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RANGER-LR²² LITE

The **RANGER-LR²² LITE** is the new lighter long-range system configuration of our RANGER Series. Featuring the Riegl VUX-1LR²² LiDAR, the **RANGER-LR²² LITE** is designed for the most demanding mapping applications. With the ultimate combination of high density, long-range LiDAR with a powerful 1,550 nm laser and up to 15 returns that penetrate dense vegetation at high speeds and altitudes in large scan regions. This system is available in UAV, manned aircraft, mobile, VTOL, and backpack configurations.

FEATURES

- High versatility payload designed with flexible mounting options
- Survey-grade (cm-level) accuracy with outstanding range capabilities for high altitude and high speed missions
- Imaging Upgrades: High-Res RGB, Thermal, Hyperspectral, and Panoramic cameras.



VTOL



UAV



VEHICLE



BACKPACK



HELICOPTER

QUICK SPECS

ABSOLUTE ACCURACY

1.5 - 3.0 cm RMSEz @ 120 m Range ⁽¹⁾⁽²⁾⁽⁴⁾

INTRASWATH PRECISION ⁽¹⁾⁽²⁾⁽³⁾

2.0 cm RMSDz @ 120 m

EXAMPLE ACQUISITIONS:

UAV

- » 120 m AGL, 8 m/s, 90° FOV, 1500 kHz
- » Swath Width = 240 m
- » Avg. Density = 195 points/m²
- » Collection Rate = 6.9 km²/h

HELICOPTER

- » 200 m AGL, 60 knots, 90° FOV, 800 kHz
- » Swath Width = 400 m
- » Avg. Density = 16 points/m²
- » Collection Rate = 44 km²/h

PLATFORM

* Without Accessories

OVERALL DIMENSIONS*	23.5 x 18.0 x 18.7 cm
OPERATING VOLTAGE	14 - 28 VDC
POWER CONSUMPTION*	75 W typical
OPERATING TEMPERATURE	0° - 40° C / 32° - 104° F
WEIGHT*	4.15 kg / 9.15 lbs

LiDAR SENSOR

LASER PROPERTIES	1550 nm Class 1 (eye safe)
RANGE MIN	1.5 m at 1 MHz PRR
RANGE MAX	1,000 m at 20% reflectivity, 50 kHz PRR
MAX EFFECTIVE MEASUREMENT RATE	1,500 kHz
HORIZONTAL FIELD OF VIEW	360°
ACCURACY	15 mm one Sigma @ 150 m
SENSOR CLASSIFICATION	IP64
WEIGHT	3.5 kg w/o fan
POWER CONSUMPTION	65 W typical

NAVIGATION SYSTEM

CONSTELLATION SUPPORT	GPS + GLONASS + BEIDOU + GALILEO
SUPPORT ALIGNMENT	Kinematic, Dual-Antenna
OPERATION MODES	Real-time, Post-Processed
ACCURACY POSITION	1 cm + 1 ppm GNSS baseline RMS horizontal
ACCURACY ATTITUDE ⁽⁵⁾	ROLL, PITCH: 0.002° RMS HEADING: 0.007° RMS

APPLICATIONS



OIL & GAS SURVEYING



UTILITIES MAPPING



RAILWAY TRACK MAPPING



AGRICULTURE AND FORESTRY MONITORING



CONSTRUCTION SITE SURVEYING



OPEN PIT MINING OPERATIONS



GENERAL MAPPING

(1) Approximate values based on PLS test condition.

(2) Using a 90° downward field of view.

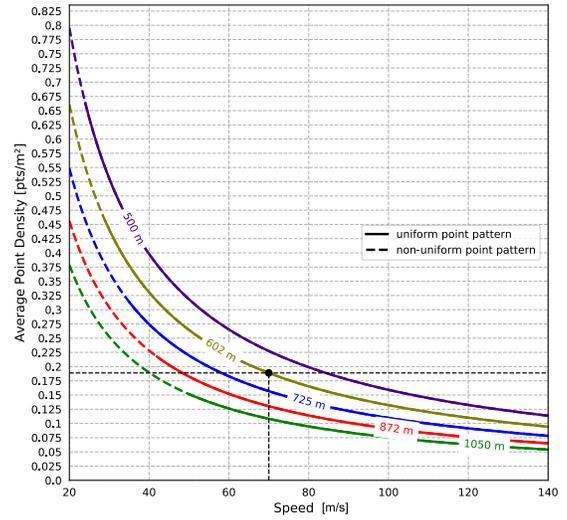
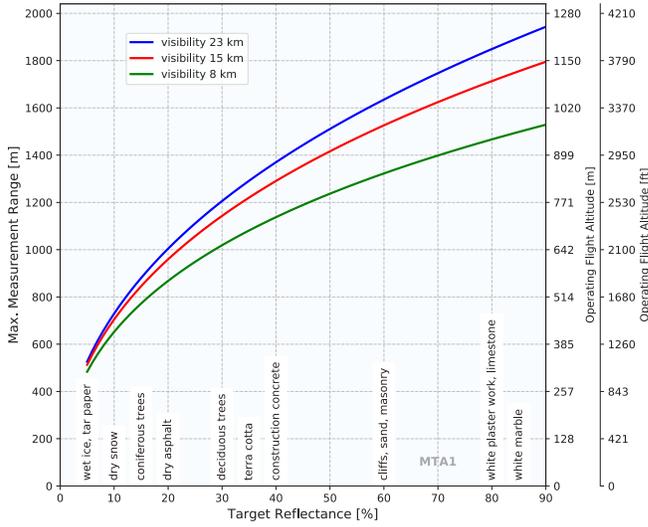
(3) Range of elevation values on flat surfaces with >20% reflectivity at the laser's wavelength.

(4) Expected RMSEz when following the PLS recommended acquisition & processing workflow and ASPRS check point guidelines.

(5) Estimated post processed accurat with IMU-30.

MAX MEASUREMENT RANGE & POINT DENSITY RANGER-LR²² LITE

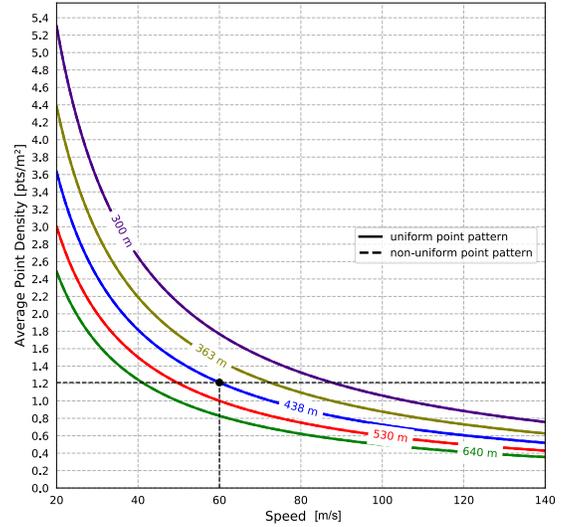
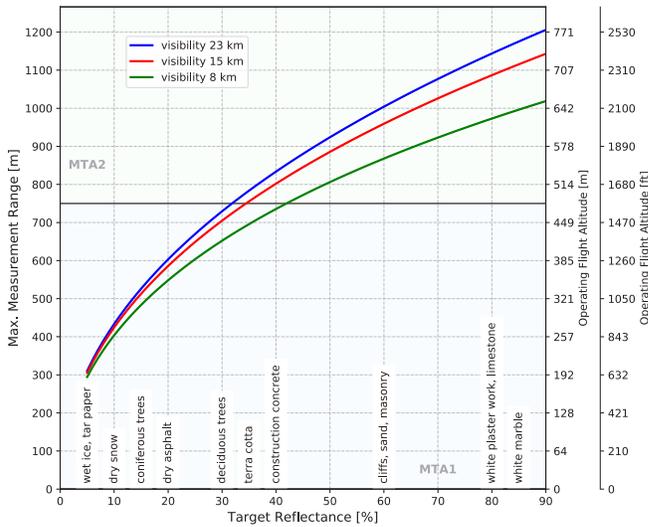
**LASER PULSE REPETITION RATE = 50 KHZ
LASER POWER LEVEL = 75%**



Example: RANGER-LR²² LITE at 50,000 pulses/second,
speed = 70 m/s, range to target = 602 m

Results: point density - 0.19 pts/m²

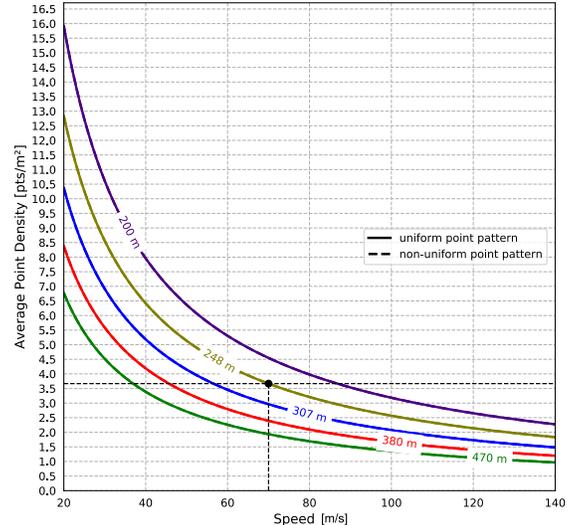
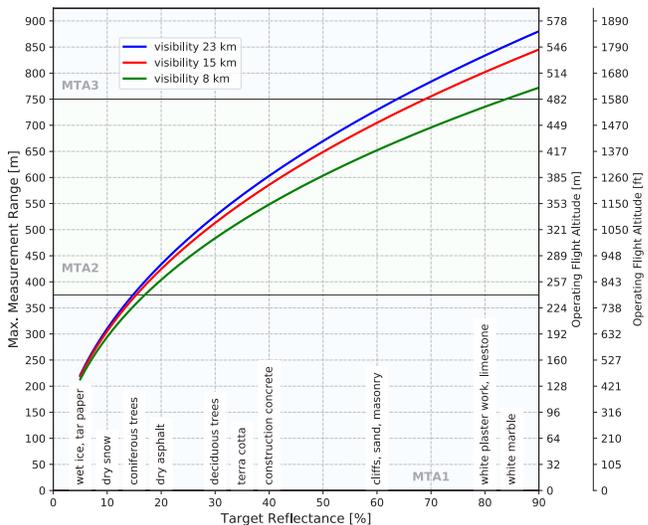
**LASER PULSE REPETITION RATE = 200 KHZ
LASER POWER LEVEL = 100%**



Example: RANGER-LR²² LITE at 200,000 pulses/second,
speed = 60 m/s, range to target = 438 m

Results: point density - 1.2 pts/m²

**LASER PULSE REPETITION RATE = 400 KHZ
LASER POWER LEVEL = 100%**



Example: RANGER-LR²² LITE at 400,000 pulses/second,
speed = 70 m/s, range to target = 248 m

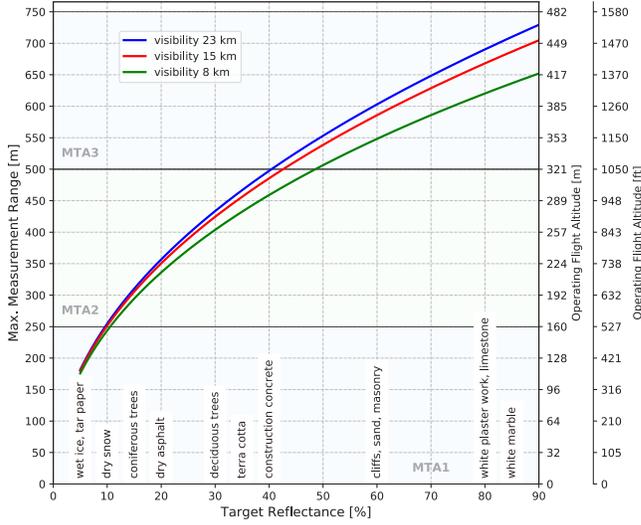
Results: point density - 3.6 pts/m²

Operating Flight Altitude AGL given for the following conditions:

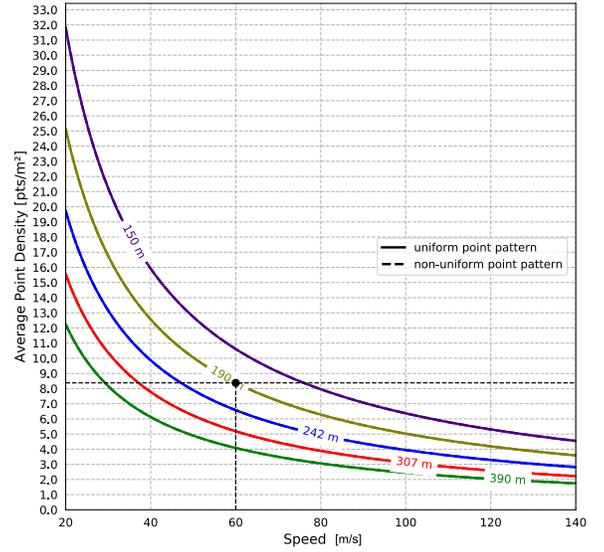
- Ambiguity resolved by multiple-time-around (MTA) processing
- FOV +/- 45°
- Target size ≥ laser footprint
- Average ambient brightness

MAX MEASUREMENT RANGE & POINT DENSITY RANGER-LR²² LITE

LASER PULSE REPETITION RATE = 600 KHZ
LASER POWER LEVEL = 100%

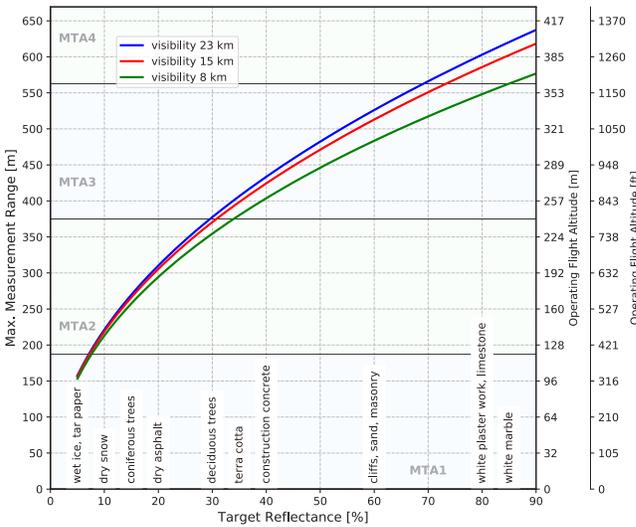


Example: RANGER-LR²² LITE at 600,000 pulses/second, speed = 60 m/s, range to target = 190 m

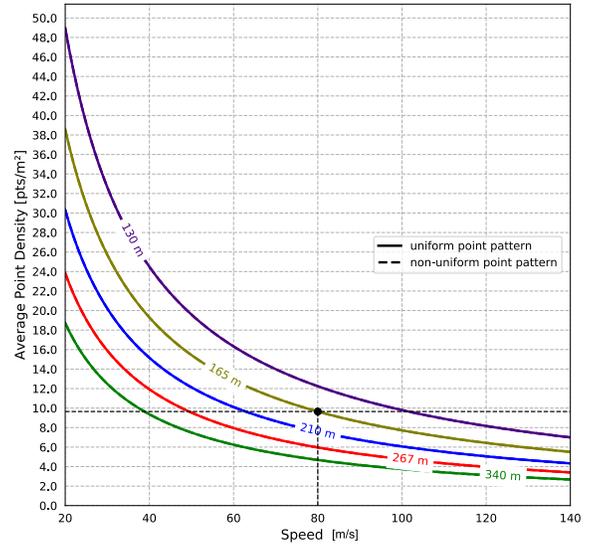


Results: point density - 8.4 pts/m²

LASER PULSE REPETITION RATE = 800 KHZ
LASER POWER LEVEL = 100%

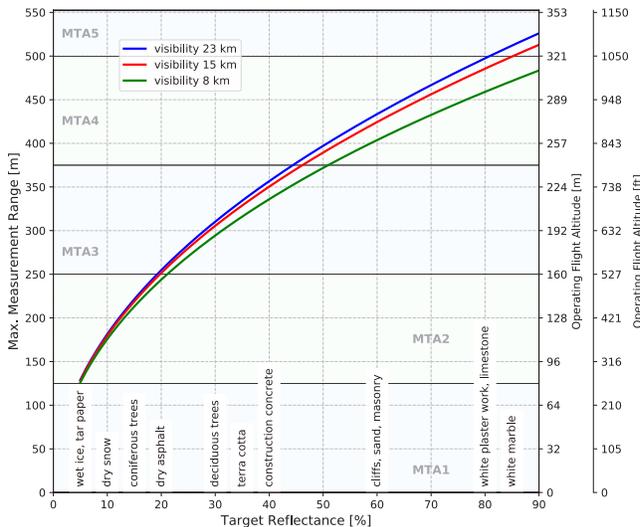


Example: RANGER-LR²² LITE at 800,000 pulses/second, speed = 80 m/s, range to target = 165 m

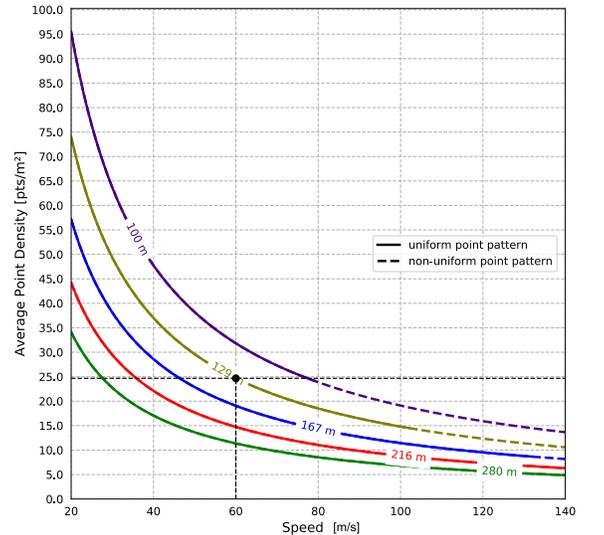


Results: point density - 9.7 pts/m²

LASER PULSE REPETITION RATE = 1200 KHZ
LASER POWER LEVEL = 100%



Example: RANGER-LR²² LITE at 1200,000 pulses/second, speed = 60 m/s, range to target = 129 m

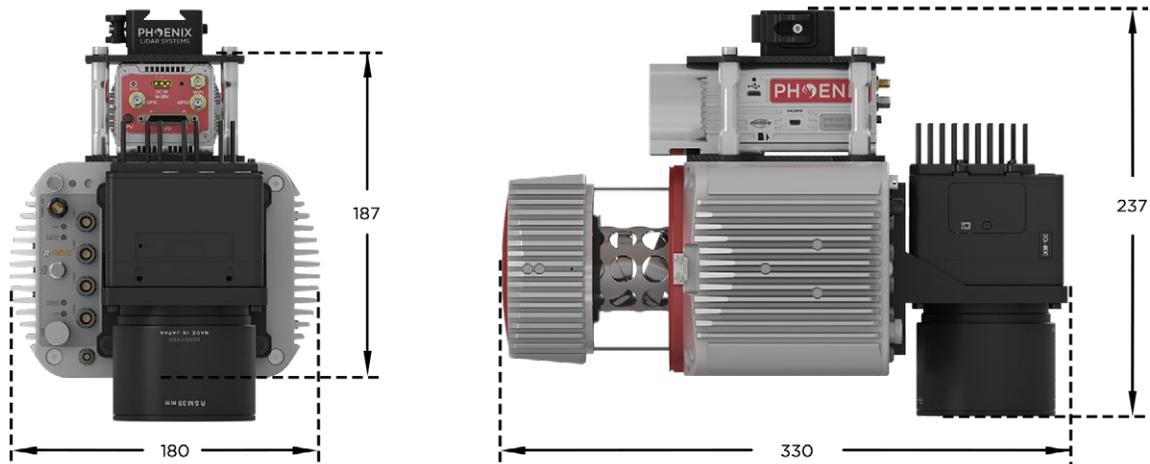


Results: point density - 25 pts/m²

Operating Flight Altitude AGL given for the following conditions:

- Ambiguity resolved by multiple-time-around (MTA) processing
- FOV +/- 45°
- Average ambient brightness
- Target size ≥ laser footprint

RANGER-LR²² LITE DIMENSIONS (mm)



RANGER-LR²² LITE MEASUREMENT PERFORMANCE

Laser Pulse Repetition Rate PRR ^{1) 5)}	50 kHz	200 kHz	400 kHz	600 kHz	800 kHz	1200 kHz	1500 kHz
Max. Measuring Range ^{3) 4)}							
natural targets $\rho \geq 20\%$	1000 m	600 m	435 m	355 m	310 m	255 m	230 m
natural targets $\rho \geq 60\%$	1630 m	1000 m	730 m	600 m	525 m	435 m	390 m
natural targets $\rho \geq 80\%$	1845 m	1140 m	830 m	690 m	600 m	500 m	445 m
Max. Operating Flight Altitude AGL ^{2) 5)}							
@ $\rho \geq 20\%$	640 m (2110 ft)	390 m (1270 ft)	280 m (920 ft)	230 m (750 ft)	200 m (650 ft)	160 m (540 ft)	150 m (490 ft)
@ $\rho \geq 60\%$	1050 m (3440 ft)	640 m (2110 ft)	470 m (1540 ft)	390 m (1270 ft)	340 m (1100 ft)	280 m (920 ft)	250 m (820 ft)
Max. Number of Targets per Pulse ⁶⁾	15	15	15	15	11	7	5

1) Rounded values.

2) Setting of intermediate PRR values possible.

3) 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.

4) Ambiguity to be resolved by post-processing.

5) Flat terrain assumed, scan angle $\pm 45^\circ$ FOV.

6) If more than one target is hit, the total laser transmitter power is split and, accordingly, the achievable range is reduced.

RANGER-LR²² LITE INTEGRATION OPTIONS



Sony ILX-LR1 (61 MP)



PhaseOne iXM-GS120 (120 MP)



360° Mobile Camera



EXPLORE A PHOENIX LiDAR SYSTEM FOR YOUR TEAM, CONTACT US!

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