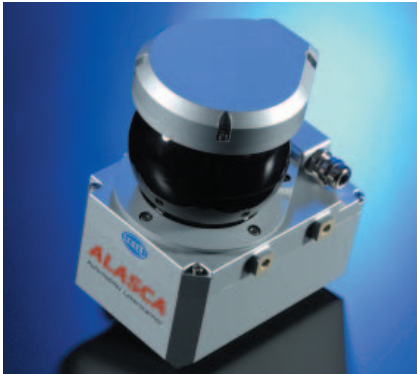


# ALASCA®

## Automotive Laser Scanner



For more Information: [www.alasca.info](http://www.alasca.info)

On the basis of a fully rotating infrared beam, ALASCA® allows the scanning of a large angle of the vehicle environment. The detection range of 30 m (5 % target reflectivity) is ideal for all applications requiring a high-precision angle and distance resolution in the short and medium range.

In 2001 Hella and IBEO Automobile Sensor GmbH agreed on a cooperation with the target of developing a laser scanner which fulfils the special needs of the automotive industry. Since 2002 the project is in the operative phase. At the IAA 2003 the result of this cooperation, the ALASCA® laser scanner, will be presented to the public for the first time.

### System Characteristics

- Infrared measuring system
- Detection of multiple targets
- Compensation of pitch angles
- High-accuracy distance measurement
- Detection of the object contour

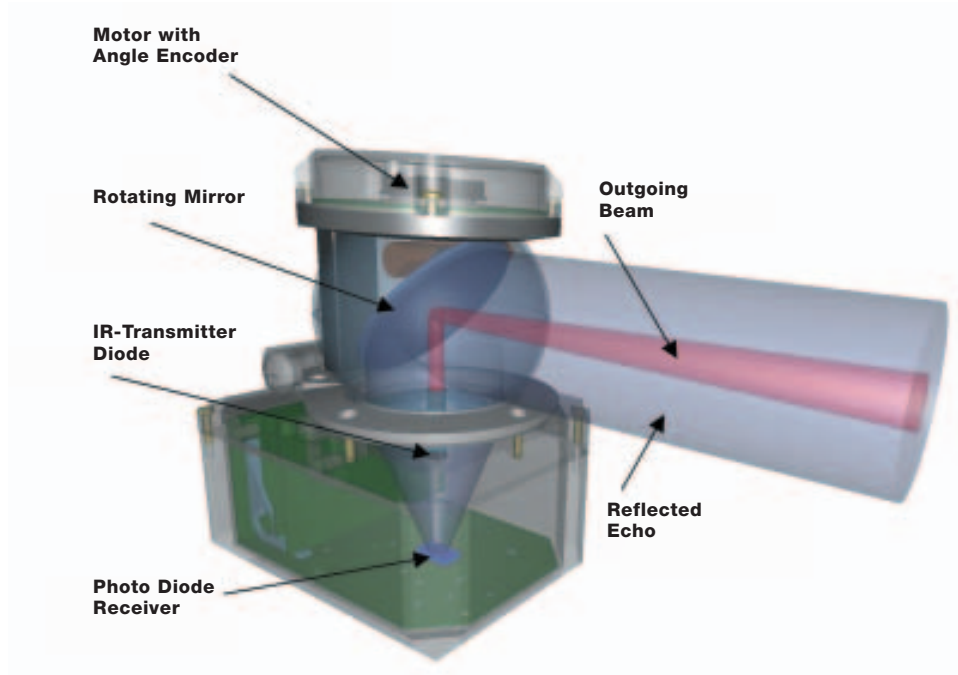
### Application

- Stop & Go
- Collision Mitigation
- Precrash
- Pedestrian Detection
- Parking Assistance

### Specifications

<b>Range</b>	0.3 m to 80 m (30 m on 5 % reflecting target)
<b>Range resolution</b>	± 5 cm
<b>Rotational frequency</b>	10 ... 40 Hz
<b>Vertical angle range</b>	3.2° subdivided into 4 levels
<b>Horizontal angle range</b>	Up to 240° (depending on the mounting position)
<b>Horizontal angle resolution</b>	0.25° ... 1°
<b>Transmitter</b>	eye safe (laser class 1)
<b>Interfaces</b>	ARCnet / Ethernet, CAN, RS232
<b>Electrical power consumption</b>	14 Watt
<b>Power supply</b>	Vehicle power supply
<b>Waterproof</b>	To IP66 (even as stand-alone unit)

## Principle of Operation



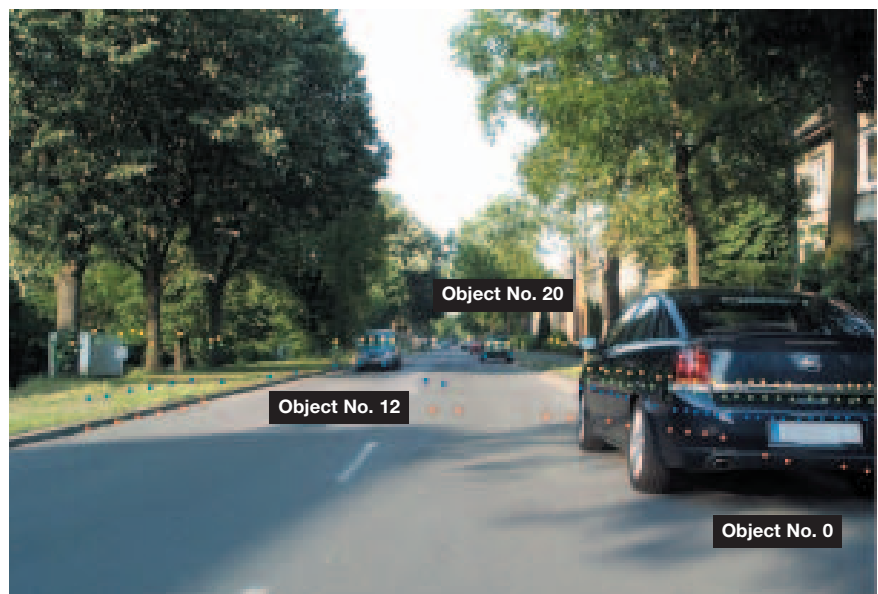
- A infrared diode generates a short light pulse
- A rotating mirror transmits the infrared beam
- The target reflects the infrared beam
- The photodiode receives the reflected beam
- Time-of-flight measurement supplies the object distance
- The angle resolution is supplied by the angle-encoder of the mirror drive
- Calculation of object velocity and acceleration
- Object tracking depending on the desired application
- Intervention in the vehicle longitudinal control:

Examples:

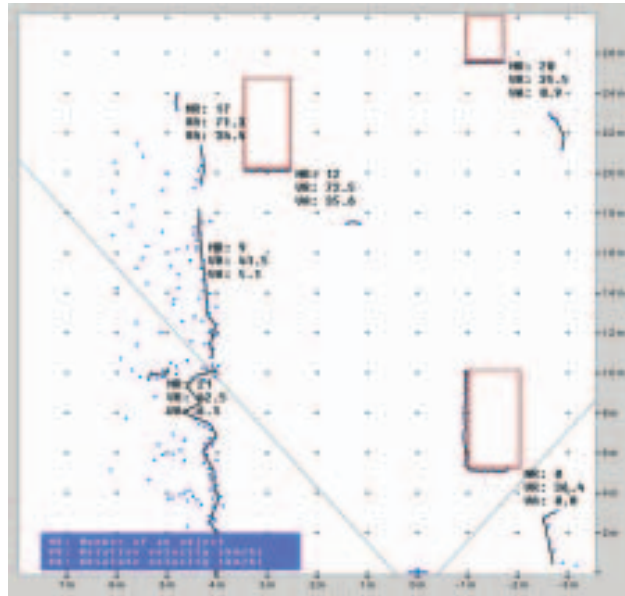
**Collision Mitigation:** Initiating of full braking in case of inevitable collision to reduce collision damage

**Stop & Go:** Intervention in engine management system and break for complete stop and standing start in traffic jams

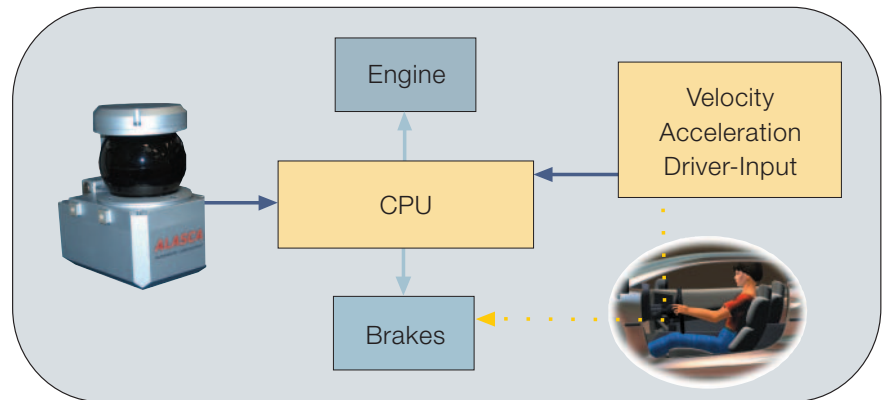
## Signalprocessing



As an illustration, the scan data are shown in the above driving scene, the four coloured dotted lines representing the scanning levels. These four levels are always in use to avoid object losses caused by the pitching motion of the vehicle under various load, acceleration and deceleration conditions (typical  $\pm 1.6^\circ$ ).



ALASCA®, calculates the object outline from the scan data by appropriate algorithms. The contour lines serve to extract and classify the objects. In addition, the distance, direction and relative velocity data of each object are supplied for further signal processing.



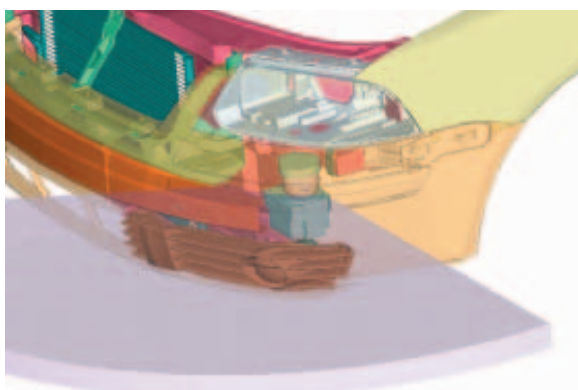
The object data are transmitted to the central processing unit. The CPU selects objects relevant for the specific application. Based on the current data of the vehicle motion the CPU directly controls the engines and the brakes. For security reasons the driver is able to overdrive the automatic control at ACC Stop&GO.

## Integration into the Vehicle Front

The detection ranges depend mainly on the sensor mounting position:



With one sensor in a central mounting position, an angle of 120° can be covered, e.g. for the presented applications **Stop & Go** and **Collision Mitigation**.



With two sensors mounted at the left and right side of the bumper, and multiple scanning of the ROI (Region of Interest) in front of the vehicle an enlarged angle of 240° can be covered. The advantage is the additional monitoring of the side areas of the vehicle.

## Future Activities:

- Reduction of the sensor size
- Extension of object classification
- Automatic switching between different applications
- Implementation of additional applications:
  - Precrash
  - Pedestrian detection
  - Parking assistant

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