



## HALO-10

The HALO series LiDAR scanners are made for high altitude high efficiency mapping. City scale lidar projects are easily achievable with swath widths reaching 4,000 m. Selectable measurement rates up to 1 MHz and line speed up to 250 per second can be tuned to meet challenging pulse density specification. The **HALO-10** is available in two different models; the HALO-10CM and HALO-10LR. The CM variant is designed for city and corridor mapping applications. The LR variant is a general-purpose longer range mapping system and can accommodate greater terrain relief due to its higher maximum flying heights.

### FEATURES

- High density 1 MHz mapping
- Narrow 0.3 mrad beam divergence results in excellent accuracy & precision
- 1030 nm laser wavelength for better measurement probability through various environmental conditions
- An 80° field of view for quick coverage of wide areas

### PAYLOAD

|                       |                           |
|-----------------------|---------------------------|
| OVERALL DIMENSIONS*   | 51.9 x 21.6 x 24.8 cm     |
| OPERATING VOLTAGE     | 12-28 V DC                |
| POWER CONSUMPTION*    | Max. 155W                 |
| OPERATING TEMPERATURE | 0° - 40° C / 32° - 104° F |
| WEIGHT*               | -30 kg / 66 lbs           |

\*with IMU-32 and Phase One iXM100

### LiDAR SENSOR

|                            | HALO-10CM                                     | HALO-10LR                                     |
|----------------------------|---|---|
| LASER WAVELENGTH           | 1030 nm                                       | 1030 nm                                       |
| RANGE MAX                  | 2500 m @ 20% reflectivity, 100 kHz            | 4300 m @ 20% reflectivity, 100 kHz            |
| PULSE REPETITION FREQUENCY | 100 - 1125 kHz                                | 100 - 1125 kHz                                |
| SCAN SPEED                 | 20 - 250 lines/second                         | 20 - 250 lines/second                         |
| MAX RETURN COUNT           | Virtually unlimited                           | Virtually unlimited                           |
| BEAM COUNT                 | 4 facet pyramidal mirror                      | 4 facet pyramidal mirror                      |
| BEAM DIVERGENCE            | 0.3 mrad                                      | 0.3 mrad                                      |
| HORIZONTAL FIELD OF VIEW   | 80°   | 80°   |
| LASER ACCURACY             | <0.03 m RMS (1200 m range @ 20% reflectivity) | <0.03 m RMS (1200 m range @ 20% reflectivity) |
| LASER SAFETY               | CLASS 3B                                      | CLASS 3B                                      |

### NAVIGATION SYSTEM

|                                  |   |
|----------------------------------|---|
| CONSTELLATION SUPPORT            | GPS + GLONASS + BEIDOU + GALILEO          |
| SUPPORTED ALIGNMENT              | Static, Kinematic, Dual-Antenna           |
| OPERATION MODES                  | Real-time, Post-Processed                 |
| ACCURACY POSITION                | 1 cm + 1 ppm GNSS baseline RMS Horizontal |
| ACCURACY ATTITUDE <sup>(5)</sup> |   |
| ROLL, PITCH                      | 0.002° RMS                                |
| HEADING                          | 0.007° RMS                                |



### QUICK SPECS

**Absolute Accuracy** <sup>(1)(2)(3)</sup>  
TBD

**Intraswath Precision** <sup>(1)(2)(4)</sup>  
6 cm RMSDz @ 750 m (preliminary)

#### EXAMPLE ACQUISITIONS:

##### Helicopter (HALO-10CM)

- 400 m AGL, 60 knots, 80° FOV, 1000 kHz
- Swath Width = 670 m
- Avg. Density = 42 points/m<sup>2</sup>
- Collection Rate = ~75 km<sup>2</sup>/hr

##### Fixed Wing (HALO-10LR)

- 1100 m AGL, 100 knots, 80° FOV, 500 kHz
- Swath Width = 1845 m
- Avg. Density = 4 points/m<sup>2</sup>
- Collection Rate = ~345 km<sup>2</sup>/hr

### APPLICATIONS

- General Mapping
- Utilities Mapping
- Agriculture & Forestry Monitoring
- Open Pit Mining Operations

(1) Approximate values based on PLS test methods described at <https://docs.phoenixlidar.com/accuracy-standards-and-quantification>

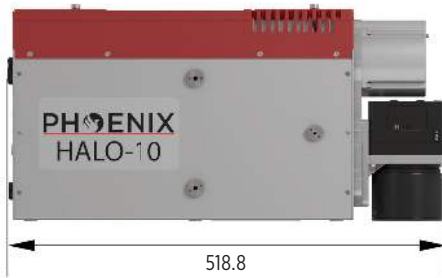
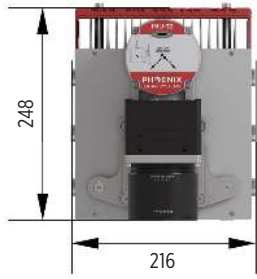
(2) Using a 80° max downward field of view.

(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

## HALO-10 DIMENSIONS (MM)



## RANGE MEASUREMENT PERFORMANCE

| Laser Pulse Repetition Rate PRR | HALO-10CM |         |         |          | HALO-10LR |         |         |          |
|---------------------------------|-----------|---------|---------|----------|-----------|---------|---------|----------|
|                                 | 100 kHz   | 300 kHz | 500 kHz | 1000 kHz | 100 kHz   | 300 kHz | 500 kHz | 1000 kHz |

### MAX. MEASURING RANGE

| natural targets $\rho \geq 20\%$<br>(e.g. Dry Roads) | 2500 m | 1443 m | 1118 m | 791 m  | 4330 m | 2500 m | 1936 m | 1369 m |
|--|--------|--------|--------|--------|--------|--------|--------|--------|
| natural targets $\rho \geq 60\%$<br>(e.g. Dry Grass) | 4330 m | 2500 m | 1936 m | 1369 m | 7500 m | 4330 m | 3354 m | 2372 m |
| natural targets $\rho \geq 80\%$<br>(e.g. Snow)      | 5000 m | 2887 m | 2236 m | 1581 m | 8660 m | 5000 m | 3873 m | 2739 m |

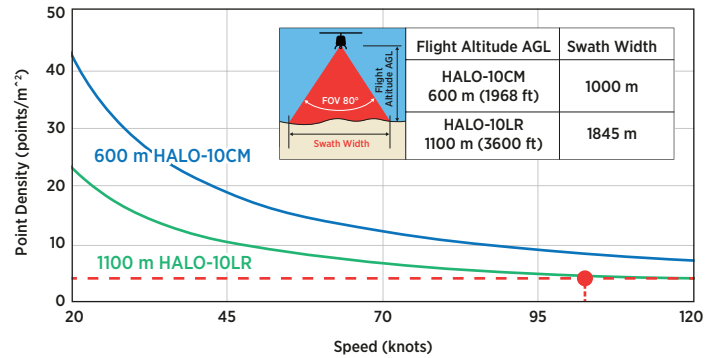
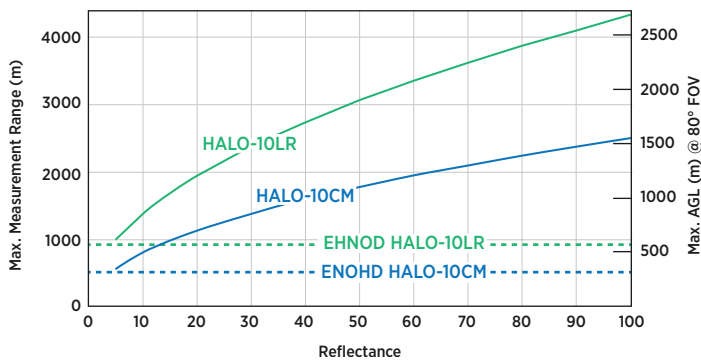
### MAX. OPERATING FLIGHT ALTITUDE AGL

| @ $\rho \geq 20\%$ | 1540 m<br>(5050 ft) | 890 m<br>(2920 ft)  | 690 m<br>(2260 ft)  | 480 m<br>(1570 ft) | 2670 m<br>(8750 ft)  | 1540 m<br>(5050 ft) | 1190 m<br>(3900 ft) | 840 m<br>(2750 ft)  |
|--------------------|---------------------|---------------------|---------------------|--------------------|----------------------|---------------------|---------------------|---------------------|
| @ $\rho \geq 60\%$ | 2670 m<br>(8760 ft) | 1540 m<br>(5050 ft) | 1190 m<br>(3900 ft) | 840 m<br>(2750 ft) | 4630 m<br>(15190 ft) | 2670 m<br>(8760 ft) | 2070 m<br>(6790 ft) | 1460 m<br>(4790 ft) |
| NOHD               | 170 m               | 100 m               | 80 m                | 50 m               | 300 m                | 170 m               | 130 m               | 90 m                |
| ENOHD              | 1200 m              | 680 m               | 510 m               | 330 m              | 2090 m               | 1200 m              | 920 m               | 640 m               |

1) 100% laser power 2) 80° field of view 3) NOHD & ENOHD determined for non-overlapping beam footprints.

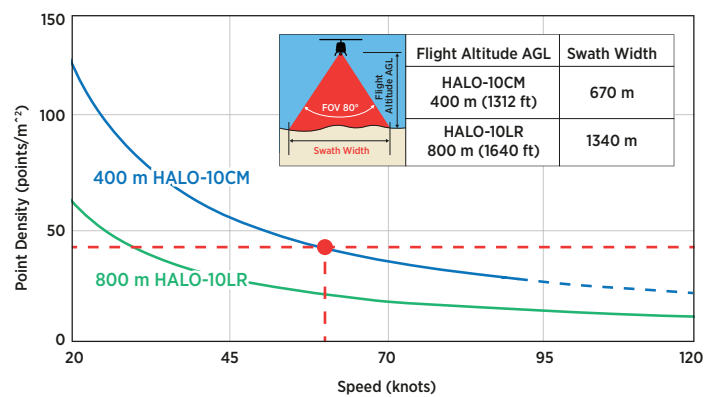
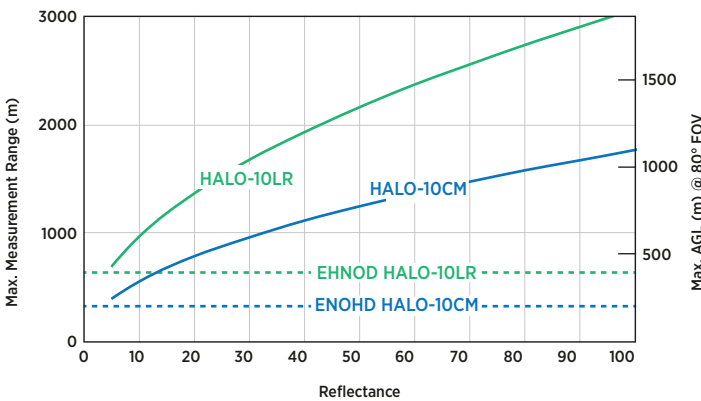
## RANGE & POINT DENSITY EXAMPLES

PRR = 500kHz



**EXAMPLE** HALO-10LR at 500 kHz • 80° FOV • Flying height AGL = 1100 m • Flying speed = 100 knots (52 m/s) **RESULTS** 4 points/m<sup>2</sup> density  
-345 km<sup>2</sup>/hr collection rate

PRR = 1000kHz



**EXAMPLE** HALO-10CM at 1000 kHz • 80° FOV • Flying height AGL = 400 m • Flying speed = 60 knots (31 m/s) **RESULTS** 42 points/m<sup>2</sup> density  
-75 km<sup>2</sup>/hr collection rate

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

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