LeddarTech®

SOLUTION OVERVIEW

Leddar technology: Providing advanced, low-cost optical detection and ranging for automotive ADAS

Optical detection and ranging is recognized as one of the key sensing technologies being leveraged to enable automotive active safety features on production cars and to develop autonomous driving solutions.

LeddarTech is leading the way in optical time-of-flight solutions, providing automakers and system vendors with the cost-effective Leddar® detection and ranging technology, which can easily be integrated into standard automotive components and help accelerate the deployment of ADAS applications from luxury to economy cars alike.

Leddar optical detection and ranging technology delivers unique capabilities to accurately detect, locate, and measure objects and people in the most demanding automotive environments, thanks to advanced, proprietary algorithms and highly efficient processing.

Implemented into highly optimized chipsets, Leddar constitutes the core element in the design of a variety of custom OEM sensor modules specifically tailored to your Advanced Driver Assistance System requirements.

Active safety applications

- Forward/rear collision warning
- Blind-spot monitoring
- Cross traffic alert
- Parking assistance
- Automatic emergency braking
- Adaptive cruise control
- Traffic jam assistance
- Gesture recognition
- Occupant detection

Leddar Benefits

- Cost-effective, fixed-beam optical detection with no moving parts
- Narrow to wide field-of-view
- Multi-segment configurations for precise multi-object detection / localization /classification
- Short- to long-range capability
- Reliable operation in all lighting and environmental conditions
- No images captured, eliminating privacy concerns

Enabling affordable active safety and ADAS solutions

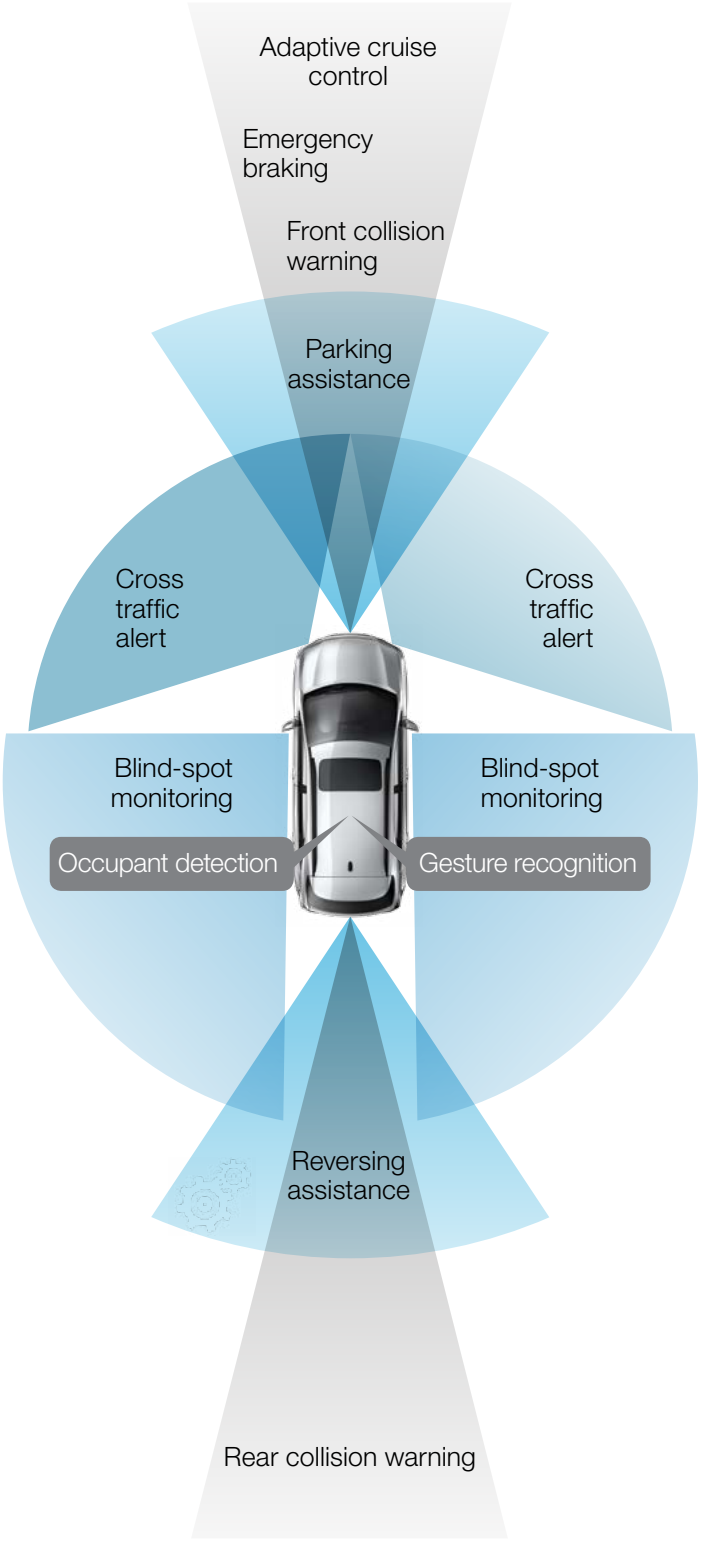
The patented Leddar technology delivers unmatched range-to-power ratio for superior sensing performances at a lower cost and in a compact format, thereby accelerating your deployment of reliable, yet affordable active safety systems.

Optimized by LeddarTech over a decade of focused R&D, Leddar optical time-of-flight technology provides unique benefits for automotive applications, with its robust performance in adverse environmental conditions, immunity to ambient light for reliable day and night detection, rapid acquisition rate, large illumination area, lateral discrimination of objects, and simultaneous acquisition capabilities in multiple independent segments.

Achieve 360° spatial awareness with Leddar technology

Available to automakers, OEMs and system vendors, Leddar detection and ranging technology enables the development of low-cost automotive-grade Lidar solutions that can easily be integrated into standard automotive components, such as headlamps, rear lamps, or side view mirrors, for use in mainstream ADAS applications. The compact, flexible format of Leddar modules help address issues related to optimal placement of sensors as well as their seamless integration into the vehicle's design.

The core technology can be embedded into ICs, which serve as the central element for the development of custom sensor modules. A wide variety of ADAS sensor configurations and fields of views can be achieved from the same Leddar core, using various optics combinations, in order to meet the applications' specific requirements.



Leddar chipset

Leddar sensor module

Automotive components and systems

Mass-production car ADAS

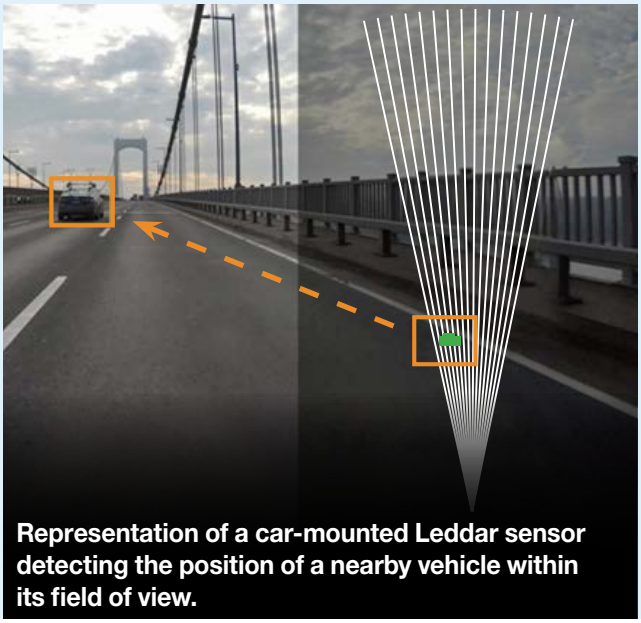
COMPARISON	ULTRASONIC	CAMERA	CAMERA	RADAR	FIXED LIDAR	LASER SCANNER	LEDDAR
Field of view type	Short and wide		Far and narrow		Short and wide	Far and wide, customizable	
Impact of weather conditions	High			Low	Medium		Low
Impact of lighting conditions	None	High		None	Low to medium		Very low
Stationary object detection	Yes			Limited	Yes		
Pedestrian detection	Limited	Yes		Limited	Yes		
No moving part design	Yes					No	Yes

Comparison of main automotive detection and ranging technologies

Traditional technologies such as ultrasound, cameras, or radars, display various limitations in the context of ADAS applications, from sensitivity to weather or light conditions to the ability to reliably detect all objects. Laser-scanning Lidars, while being an advanced technology with clear benefits for ADAS, remain cost-prohibitive even at high volumes and may lack the robustness required for automotive applications. Existing fixed-beam Lidars used in the automotive industry prove to be more robust than their scanning counterparts; however, they also entail major limitations in terms of distance range.

Leddar solutions bridge the cost, performance and form factor gaps experienced with previous ADAS optical time-of flight sensors. Leddar may also be integrated as part of a larger sensor suite through sensor fusion, helping to build redundancy into ADAS for situations where other types of sensors fall short.

Leddar: Highly-efficient, optimized optical detection and ranging



Representation of a car-mounted Leddar sensor detecting the position of a nearby vehicle within its field of view.

Leddar provides continuous, rapid and accurate detection and ranging without any moving parts through time-of-flight measurements from a diffused light beam using infrared light sources (such as LEDs, VCSELs, or Laser diodes) pulsed at high rates and for very short pulse widths.

The echoed light signal is captured by multi-segment photo-detectors, then digitalized and analyzed through innovative, proprietary algorithms, resulting in the reliable detection and ranging of multiple objects within a narrow or wide field of view. Different optical components can be selected to shape the illumination beam, deliver the required range, and provide the detection element configuration that best fit each application. Moreover, numerous operating parameters can then be adjusted to further optimize performance for particular uses.

Leddar's superior optimization means that sensor designs can leverage affordable off-the-shelf optical components to deliver cost-effective solutions without sacrificing on performance.

Sample sensor configurations

The table below presents two examples of the many possible Leddar configurations for mainstream ADAS applications.

	Long range Automotive Leddar	Mid-range Automotive Leddar
Detection range: vehicles	Front-facing vehicles: 65 m Rear-facing vehicles: 150 m	Front-facing vehicles: 15 m Rear-facing vehicles: 40 m
Detection range: pedestrians	60 m	12 m
Field of view	20°	90°
Detection segment number	16	16
Operating temperature	-40° C to + 105° C	-40° C to + 105° C
Typical applications	Front/rear collision warning Adaptive cruise control Automatic emergency breaking Traffic jam assistance	Blind spot monitoring Cross-traffic alert Lane change assistance Parking assistance

Enabling your active safety and ADAS solutions

With Leddar, we provide you today with a highly efficient, cost-effective solution for optical detection and ranging for all types of obstacles (i.e. vehicles, structures, pedestrians, cyclists) in any environment. With its unique approach to active optical sensing, enabling multi-object detection and real-time tracking capabilities over short or long ranges, Leddar is the technology of choice for affordable, reliable ADAS and active safety solutions.

FROST & SULLIVAN

2016 BEST PRACTICES AWARD

NORTH AMERICAN AFFORDABLE ADAS PRODUCT INNOVATION AWARD

Winner of Frost and Sullivan Best Practices Award 2016 for

New Product Innovation in the Affordable ADAS Industry

This prestigious award recognizes companies that have successfully introduced new and innovative products into their markets, with emphasis on product quality and customer value.

Frost & Sullivan recognized Leddar's distinct advantages to carmakers, OEMs and Tier I automotive suppliers over other sensors in the ADAS domain, and highlighted the key advantage of Leddar in cost-performance ratio, which allows it to address many challenges related to performance, vehicle integration, and cost faced with other sensors, and enables carmakers to use the technology for a variety of vehicle applications.

The Advanced Driver Assistance Systems (ADAS) market in Europe and North America are both expected to grow at CAGRs of over 25% from 2014 to 2020.

— Frost and Sullivan

Ask us about Leddar sensing technologies for automotive: leddartech.com/en/contact-us

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