PHOENIX LiDAR SYSTEMS

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RANGER-UAV²² FLEX

The **RANGER-UAV²² FLEX** is our most versatile system, capable of seamlessly integrating into various platforms such as backpacks, UAVs, and Dual Scanner Mobile Mapping setups. The high pulse rate measurement capability ensures exceptional precision in data collection. Whether you're embarking on high-density UAS missions, tackling detailed mobile mapping projects, or conducting surveys with low-altitude piloted aircraft, the **RANGER-UAV²² FLEX** is up to the task.

FEATURES

- A 360° scanner FOV creates a payload designed for flexible mounting options for Backpack, UAV, and Mobile
- Class leading 10 mm range measurement accuracy
- Removable 61 MP RGB camera for UAV applications optional
- Grows with your needs - Single RANGER FLEX unit can be installed in dual scanner mobile accessory

VTOL UAV VEHICLE BACKPACK

QUICK SPECS

ABSOLUTE ACCURACY (1)(2)(3)
1.5 - 3.0 cm RMSEz @ 120 m

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

EXAMPLE ACQUISITIONS:

UAV

» 100 m AGL , 10 m/s, 90° FOV, 1200 kHz
» Swath Width = 200 m
» Avg. Density = 150 points/m²
» Collection Rate = ~7 km²/hr

MOBILE

» 360° FOV, 1200 kHz
» Point Density = 1700 points/m² @ 10 m range to target
» Collection Rate = 40 km/h (25 mph)

APPLICATIONS

- UTILITIES MAPPING
- OIL & GAS SURVEYING
- RAILWAY TRACK MAPPING
- CONSTRUCTION SITE 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° max 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.
(5) Estimated post-processed accuracy with IMU-30.

PAYLOAD	RANGER FLEX	RANGER FLEX w/CAMERA
OVERALL DIMENSIONS (L x W x H) (cm)	27.9 x 20.9 x 17.3	33.4 x 20.9 x 17.3
POWER CONSUMPTION	75 W typical	85 W typical
WEIGHT	4.7 kg / 10.3 lbs	5.5 kg / 12.1 lbs
OPERATING TEMPERATURE	0° - 40° C / 32° - 104° F	
OPERATING VOLTAGE	14 - 28 VDC	

LiDAR SENSOR

Source: RIEGL Laser Measurement Systems

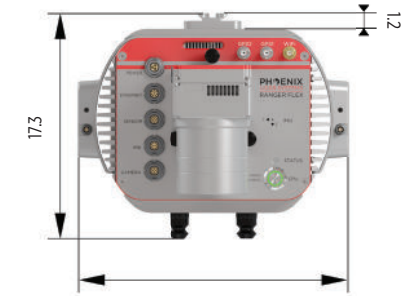
LASER WAVELENGTH	1550 nm
RANGE MIN	1.5 m at ≥1 MHz PRR
RANGE MAX	755 m at 20% reflectivity, 50 kHz PRR
PULSE REPETITION FREQUENCY	Up to 1200 kHz
SCAN SPEED	10 - 200 lines/second
MAX RETURN COUNT	15
BEAM COUNT	1 facet rotating mirror
BEAM DIVERGENCE	0.35 mrad @ 1/e
HORIZONTAL FIELD OF VIEW	360°
LASER ACCURACY	10 mm One sigma @ 150 m
LASER SAFETY	CLASS 1

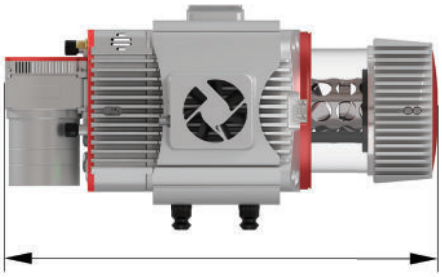
NAVIGATION SYSTEM

CONSTELLATION SUPPORT	GPS + GLONASS + BEIDOU + GALILEO
SUPPORT ALIGNMENT	Static, 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

DIMENSIONS (cm)

RANGER-UAV[22] FLEX





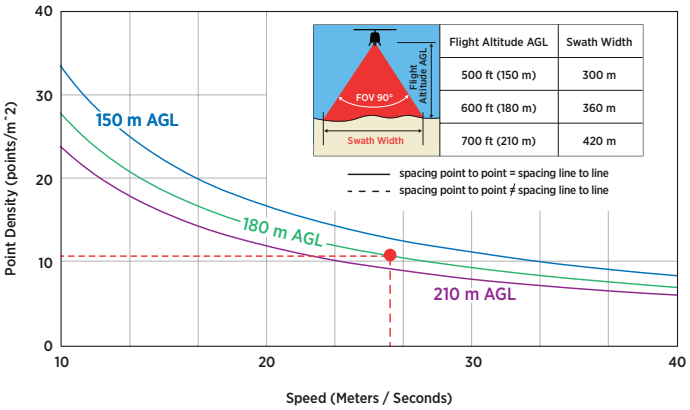
MEASUREMENT PERFORMANCE

Laser Pulse Repetition Rate PRR [1) 5)]	50 kHz	100 kHz	200 kHz	400 kHz	800 kHz	1200 kHz
Max. Measuring Range [3) 4)]						
natural targets ρ ≥ 20% (e.g. Dry roads)	755 m	545 m	390 m	280 m	200 m	160 m
natural targets ρ ≥ 60% (e.g. Sand)	1250 m	910 m	660 m	480 m	340 m	280 m
natural targets ρ ≥ 80% (e.g. Limestone)	1415 m	1040 m	755 m	550 m	390 m	320 m
Max. Operating Flight Altitude AGL [2) 5)]						
@ ρ ≥ 20%	490 m (1590 ft)	350 m (1150 ft)	250 m (820 ft)	180 m (590 ft)	130 m (420 ft)	100 m (340 ft)
@ ρ ≥ 60%	800 m (2640 ft)	580 m (1920 ft)	420 m (1390 ft)	310 m (1010 ft)	220 m (720 ft)	180 m (590 ft)

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 +/- 45°.
6) If more than one target is hit, the total laser transmitter power is split and, accordingly, the achievable range is reduced.

RANGE & POINT DENSITY EXAMPLES

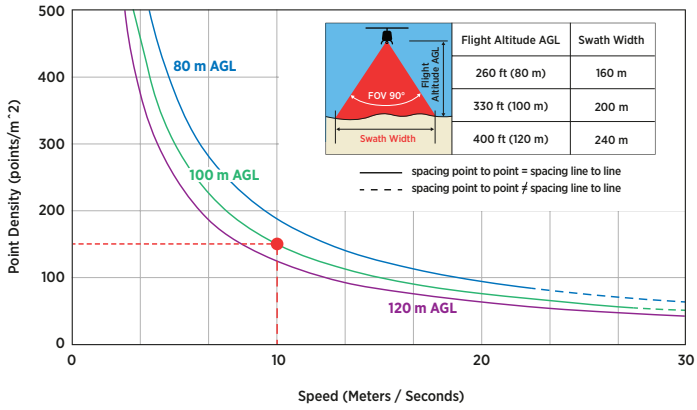
PRR = 400KHZ



Flight Altitude AGL	Swath Width
500 ft (150 m)	300 m
600 ft (180 m)	360 m
700 ft (210 m)	420 m

EXAMPLE	**RANGER-UAV[22] FLEX** at 400 kHz, 90° Field of View, Flying Height AGL = 180 m, Flying Speed = 50 knots (26 m/s)	RESULTS	11 points/m² density ~ 33 km²/hr collection rate

PRR = 1200KHZ



Flight Altitude AGL	Swath Width
260 ft (80 m)	160 m
330 ft (100 m)	200 m
400 ft (120 m)	240 m

EXAMPLE	**RANGER-UAV[22] FLEX** at 1200 kHz, 90° Field of View, Flying Height AGL = 100 m, Flying Speed = 10 m/s	RESULTS	150 points/m² density ~ 7 km²/hr collection rate

ACCESSORIES

UAV Integration

Dual Mobile Setup
(w/ 360° Camera)

Backpack

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

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