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## LIDAR CAMERA OWL

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### SPAD based time-of-flight (ToF)

The new compact LiDAR (light detection and ranging) camera Owl stands for fast and reliable distance measurements.

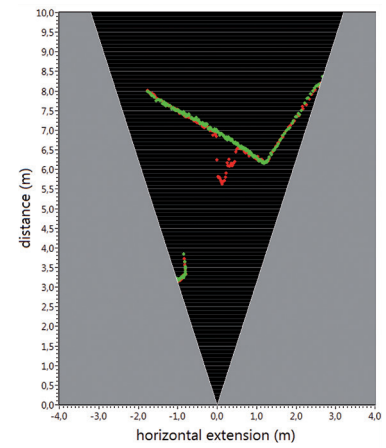
Owl comprises a dual line sensor based on the newest on-site SPAD (single photon avalanche diode) technology. These high-sensitive photodetectors can – analogous to a sight of an owl – get along with extremely low light. Even a single photon can be converted to a dedicated electrical signal in the photodiode.

Therefore, SPADs show a high potential for many applications where accurate and fast range measurements even for long distances are important. One example is the use in autonomous moving vehicles where photons have to be detected which were reflected from far objects over more than 200 m distance.

Besides the quality not to “overlook” low light signals, the big advantage from the SPAD-measurement mechanism is that the photodiode will not saturate even with higher photon rates. If a high photon rate arrives at the pixel, the sensor will still be online and will provide reliable measurement results. A high dynamic range of 134 dB is achieved.

### Solution for high ambient light

Another improvement of Owl is that an innovative readout circuitry on chip level is implemented. The variable sensitivity of the SPAD-pixels allows for robust measurements even with high ambient light, for example with sunlight. The signal-to-noise ratio is even high for the detection of objects in high ambient light without the loss of measurement speed.



### Leading edge properties

*Owl* is a flash LiDAR camera with two laser modules working at 905 nm wavelength. Containing 192 pixels the line sensor can be read out in real time, with 25 fps. Two laser diodes emit 17 ns short pulses with 10 kHz repetition rate. Each laser diode

corresponds to one detector line. *Owl* is an eye-safe LiDAR application. A field-of-view of 36° each line covers a wide area at great distance.

The solid state camera comes without any moving mechanical parts for laser beam steering or receiving optics and measurement

distances of 50 m are achievable. A mounted webcam ensures a good visualization of the range information. With the geometric dimension of 100 mm x 130 mm x 120 mm and an easy operation with USB 2.0 connection, *Owl* offers the best opportunities to test the newest LiDAR-technology in manifold applications.

### Specifications

LiDAR method	Flash
LiDAR architecture	Solid state
Laser class	1 (eye safe)
Geometric dimension (h/w/d)	100 mm x 130 mm x 120 mm
Camera connection	USB 2.0 B / USB 3.0 B
Power supply	12 V
Housing	Black eloxated aluminium housing with mounted Logitech webcam
<b>SPAD detector</b>	
Line sensor	2 lines with 192 pixel each
Direct ToF clocking	Time to digital converter (TDC) in each pixel
Resolution TDC	312.5 ps
Resolution measurement distance	< 5 cm (without any image processing)
Frame rate	25 frames per second
Acquisition mode	timing mode for ranging; counting mode for background measurement
<b>Optics</b>	
Laser source	Two laser diodes, 75 W, each for one line
Wavelength	905 nm
Puls width	17 ns
Repetition rate	10 kHz
Field of View h/v	(36° / 1°) x 2
Lens	C-mount w/o ARC 12.5 mm F1.3*
Optical filter	Yes, bandwidth 60 nm

\*custom solution possible

3 Webcam picture combined with range information

4 Corresponding polar map