PHOENIX LiDAR SYSTEMS

RANGER ULTRA SERIES

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RANGER-U240[24]

The **RANGER-U240[24]** is a lightweight airborne laser scanner, especially designed for use on UAS and small manned airplanes or helicopters. With a wide field of view of 75 degrees and an extremely fast data acquisition rate of up to 2400 kHz, the **RANGER-U240[24]** is perfectly suited for high point density corridor mapping applications such as power line, railway track and pipeline inspection.

VTOL UAV HELICOPTER AIRPLANE

QUICK SPECS

ABSOLUTE ACCURACY (1)(2)(3)
1.5 - 3 cm RMSEz @ 120 m (preliminary)

INTRASWATH PRECISION (1)(2)(4)
1.5 cm RMSDz @ 120 m (preliminary)

EXAMPLE ACQUISITIONS:

HELICOPTER

» 340 m AGL , 60 knots, 75° FOV, 2400 kHz
» Swath Width = 520 m
» Avg. Density = 124 points/m²

FIXED WING

» 460 m AGL, 120 knots, 75° FOV, 1200 kHz
» Swath Width = 705 m
» Avg. Density = 23 points/m²

APPLICATIONS

- UTILITIES MAPPING
- RAILWAY TRACK MAPPING
- CONSTRUCTION SURVEYING
- AGRICULTURE & FORESTRY MONITORING
- OPEN PIT MINING OPERATIONS
- OIL & GAS SURVEYING
- GENERAL MAPPING

(1) Approximate values based on PLS test methods described at https://docs.phoenixlidar.com/accuracy-standards-and-quantification.
(2) Using a 90° downward field of view.
(3) Expected RMSEz when following the PLS recommended acquisition & processing workflow and ASPRS check point guidelines.
(4) Flat surfaces with >20% reflectivity at the laser's wavelength.

FEATURES

- Easily mountable to unmanned platforms (UAVs) and to helicopters, gyrocopters, and other small manned aircrafts.
- Operating flight altitude up to 1,430 m / 4,700 ft
- Scan speed up to 600 lines/second

PLATFORM

OVERALL DIMENSIONS (with AIR NavBox)	34.8 x 16.4 x 18.9 cm
OPERATING VOLTAGE	20 - 28 VDC
POWER CONSUMPTION	85 W typical
OPERATING TEMPERATURE	0° - 40° C / 32° - 104° F
WEIGHT (including Air NavBox)	4.7 kg / 10.4 lbs

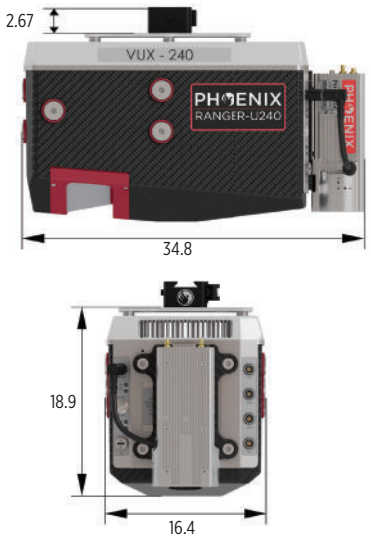
LiDAR SENSOR

LASER PROPERTIES	1550 nm
RANGE MINIMUM	5 m
RANGE MAXIMUM	1200 m @ 20% reflectivity, 300 kHz
MAX EFFECTIVE MEASUREMENT RATE	up to 2,000,000 meas./sec
SCAN SPEED	40 - 600 lines/second
LASER BEAM DIVERGENCE	0.35 mrad
LASER BEAM FOOTPRINT (Gaussian beam definition)	35 mm @ 100 m, 175 mm @ 500 m, 350 mm @ 1000 m
MAX MEASURING RANGE ρ 20% (ρ 60%)	1200 m (1900 m)
HORIZONTAL FIELD OF VIEW	75°
LASER ACCURACY	0.01 m (1σ @ 150 m)
LASER PRECISION	15 mm
LASER SAFETY	CLASS 3R ENOHD 3.5 m

NAVIGATION SYSTEM

CONSTELLATION SUPPORT	GPS + GLONASS + BEIDOU + GALILEO
SUPPORTED 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

RANGER-U240[24] DIMENSIONS (cm)



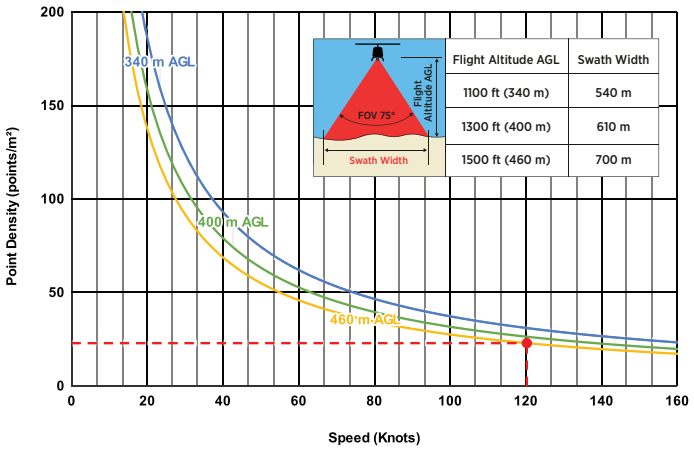
RANGE MEASUREMENT PERFORMANCE

Laser Pulse Repetition Rate PRR [1]	300 kHz	600 kHz	1200 kHz	1800 kHz	2400 kHz
Max. Measuring Range [2] [3] natural targets ρ ≥ 20% natural targets ρ ≥ 60%	1200 m 1940 m	880 m 1440 m	640 m 1060 m	530 m 880 m	460 m 770 m
Max. Operating Flight Altitude AGL [2] [4] @ ρ ≥ 20% @ ρ ≥ 60%	890 m (2900 ft) 1430 m (4700 ft)	650 m (2150 ft) 1060 m (3500 ft)	470 m (1550 ft) 780 m (2550 ft)	390 m (1250 ft) 650 m (2150 ft)	340 m (1100 ft) 570 m (1850 ft)
Max. Number of Targets per Pulse [5]	30	24	11	7	5

1) Rounded average PRR.
2) Typical values for average conditions and average ambient brightness. In bright sunlight, the max. range is shorter than under an overcast sky.
3) The 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. Range ambiguities have to be resolved by multiple-time-around processing.
4) Effective FOV 75°, additional roll angle ± 5°.
5) If the laser beam hits, in part, more than one target, the laser's pulse power is split accordingly. Thus the achievable range is reduced.

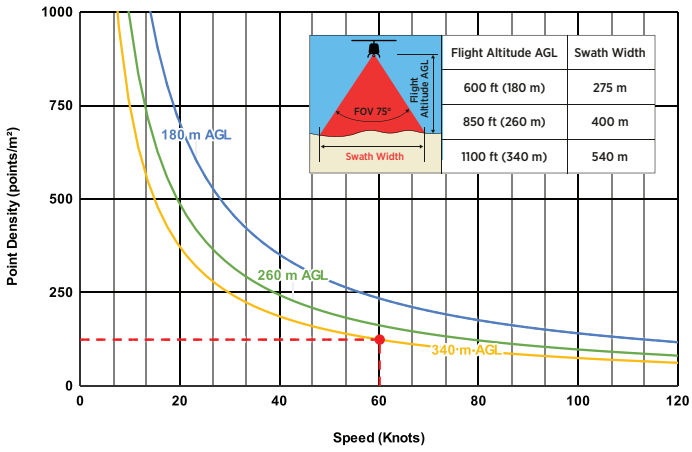
MAX MEASUREMENT RANGE & POINT DENSITY RANGER-U240[24]

PRR = 1200 kHz



EXAMPLE	VUX-240[24] at 1,200,000 pulses/sec, laser power level 100% Altitude = 1,500 ft AGL, Speed 120 kn	RESULTING POINT DENSITY	23 pts/m²

PRR = 2400 kHz



EXAMPLE	VUX-240[24] at 2,400,000 pulses/sec, laser power level 100% Altitude = 1,100 ft AGL, Speed 60 kn	RESULTING POINT DENSITY	124 pts/m²

RANGER-U240[24] ACCESSORIES

Nadir PhaseOne


HeliMount with Oblique PhaseOne's

Cessna UltraPod

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

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