# LeddarTech in 6 Minutes

EPIC Online Technology Meeting on LIDAR Technology and Applications

Pierre Olivier, Chief Technology Officer

2020-04-14

"Elon Musk says Tesla's fully autonomous cars will hit the road in 3 years"
– Business Insider, September 2015

"10 Million Self-Driving Cars Will Hit The Road By 2020"
– Forbes, March 2017

"General Motors Co. has laid out a plan to not only mass-deploy self-driving cars on public roads in 2019, but to do it profitably"
– The Detroit News, November 2017

"Fully self-driving cars are here"
- Waymo CEO John Krafcik, November 2017

"We overestimated the arrival of autonomous vehicles"
– Jim Hackett, Ford CEO, April 2019

"It's really, really hard…Autonomy will always have some constraints"
– John Krafcik, Waymo CEO, November 2018

"The leap from level 3 features to level 4/5 is orders of magnitude in complexity"
– Robert Day, ARM director of automotive solutions and platforms, Las Vegas DAC

"Feature complete just means [the car] has some chance of going from your home to work without intervention. That doesn't mean the features are working well."
- Elon Musk, Tesla CEO, January 2020

## Autonomous Vehicles: More Challenging than Anticipated
As an industry, it turns out we have difficulty, even with ADAS





Credit: Thatcham Research Video

"…automatic emergency braking systems with pedestrian detection perform inconsistently, and proved to be completely ineffective at night…"

*- AAA, October 2019*

- **Founded in 2007, Quebec City, Canada**

- **LiDAR and AD sensing technology**

- **>35,000 units sold and 30+ million hours of 24/7 SSL operations in outdoor environments**

- **Strong IP in signal acquisition and processing technology (80 patent applications - 59 granted)**

- **14 generations of solid-state LiDAR technology in volume production since 2010**

  - Leddar® M16/IS16, Vu8, LeddarOne™, D-tec™

  - Next-generation LCA2 & LCA3 based LiDARs with announced customer wins

- **Open, scalable, flexible platform enabling various LiDAR solutions, optimized for ADAS & AD applications**
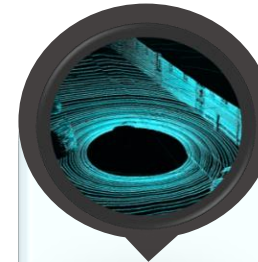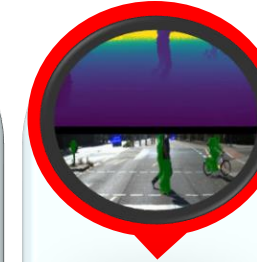
## Four Pillars of the LeddarEngine™

**LeddarCore® SoC, Drivers & Eval Kits**

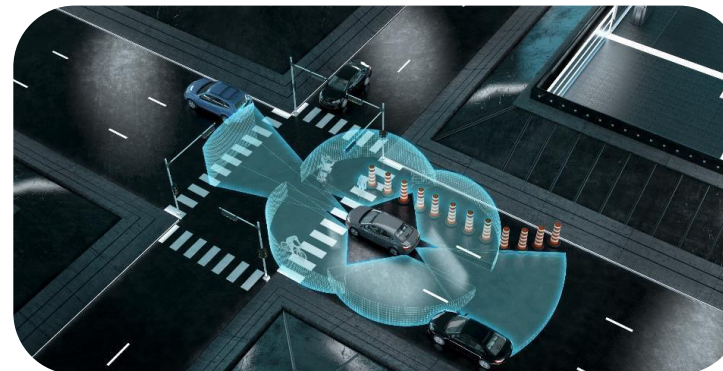**Leddar Signal Processing Library & LiDAR modules and Tools**

**3D Perception Software Stack Dataset Infrastructure**

**Sensor Fusion**

**Delivers the Solid-State LiDAR Technology with the Lowest Cost and Highest Performance**

**ADAS / AD (Level 2 to 5)**

## Performance

- Full Waveform Conversion SoC with patented acquisition algorithms
- Parallel acquisition and detection
  - LCA2: 32 channels;  LCA3: 64 channels
  - Fully synchronized, multiple SoC support for higher channel counts
- Large dynamic range
- Low input referred noise
- ISO 26262 ASIL B
- AEC-Q100

## Processing features

- Complete and comprehensive Lidar measurement library
- Compatible with standard ADAS processors
- Advanced signal processing features including interference rejection
- Patented crosstalk mitigation algorithms

## Other features

- Programmable laser controller
- Built-in monitoring for photodetectors, lasers, power supplies
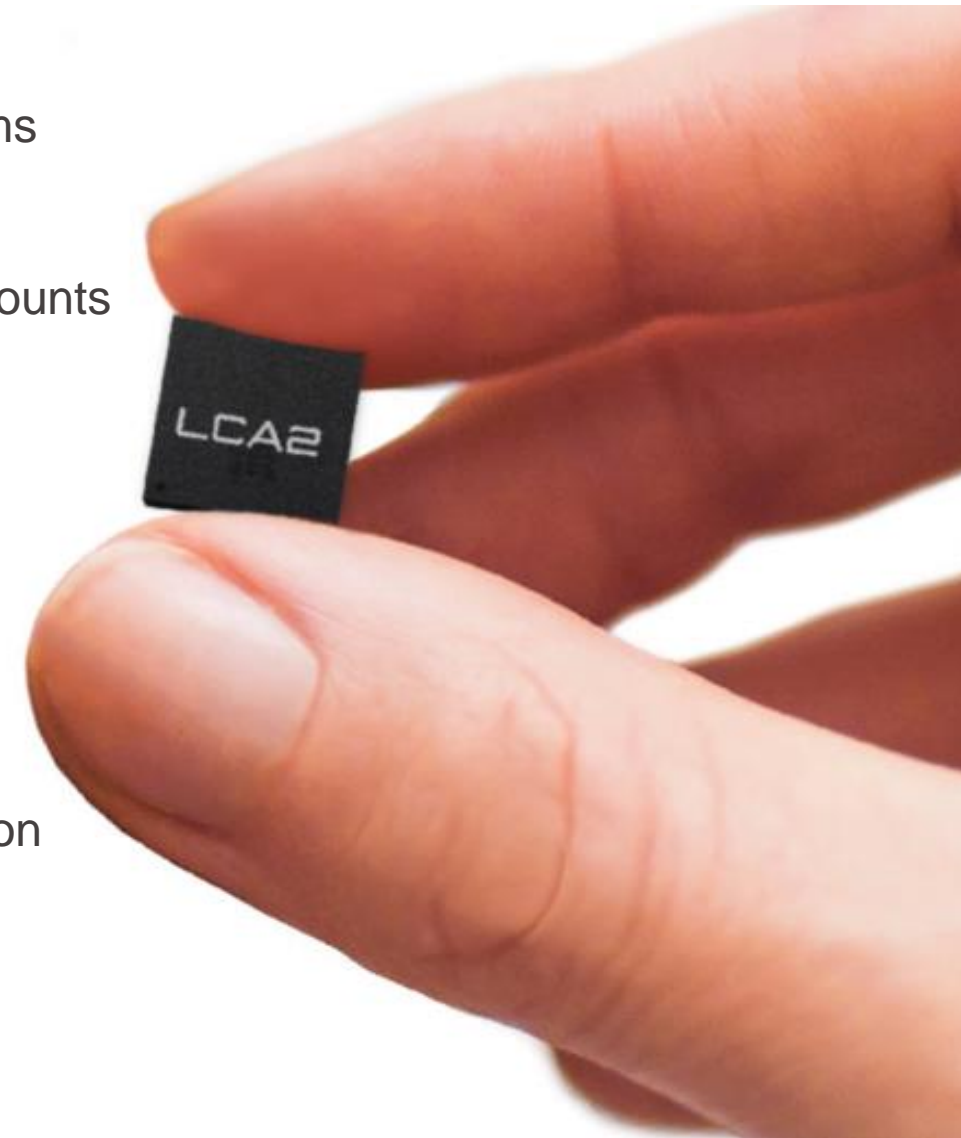
## The Leddar Pixell 3D Flash Cocoon LiDAR

- True Solid-State, full waveform conversion LiDAR

- Dependable environment, object and VRU detection over 180°

- 96 horizontal x 8 vertical segments = **768 independent surfaces** with simultaneous data acquisition

- Road-ready design for superior durability

- Standalone or complementary to mechanical scanning LiDAR for superior safety and reliability

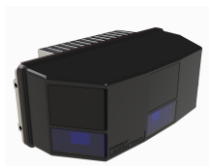**100% Solid-state**

**Zero-Dead-Zone Proximity Coverage**

**Road-ready design for Superior durability**

## Jump-starting Perception Development for Flash LiDAR

**LeddarTech Pixell Sensor**

**Dev Kit Laptop (Linux)**
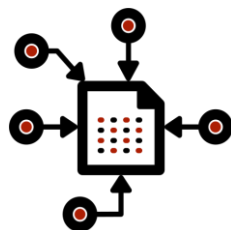
**Documentation**

**Camera Pod**

**Calibration Checkerboard**

**Leddar Data Acq. Software (DAS)**

**RTMaps SW (by Intempora)**

**Leddar Pixel Cloud Dataset (Annotated)**

**Open Source Machine Learning Framework**

**PYTORCH**

Deep Learning with PyTorch

**Leddar Demo App (pedestrian segmentation)**

**DEMO**

**Demo software covering both learning of the CNN & execution of the segmentation demo**

**Provided pre-assembled with LiDAR to camera alignment**

- Running the demo
- Sensor installation & calibration
- DAS API (sensor data acquisition & read dataset)
- Dataset file format
- PC setup / configuration
- Guide for developing a custom perception application based on the Leddar Pixell cloud echoes and waveform data
- Getting Started Guide on pedestrian classification

# Thank You!

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Quebec City
Montreal
Toronto

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Austin, TX
Dallas, TX
San Jose,
CA

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Lyon, France
Munich, Germany
Stuttgart,
Germany
Milan, Italy

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