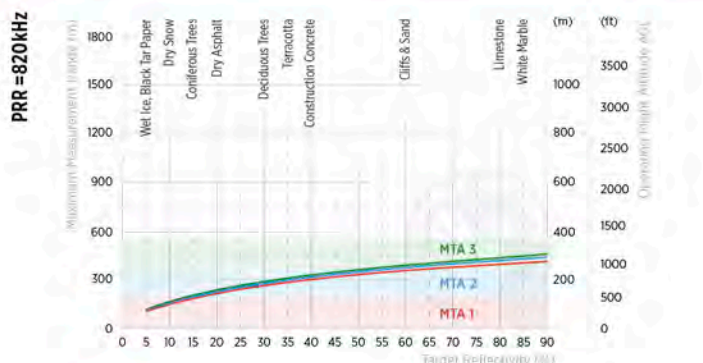
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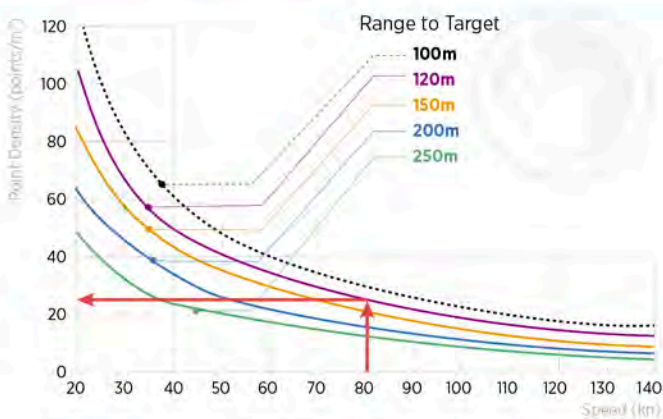
**EXAMPLE**  
Ranger-LR at 600k pulses/s  
Range to target = 150m, speed 60kn  
Resulting Point Density 21 pts/m<sup>2</sup>



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@ visibility 8km

**MTA 2**  
Two transmitted pulses "in the air"  
@ visibility 15km

**MTA 3**  
Three transmitted pulses "in the air"  
@ visibility 23km



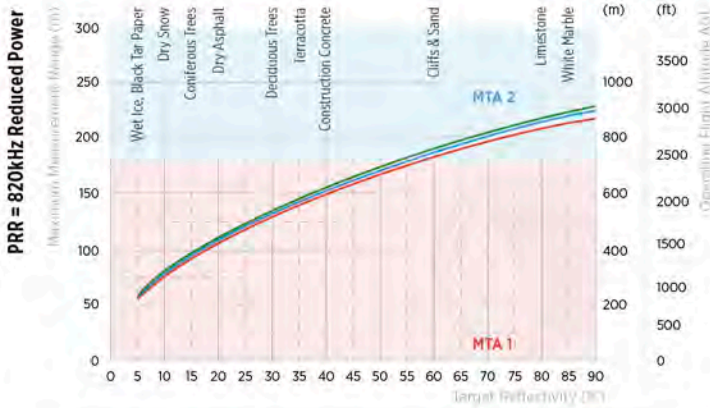
**EXAMPLE**  
Ranger-LR at 820k pulses/s  
Range to target = 120m, speed 80kn  
Resulting Point Density 260 pts/m<sup>2</sup>

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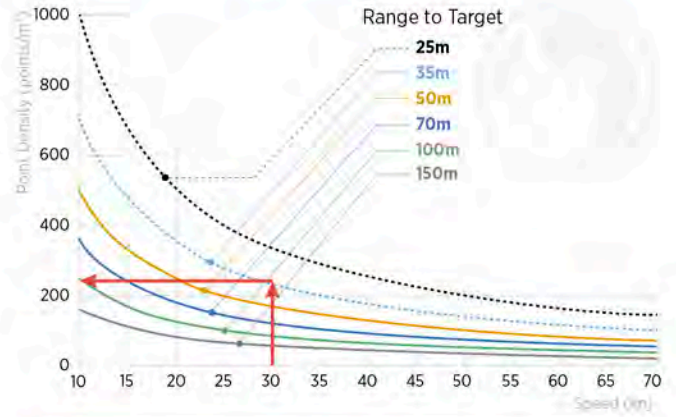
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