LeddarTech®

SOLVING CRITICAL SENSING, FUSION AND PERCEPTION CHALLENGES

Sensing and Perception
Solutions That Enable
ADAS and Autonomous
Vehicles

Solving Critical Sensing, Fusion and Perception Challenges

LeddarTech provides the most flexible, robust and accurate sensing technology for advanced driver assistance systems (ADAS) and autonomous vehicles. Our solutions enable customers to solve critical environmental sensing, fusion and perception challenges across the entire value chain.

The company offers cost-effective, scalable solutions such as LeddarVision™, a raw-data sensor fusion and perception platform that generates a comprehensive 3D environmental model with multi-sensor support for camera, radar and LiDAR configurations. LeddarTech also supports LiDAR developers and Tier 1-2 manufacturers with LeddarSteer™, a digital beam steering device. The LiDAR XLRator™ development platform enables automotive-grade solid-state LiDAR based on the LeddarEngine™ and core components from global technology partners.

LeddarTech's field-proven technology, partner ecosystem and disruptive business model reduce risks, accelerate development cycles and enable faster time-to-market. We are responsible for several cutting-edge remote-sensing innovations, with over 100 patented technologies (granted or pending) enhancing ADAS and autonomous driving capabilities.

Our mission is to improve safety and quality of life for travelers, commuters, workers and mobility industry professionals by enabling applications that reduce traffic congestion, minimize the risk of road accidents and improve the overall efficiency of road transport.

Our customers are OEMs, Tier 1-2s, system integrators and LiDAR manufacturers looking for sensing and perception solutions that are flexible, adaptable and scalable, allowing them to meet their key performance, cost and development time requirements.

We believe that environmental sensing will be a key element in making global mobility safer, efficient, ecological and affordable. This is what drives us to become the most widely deployed environmental sensing solution in ADAS and AD.

LeddarVision™
Sensor-Fusion and Perception Platform

LeddarVision is an advanced environmental perception solution for automotive and mobility applications, from passenger light vehicles to off-road heavy industrial vehicles. LeddarVision software develops a comprehensive environment model delivering superior perception performance from any sensor set to enable and accelerate the development of high-performance, scalable ADAS and autonomous driving (AD) solutions.

Based on LeddarTech's comprehensive and demonstrated raw-data sensor fusion expertise, LeddarVision software processes sensor data to achieve a reliable understanding of the vehicle's environment required for navigation decision-making.

LeddarVision resolves many limitations of legacy ADAS perception architectures. Centralized, sensor-agnostic object-level fusion optimally fuses all sensors for higher and more reliable performance. Its modular architecture allows to effectively handle a growing variety of use cases, features and sensor sets:

- radar/camera fusion (RCF)
- LiDAR/camera fusion (LCF)
- LiDAR/radar/camera fusion (LRCF)
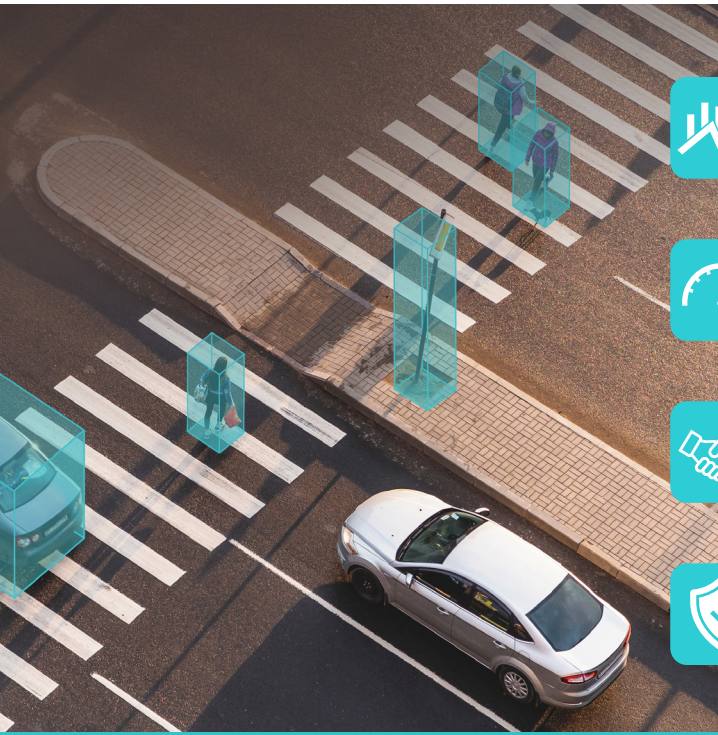
A single, modular fusion and perception environmental model that scales from ADAS into AD

Raw data sensor fusion-perception solution providing superior performance, surpassing object-level fusion in adverse scenarios
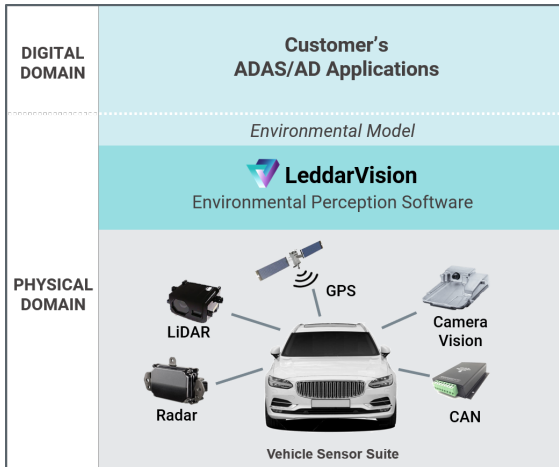
Built-in redundancy for more reliable system operation

Strong domain expertise, work process and field experience bringing technology from concept to reality

Making Optimized Fusion and Perception a Reality

DIGITAL DOMAIN
Customer's ADAS/AD Applications

Environmental Model

LeddarVision
Environmental Perception Software

PHYSICAL DOMAIN

GPS
LiDAR
Camera Vision
Radar
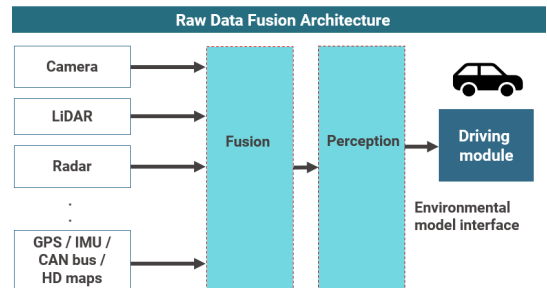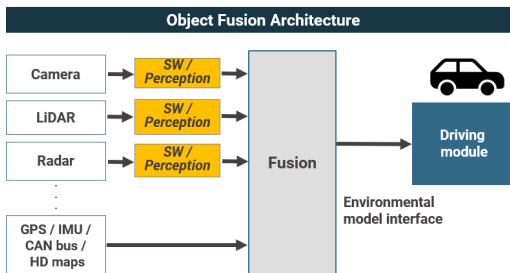CAN

Vehicle Sensor Suite

LeddarVision Key Applications

- L2/L2+ automotive ADAS
- L3 autonomous driving
- L4-5 autonomous vehicles
- Off-road commercial vehicles ADAS/AD

Implementing a complete perception process based on raw data sensor fusion is challenging for the suppliers to the automotive and commercial & industrial vehicle segments.

LeddarTech has strong domain expertise and a complete, demonstratable work process to bring your technology integration from concept to practice.

Object Fusion Architecture

Camera → SW / Perception
LiDAR → SW / Perception
Radar → SW / Perception
GPS / IMU / CAN bus / HD maps

Fusion → Driving module

Environmental model interface

Raw Data Fusion Architecture

Camera
LiDAR
Radar
GPS / IMU / CAN bus / HD maps

Fusion → Perception → Driving module

Environmental model interface

Object-level Fusion Limitations

Each sensor detects and **classifies** objects. Sensors' decisions **are then fused.** Raw information from the sensors **is lost.**

- Increased **missed detections** and **false positives.**
- **Conflicting sensor output** and **false alarms** require complex heuristics.
- **Higher-cost sensors** and **higher efforts** required for modifying sensors.

Raw Data Fusion Benefits

Raw data from sensors is **first fused together.** Detection and classification algorithms then **run on the fused model.** Decision is based on **all sensors' input.**

- Sensors complement each other for **better detection** and **less false positives.**
- Conflicting and degraded sensor output is inherently solved, with **built-in redundancy** and more reliable operation.
- **Hardware/software decoupling** for cost savings.

LeddarSteer™ DBSD
## Automotive-Grade, Solid-State Digital Beam Steering

LeddarSteer™ is a unique technology from LeddarTech that enables beam steering based on clever use of the polarization of light. LeddarSteer is available to LiDAR manufacturers, Tier 1-2s and system integrators for the design and production of long-range, high-resolution LiDARs in a complete solid-state form –with no moving parts to wear out or to be affected by shocks and vibrations present in an automotive environment.

- Compact, reliable, 100% solid-state, automotive-grade compatible
- Improves LiDAR range and resolution
- Reduces optical design requirements, cost and size
- Compatible with a broad range of wavelengths and architectures
- Fulfills multiple ADAS/AD use cases from a single LiDAR design
- Can be fully customized (number of layers, steering angles, aperture and more) for volume production
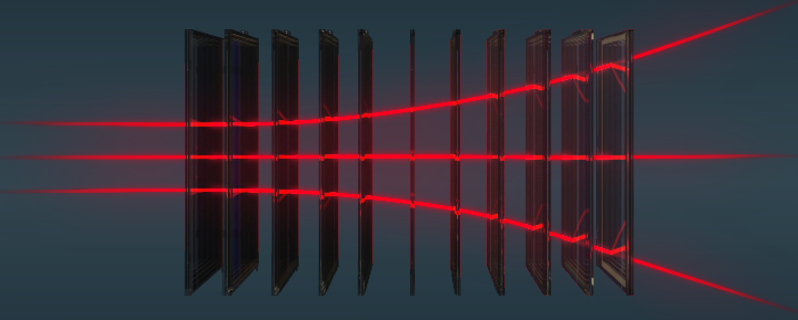
Enabling Flex View Digital Steering

With LeddarSteer, the field of view can be changed and adjusted on-the-fly, allowing dynamic FoV configuration, customized to the region of interest, while driving.

Highway setting
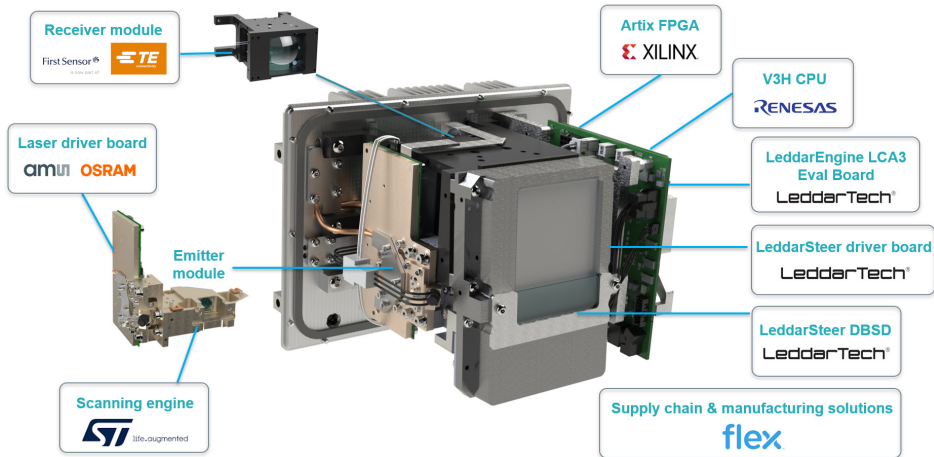
City setting

Variable zoom
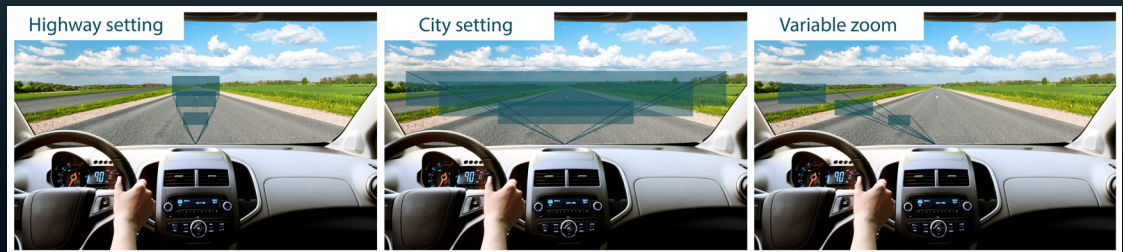
Long-range FoV

Front LiDAR vs. two-corner design

On-the-fly SNR and resolution adjustment in adverse weather

LiDAR XLRator™

Development Platform for LiDAR Developers and Automotive Tier-1 Suppliers

Receiver module
First Sensor ≡ TE

Artix FPGA
XILINX

V3H CPU
RENESAS

Laser driver board
amu OSRAM

LeddarEngine LCA3 Eval Board
LeddarTech®

Emitter module

LeddarSteer driver board
LeddarTech®

LeddarSteer DBSD
LeddarTech®

Scanning engine
ST life.augmented

**Supply chain & manufacturing solutions**
flex

The LiDAR XLRator is a versatile, full-fledged development environment based on the LeddarEngine™ and created for LiDAR developers, Tier-1 manufacturers and system integrators. This industry-first collaboration, stemming from leading Leddar™ Ecosystem partners, integrates core building blocks from LeddarTech and from world-class technology providers such as ST Micro, ams OSRAM and TE/First Sensor.

XLRator's modular environment provides state-of-the-art performance, enables the fast-prototyping and cost-effective development of multiple automotive-grade sensing solutions and accelerates time-to-market by up to 2 years.

- Reduces risk and development time
- Reduces financial investment
- Enables state-of-the-art LiDAR performance
- Driven by LeddarSP or custom signal processing
- Accelerates time-to-market

Design Your Optimized LiDAR With the XLRator Development Tools
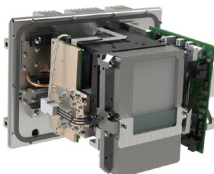
The **XLRator Evaluation/Development Kit** is a modular, complete LiDAR sensor demonstrator kit that allows LiDAR developers to demonstrate, evaluate and test key components from leading technology providers towards automotive LiDAR designs.

The **XLRator Automotive Reference Design** is a compact, automotive-grade implementation of the XLRator development platform demonstrating its capabilities and performance. It integrates automotive-grade components in an automotive form factor, achieving key ADAS/AD performance with a focus on integration and reliability.

LeddarEngine™
The Engine at the Core of Automotive-Grade LiDARs

At the core of our LiDAR XLRator platform, LeddarEngine™ sets a new standard for integrated, customizable solid-state LiDAR solutions that are optimized for high-volume production. LeddarEngine consists of a suite of automotive-grade, functional safety certified SoCs working in tandem with proprietary LeddarSP™ signal processing software. LeddarEngine enables LiDAR manufacturers, Tier 1-2s and system integrators to design their own differentiated LiDAR solution by providing the technology, tools and resources they need to meet the specific OEM requirements of various ADAS and autonomous driving applications.

LeddarCore™ LCA2 SoC

Short- to medium-range LiDAR
- 32 channels
- 1.6 billion samples/sec.
- Up to 48,000 waveforms/sec.

LeddarCore™ LCA3 SoC

For medium- to long-range LiDARs
- 64 channels
- Small footprint - 12 x 12 mm FCCSP225 Package
- Up to 1 megapixels/s

Leddar-based LIDAR

Microcontroller

LeddarSP
- API
- HAL
- FUNCTIONAL SAFETY & MONITORING
- PROCESSING
- CONTROL
- DATA MANAGEMENT

CUSTOMER LIDAR APPLICATION

LeddarCore®
- ACQUISITION
- PRE-PROCESSING
- FUNCTIONAL SAFETY
- TIMING CONTROL

PHOTO-SENSITIVE DEVICE

RECEIVER OPTICS

BEAM STEERING — LeddarSteer DBSD

LIGHT SOURCE

BEAM-SHAPING OPTICS

Received laser pulse

Emitted laser pulse

Target

LeddarEngine = LeddarCore SoC + LeddarSP Library

LeddarTech®   Leddar ECOSYSTEM

LeddarEcho™

High-Fidelity Component-Level Model for Sensor Simulation

LeddarEcho™ Simulation Software provides a high-fidelity model of the XLRator™ automotive front LiDAR. This unique high-precision simulation tool enables LiDAR developers and Tier 1-2 suppliers to accelerate both sensor and perception development. LeddarEcho significantly reduces the R&D cycles, optimization and validation time of LiDAR sensors based on the LeddarEngine™ and supports the development of related and autonomous driving applications.

LeddarEcho is developed in partnership with dSPACE, which simulates the driving environment with its AURELION software. LeddarEcho can also operate with other environment simulators.

Validations include physically accurate simulation of the LiDAR and the vehicle environment, including objects in motion (e.g., vehicles, pedestrians), the road and other static objects (e.g., traffic signs, curbs).

- Software-in-the-loop (SiL)
- High-fidelity LiDAR model
- Open application programming interface (API)
- Modeling at submodule level

Leddar ECOSYSTEM ®

STRATEGIC PARTNERS

ams OSRAM

dSPACE

First Sensor is now part of TE connectivity

flex

onsemi

RENESAS

ST

SUNNY OPTICAL TECHNOLOGY

ECOSYSTEM COLLABORATORS

Ansys

SBG SYSTEMS

BlackBerry QNX

arm

INTEMPORA MULTISENSOR SOFTWARE SOLUTIONS A dSPACE COMPANY

POLYSYNC

HAMAMATSU PHOTON IS OUR BUSINESS

LASERTEL a LEONARDO company

VIAVI Viavi Solutions

ALP.Lab Austrian Light Vehicle Proving Region for Automated Driving

AKKA PASSION FOR TECHNOLOGIES

MORITEX Vision Creating Value

SEOUL ROBOTICS

EXCELITAS TECHNOLOGIES

clarion

dhBOWLES

The Leddar™ Ecosystem comprises a select group of world-class partners, suppliers and collaborators that support the customer development of automotive sensing solutions for ADAS and autonomous driving applications.

In tandem with LeddarTech, the Ecosystem provides technical expertise, components, software, tools and services, leveraging a hardware-agnostic platform that is both open and scalable. Members are prequalified for integration with LeddarTech's LeddarEngine platform and LeddarVision sensor fusion and perception stack.

This collaborative approach maximizes design agility and reduces cycle time and costs, leading to a shorter time-to-market, reduced risks and a faster path to high-volume commercial deployments.

Associations and Memberships

APMA – Automotive Parts Manufacturers' Association of Canada

AQT – Association québécoise des technologies

Autotech Council – Better and faster innovation

CCI – Council of Canadian Innovators

CCIQ – Québec Chamber of Commerce and Industry

CTA – Consumer Technology Association (USA)

FCCQ – Fédération des chambres de commerce du Québec

InnovÉÉ – Innovation in Electrical Energy (Québec)

Linux Foundation – World-class Open Source Software

INO – National Optics Institute

IWPC – International Wireless Industry Consortium

MIPI Alliance – Mobile Industry Processor Interface Alliance

Propulsion Québec – Intelligent and Electrical Transports

Québec Innove – Network for Acceleration of Innovation

ISO 9001:2015 Certified
Quality Management Systems certification

Certified System ™
SAI GLOBAL
ISO 9001
Quality

Since January 2019, LeddarTech's management system is certified to ISO 9001 by SAI Global, a leading global management systems certification body.

Events
See full event listing on leddartech.com/events

CES 2022
January 5-8, 2022
Las Vegas, USA

SPIE-Photonics West
January 22-27, 2022
San Francisco, CA, USA

IWPC Webinar-LeddarTech
January 26, 2022

Tech.AD Europe
April 4-5, 2022
Berlin, Germany

Sensor and Test
May 10-12, 2022
Numberg, Germany

Specialized Expertise, Global Presence.

Global Headquarters
Product Line Management
Advanced Software Engineering
LiDAR Research & Development
Manufacturing & Test Center
Marketing & Communications
Sales & Business Development

Quebec City

Sensor Fusion & Perception Development

Toronto

Montreal

Software Platform Development

Silicon Valley

Detroit

Karlsruhe, Germany

Sensing Platform and Solutions System Architecture

Stuttgart

Munich

Lyon

Austria

Milan & Turin

Sensor Fusion & Perception Development

Tel Aviv, Israel

Shenzhen

Hong Kong

● Research & development centers: Quebec, Montreal, Toronto, Karlsruhe, Tel Aviv

● Sales and business development locations: Canada, USA, Italy, France, Austria, Germany, Hong Kong, China

◆ Countries with franchised distribution

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