

Welcome at Anteryon!

30 October 2019

Marno Panis

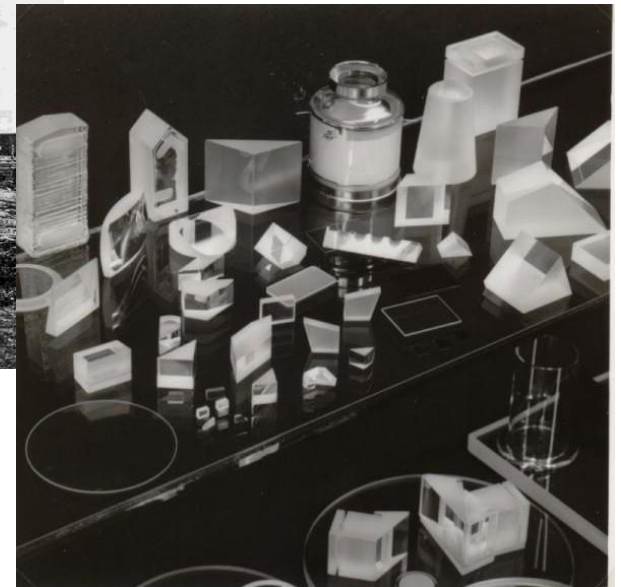
marno.panis@anteryon.com

Something about Anteryon...

A long history



First Philips Glass factory @ "Strijp S"



1977 Product overview

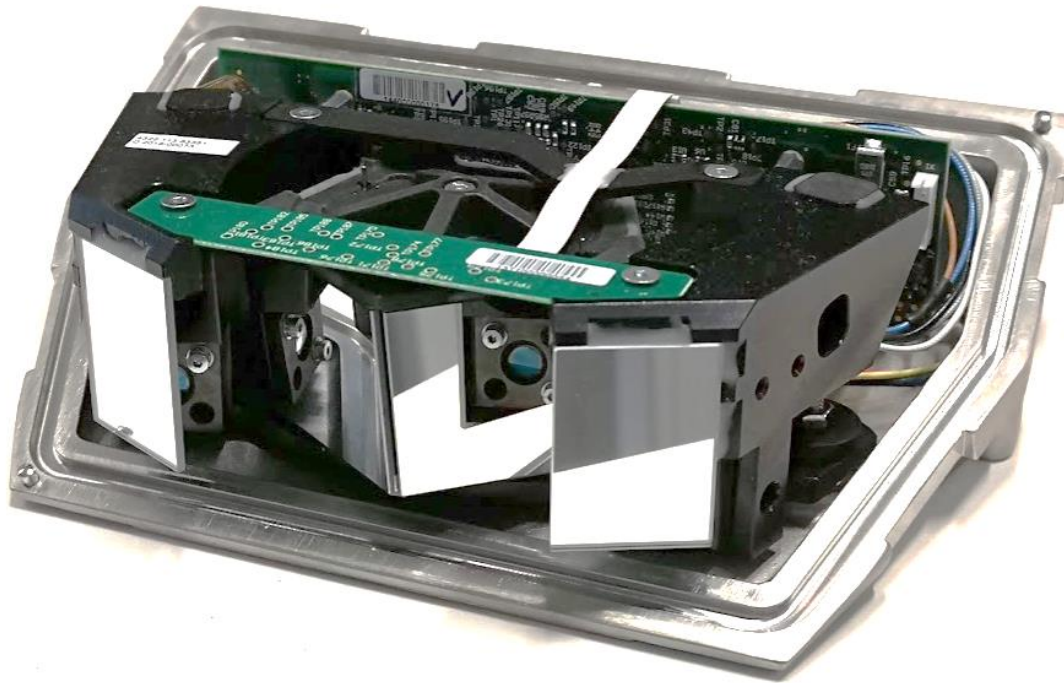
1986



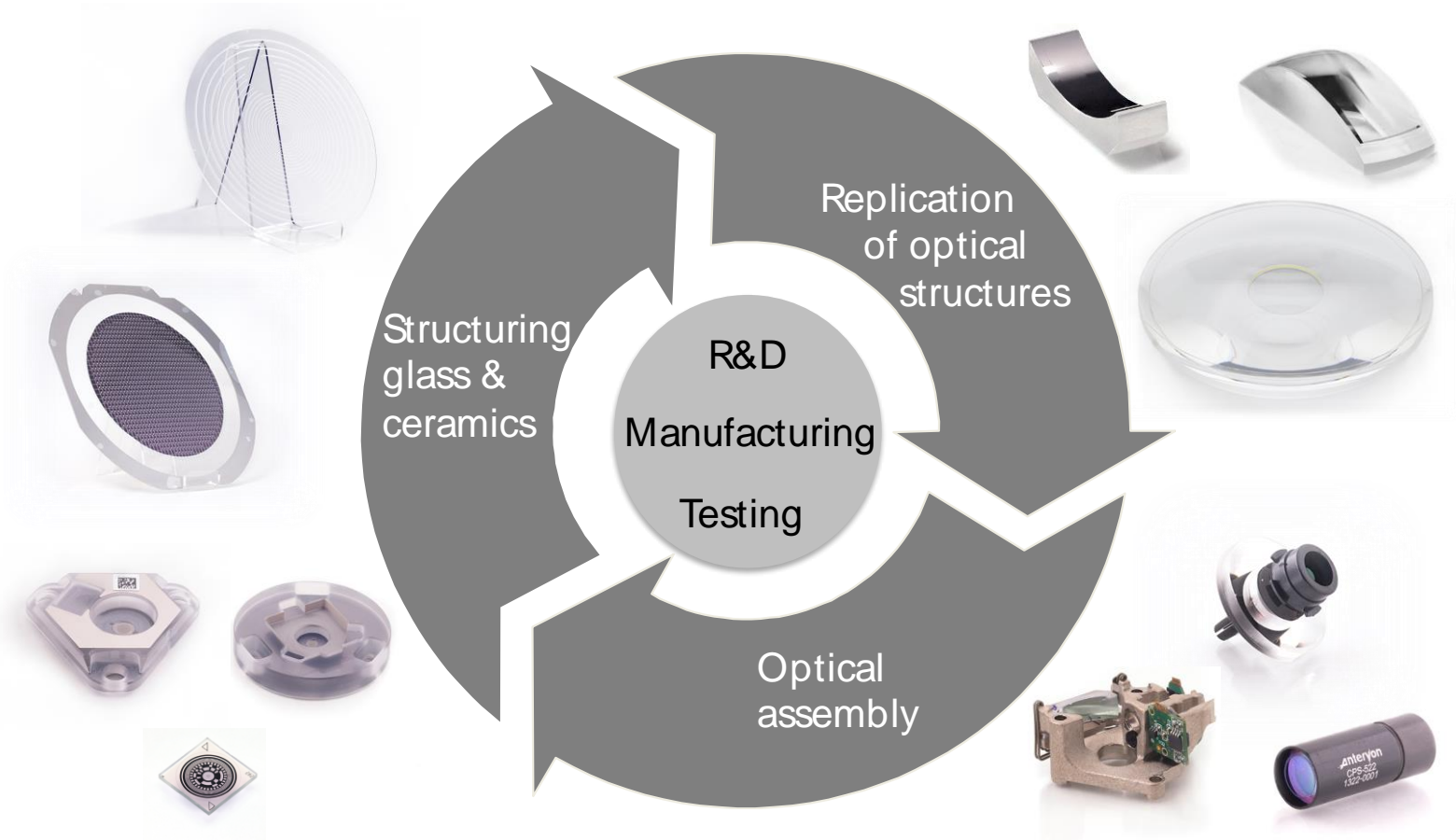
Aspheric lenses for CD players



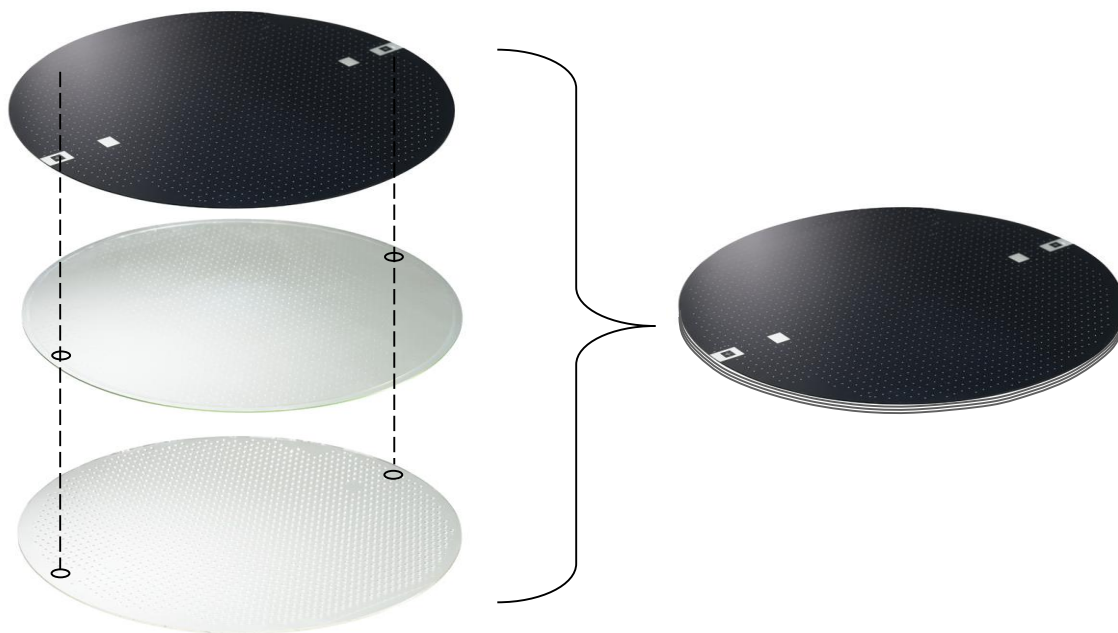
2000's



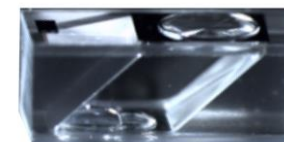
Opto-mechanical assemblies



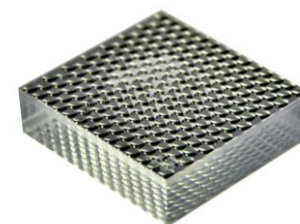
2001 Wafer Optics



Camera Modules



Collimator with integr. periscope



Micro lens array (MLA) with integrated aperture



Anteryon @ Brainport Industry Campus

Facilities	4000 m ² manufacturing
Clean Room	1800 m ² (classes ISO 7, 6, 5)
Employees	180 FTE





Anteryon / WLCSP @ Suzhou Industrial Park

Clean Room 10.000 m² (classes ISO 5)

Employees starting up



...and something about LiDaR



Amazon has expanded their self-driving robot delivery system to Southern California. (Courtesy: Amazon)

TECHNOLOGY

Amazon Self-Driving Robots Hit Irvine Sidewalks





SHUTTLE BUZZ
We Took a Ride on NYC's First Self-Driving Shuttle
 New York City just got its first autonomous vehicles. Futurism was on the scene.

Dan Robitzki | August 7th 2019

Ford Launching Self-Driving Vehicles For Domino's Pizza Delivery In Miami

by **Chuck Martin**, March 2, 2018



Ford is bringing self-driving cars to the streets of Miami and Miami Beach to deliver pizzas from Domino's.

In collaboration with Miami-Dade County, Ford is testing to prove out a business model, according to Sherif Marakby, vice president, autonomous vehicles and electrification at Ford.

"What we learn from this customer experience research will be applied to the design of our purpose-built self-driving vehicle that we plan to launch in 2021 to support the expansion of our service," Marakby stated in the Ford



Lexus LS Autonomous Vehicle Test Drives Coming to Tokyo Next Summer

Posted by **lazar** on October 27th, 2019



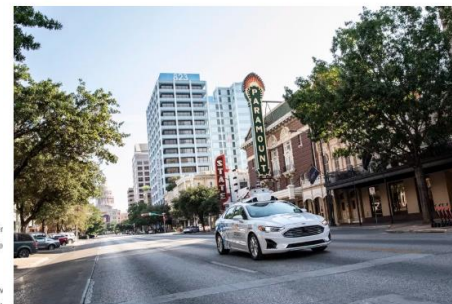
TECH TRANSPORTATION CARS

Ford's autonomous vehicles are coming to Austin, Texas

The third city for the automaker's test vehicles

By **Andrew J. Hawkins** | @andyjshawk | Sep 25, 2018, 10:00am EDT

By **George Luo**, Taiwan News, Staff Writer 2019/09/15 14:59



Ford is bringing its autonomous vehicles to Austin, Texas, the company announced on Wednesday. Ford will start by mapping the streets of downtown Austin this November. Eventually, the size of the fleet and the geographic area will grow until Ford is ready to launch an autonomous taxi and delivery service at scale in 2021, the company said.

Singapore

Driverless shuttle bus to start passenger trial at NUS Kent Ridge campus



The NUSmart Shuttle, a self-driving shuttle bus, will begin taking passengers on Tuesday (Jul 30) in a year-long trial after undergoing road tests for one-and-a-half months. Elizabeth Neo with more.

Waymo to customers: "Completely driverless Waymo cars are on the way"

By **Kirsten Korosec** @kirstenkorosec / 12:38 am CEST • October 10, 2018



Waymo, the autonomous vehicle business under Alphabet, sent an email to customers of its ride-hailing app that their next trip might not have a human safety driver behind the wheel, according to a copy of the email that was posted on Reddit.

Over 1,400 self-driving vehicles are now in testing by 80+ companies across the US

Darrell Etherington @etherington / 2 months ago

Comment



<https://techcrunch.com/2019/06/11/over-1400-self-driving-vehicles-are-now-in-testing-by-80-companies-across-the-u-s/>

In a talk at the **Uber** Elevate Summit in Washington, D.C., today, U.S. Department of Transportation Secretary **Elaine Chao** shared a total overall figure for ongoing testing of autonomous vehicles on U.S roads: More than 1,400 self-driving cars, trucks and other vehicles are currently in testing by more than 80 companies across 36 U.S. states, plus DC itself.

Several challenges wait to be overcome to attain **Level 4** and **Level 5** autonomy ..

Challenges to reach Level 5 autonomy and enjoy personal driving freedom

Data Storage

Self-Driving Cars generate a tremendous amount of data. According to Intel, autonomous vehicles can create 4TB of raw data every day. Imagine 2500 vehicles are on the road, Petabytes of data can be easily generated. Such massive amounts of data require extensive data storage architecture.

Such massive amounts of data need to be extracted from cars, often Self-Driving cars are not equipped with high bandwidth internet and transferring heavy amounts of data over-the-air possess quite a lot of challenges.

Data Transportation

Expense of Sensors

Self-Driving Cars utilize camera images and LiDAR technology to perceive its environment, LiDAR is extremely expensive. LiDAR sensor from **Velodyne** costs around 75k\$/unit, compared to the price of an entire car which makes SDC difficult to afford.

Corner cases are situations which rarely happen, e.g. a pedestrian unexpectedly stepping on the street or placing a concrete block in the middle of the street. It's good to have data from driving on the highway, but much value lies in corner case training data.

Acquisition of Corner Case Data

Training

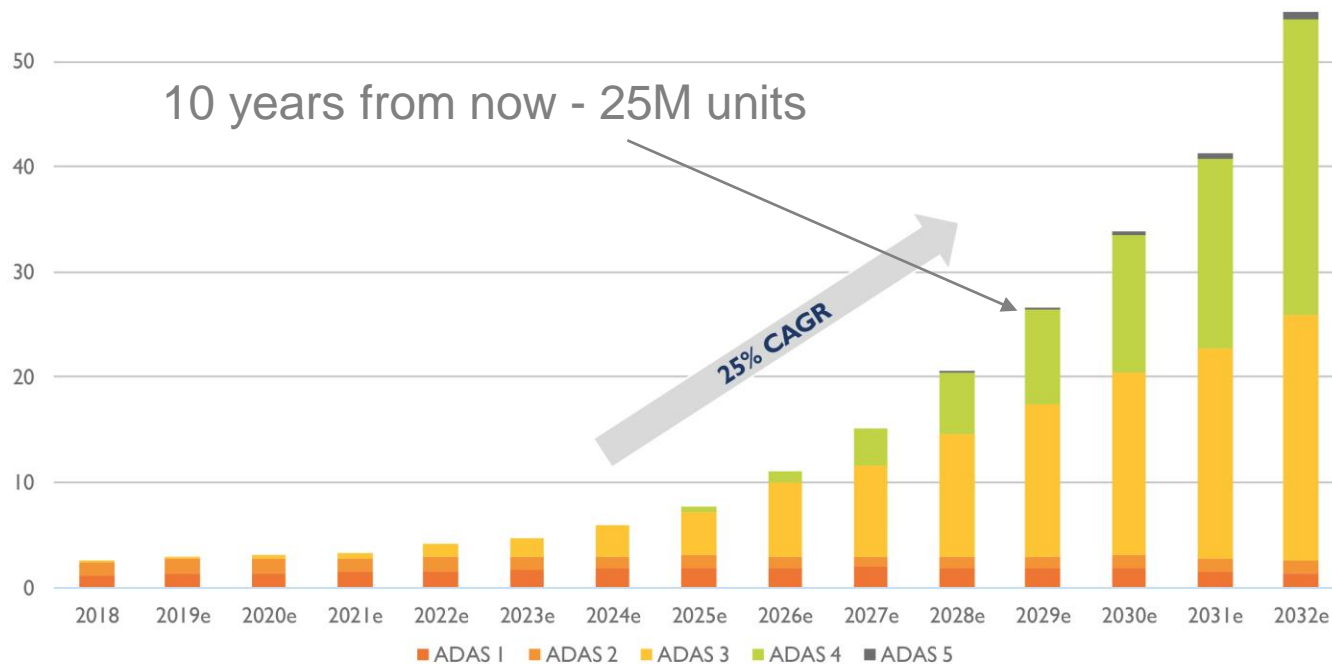
Self-Driving Cars need to be driven about 100 million miles to capture sufficient data to safely navigate autonomously. Companies also drive millions of virtual miles on a daily basis but collecting results in the real world is time-intensive.

Understanding why or why not a Self-Driving Car identifies another car is paramount to convince regulators that these cars are safe enough for public use. SDCs rely on Deep Learning algorithms, which are notorious for not explaining why they decide one way or another.

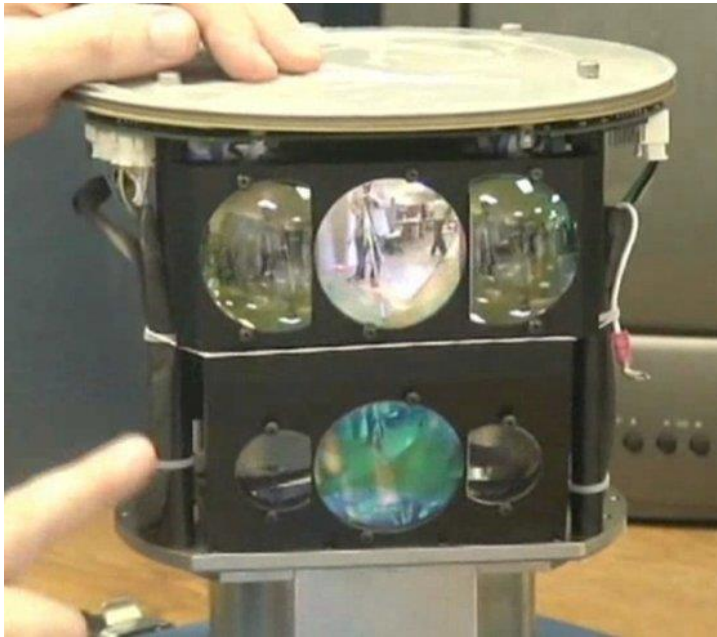
Verifying Deep Neural Networks

Automotive LiDAR market: LiDAR shipments for ADAS vehicles – split by ADAS level - In million unit

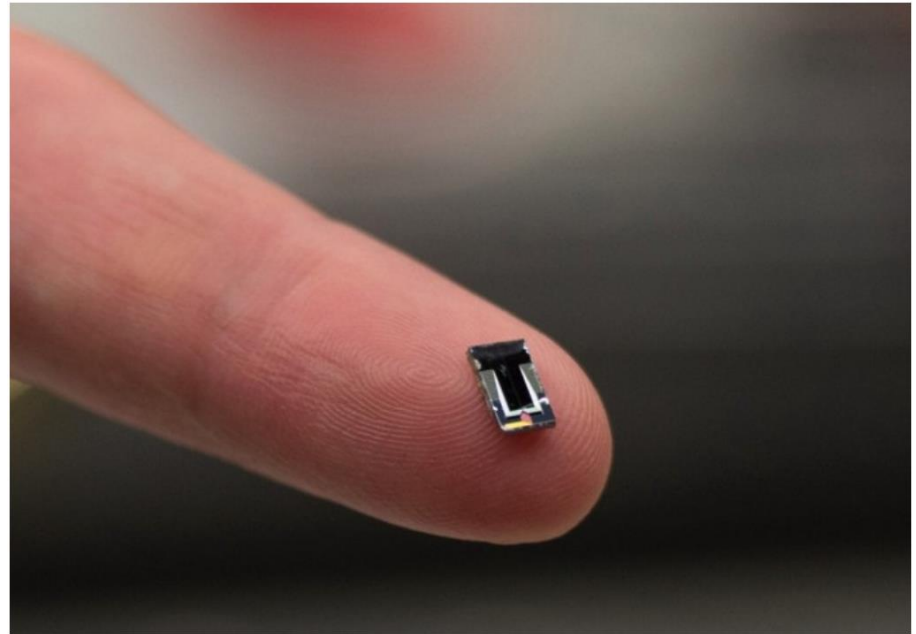
(Source: LiDAR for Automotive and Industrial Applications report, Yole Développement, 2019)



Note: LiDAR for ADAS 1 and 2 are non-scanning LiDAR used for AEB (Automatic Emergency Braking).



Velodyne HDL-64E Laser Rangefinder



Voyant Photonics is shrinking LIDAR to a chip that fits on your fingertip, (📷: Voyant Photonics)

Large variety in solutions...





AIRBUS

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members only

ITALDESIGN

eDC
HYBRID

This presentation was presented at
EPIC Meeting on LIDAR Technologies for Automotive 2019

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