



Velodyne

## High Definition Lidar HDL-64E S2

Velodyne now offers an improved high definition lidar scanner designed for autonomous vehicle navigation, mapping, surveying, industrial automation, and other uses. The S2 version of the HDL-64E provides improved accuracy and a higher data rate than the original version.

### High Field of View, High Frame Rate

With its full 360° HFOV by 26.8° VFOV, the HDL-64E S2 provides significantly more environmental information than previously available. With its 5-15 Hz user-selectable frame rate and over 1.3 million points per second output rate, the HDL-64E S2 provides all the distance sensing data you'll ever need. The unit's development has been focused on high data rate, high robustness, accuracy and simple 100 MBPS Ethernet interfacing to the end user.

### Patent Pending 64-Laser One-Piece Design

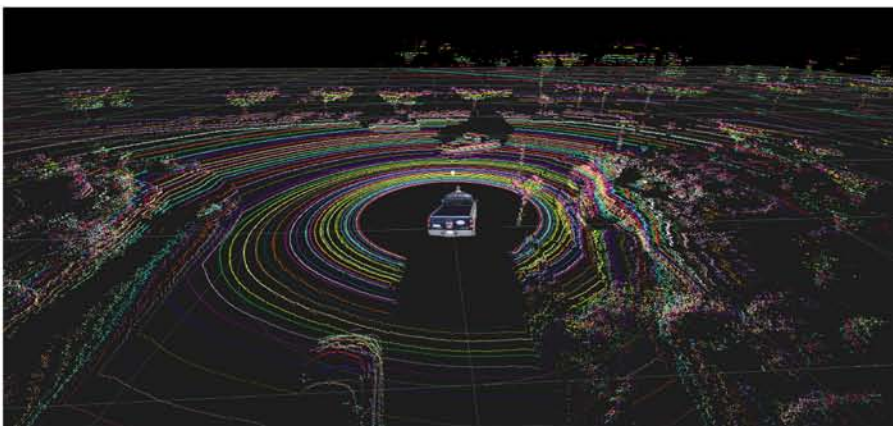
Traditional lidar sensors have relied upon a single laser firing into a mechanically actuated mirror, providing only one plane of view. The HDL-64E S2's patented one-piece design uses 64 fixed-mounted lasers to measure the surrounding environment, each mechanically mounted to a specific vertical angle, with the entire unit spinning. This approach dramatically increases reliability, FOV, and point cloud density.

### The HD Lidar Concept

Velodyne's unique HD Lidar technology lets you focus your efforts on control algorithms, image parsing and application-specific processing instead of multi-sensor mounting, debugging and integration. A prototype of the HDL-64E S2 was successfully used in the 2005 DARPA Grand Challenge and the HDL-64E played an essential role in the 2007 DARPA Urban Challenge for multiple prominent teams.



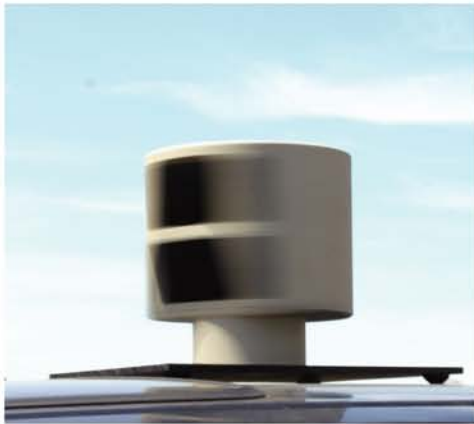
HDL-64E S2



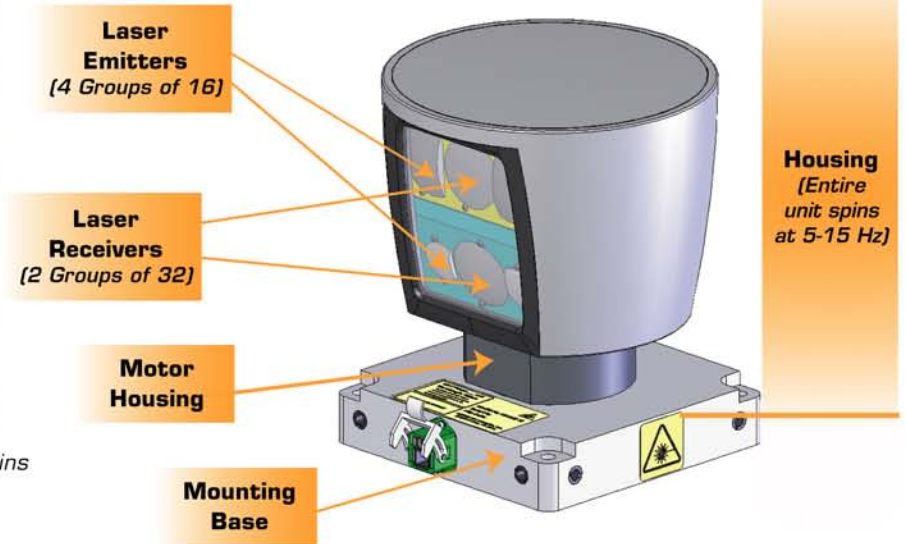
*Actual point cloud image from HDL-64E S2 showing vehicle at intersection and other vehicles in vicinity along with road features.*

## High Definition Lidar

The HDL-64E S2 provides high definition 3 dimensional information about the surrounding environment.



HDL-64E S2 mounted atop vehicle. Unit spins up to 900 RPM (15 Hz) to gather data.



Specifications	
Sensor:	<ul style="list-style-type: none"> <li>• 64 lasers/detectors</li> <li>• 360 degree field of view (azimuth)</li> <li>• 0.09 degree angular resolution (azimuth)</li> <li>• 26.8 degree vertical field of view (elevation) - +2° up to -24.8° down with 64 equally spaced angular subdivisions (approximately 0.4°)</li> <li>• &lt;2 cm distance accuracy (one sigma)</li> <li>• 5-15 Hz field of view update (user selectable)</li> <li>• 50 meter range for pavement (~0.10 reflectivity)</li> <li>• 120 meter range for cars and foliage (~0.80 reflectivity)</li> <li>• &gt;1.333 M points per second</li> <li>• Operating temperature - 10° to 50° C</li> <li>• Storage temperature - 10° to 80° C</li> </ul>
Laser:	<ul style="list-style-type: none"> <li>• Class 1 - eye safe</li> <li>• 4 x 16 laser block assemblies</li> <li>• 905 nm wavelength</li> <li>• 5 nanosecond pulse</li> <li>• Adaptive power system for minimizing saturations and blinding</li> </ul>
Mechanical:	<ul style="list-style-type: none"> <li>• 15V ± 1.5V @ 4 amps</li> <li>• &lt;29 lbs.</li> <li>• 10" tall cylinder of 8" OD diameter</li> <li>• 300 RPM - 900 RPM spin rate (user selectable)</li> <li>• Environmental Protection IP67</li> </ul>
Output:	<ul style="list-style-type: none"> <li>• 100 MBPS UDP Ethernet packets</li> </ul>

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