



# Global Auto Industry Conf, Deutsche Bank

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# Risk Factors

This presentation occurs during Intel's "Quiet Period," before Intel announces its financial and operating results for the fourth quarter of 2017. Therefore, presenters will not be addressing fourth quarter information during this program.

Statements in this presentation that refer to forecasts, future plans and expectations are forward-looking statements that involve a number of risks and uncertainties. Words such as "anticipates," "expects," "intends," "goals," "plans," "believes," "seeks," "estimates," "continues," "may," "will," "would," "should," "could," and variations of such words and similar expressions are intended to identify such forward-looking statements. Statements that refer to or are based on projections, uncertain events or assumptions also identify forward-looking statements. Such statements are based on management's current expectations and involve many risks and uncertainties that could cause actual results to differ materially from those expressed or implied in these forward-looking statements. Important factors that could cause actual results to differ materially from the company's expectations are set in Intel's earnings release dated Oct 26, 2017, which is included as an exhibit to Intel's Form 8-K furnished to the SEC on such date. Additional information regarding these and other factors that could affect Intel's results is included in Intel's SEC filings, including the company's most recent reports on Forms 10-K and 10-Q. Copies of Intel's Form 10-K, 10-Q and 8-K reports may be obtained by visiting our Investor Relations website at [www.intc.com](http://www.intc.com) or the SEC's website at [www.sec.gov](http://www.sec.gov).

# Computer Vision Expertise





**A WINNING COMBINATION**

# Strategy



## Philosophy: a single effort

Level-4/5 Automation  $\xrightarrow{\text{derivatives}}$  L2, L2+, L3



## Economical Scalability

- Automating HD-maps through a crowdsourcing approach
- Controlling the explosive computational demands of Driving Policy (Planning)
- Scalable, workload-diverse and low-power SoC together with powerful ATOM CPU



## Model for Safety Guarantees

- Decouple Sensing from Planning mistakes that could lead to an accident
- RSS - a formal model of the human judgement of common-sense of Planning
- Using RSS to provide safety guarantees

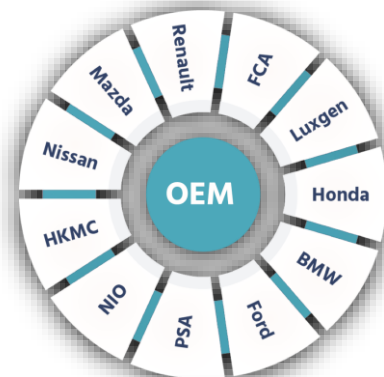
# New Design Wins 2017

Nearly 70 vehicle models, 27 OEMs, 30 design wins  
(in 2016 there were 12 design wins)



24M EyeQs  
shipped to date

Main Features	Main Features
AEB EUNCAP 2018, LDW	AEB, LDW
AEB, ACC, LKA	AEB, LDW, ACC
AEB, VOACC, LKA	AEB, LDW, ACC
AEB EUNCAP 2020, Traffic Jam Assist, Road Profile	AEB, ACC, LKA
AEB, ACC, LKA, FreeSpce	LDW, FCW
AEB, LKA	AEB, ACC, LKA, TJA
AEB, ACC, HLB, FreeSpace	AEB, ACC, LKA, Lane Changes
AEB, ACC, FreeSpace, Road Edge	AEB, LDW, ACC
AEB, ACC, LKA, TSR	AEB, LKA, ACC
Base: L2/3 premium: L3/4	AEB, ACC, LKA, Lane Changes
AEB, VOACC, Glare Free HB, 3D VD, REM	AEB, LDW, ACC
AEB, pedal confusion, Enhanced LKA	AEB, LDW, ACC
AEB EUNCAP 2020, Traffic Jam Assist, Road Profile	Full EUNCAP2020 compliance, 3D VD, FreeSpce, Objects
AEB, LDW	AEB, LKA, ACC
AEB EUNCAP 2020 & NHTSA, Road Edge, REM	L3, surround, Road Profile, REM



# 2018 Program Launches



## **15 programs to be launched during 2018 (vs 6 launches in 2017)**

- 14 OEMs (4 of which are Chinese)
- 4 programs with EyeQ4 (12 additional launches starting from 2019)
- ALL programs have full-feature bundles (high-end)



## **New features launched in 2018**

- 3DVD
- Traffic Lights Detection and Recognition
- Advanced Road features: Semantic Free Space, Holistic Path Prediction
- REM

# Recent News



- **Pushing the Technology Forward in 2018**
  - Road Experience Management launch
  - Integrated, super-efficient compute platform (2x EQ5 plus 1x Atom)
  - 100 Vehicle Fleet. 12 Cameras + 6 Radar + 6 LIDAR + RoadBook
- **REM Expands to China and to Aftermarket**
  - REM agreements with SAIC and NavInfo. L4/L5 with SAIC.
  - EyeQ4-enabled Aftermarket product for data collection
- **Bringing Near-term Value to Customers and Consumers (L2+ / L3)**
  - 11 Design Wins with OEM's at cumulative >50% market share



# Strategic Value of REM



## Leveraging ADAS

- Introduce REM software on EyeQ for front-facing cameras (leverage existing real-estate in the car)



## Leveraging Crowd-sourcing

- Bandwidth of data from car to cloud is very low ~**10kb** per kilometer of driving



## Automation

- The process for creating and updating maps is automatic.



## Density of data sources

- Volume of ADAS-enabled vehicles enable very low “**time to reflect reality**” everywhere, rather than merely in “geo-fenced” neighborhoods.

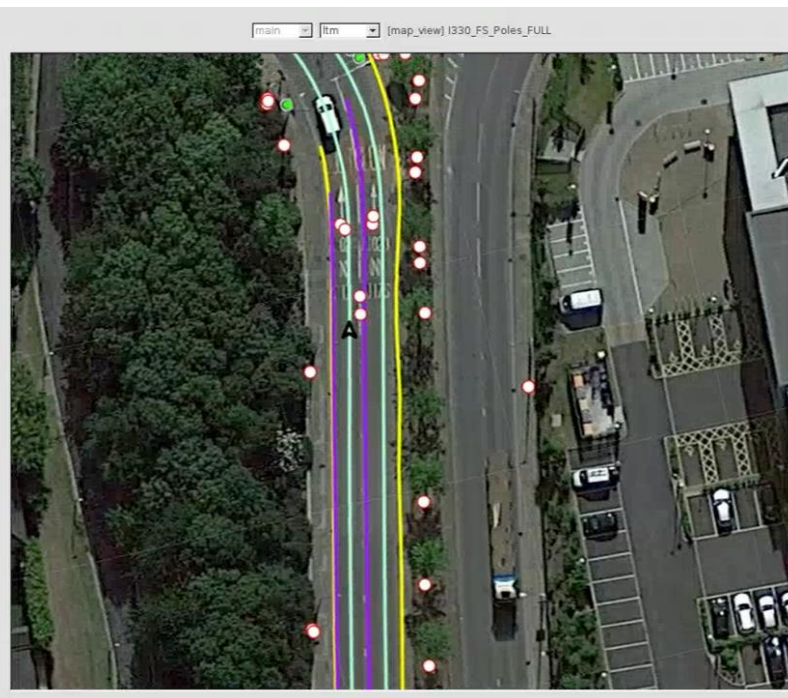
REM introduces highly scalable “live” HD-map at low-cost

# Strategic Value of REM





RB data projected onto image space. Road edge, lane marks, lane center, landmarks (in Yellow).



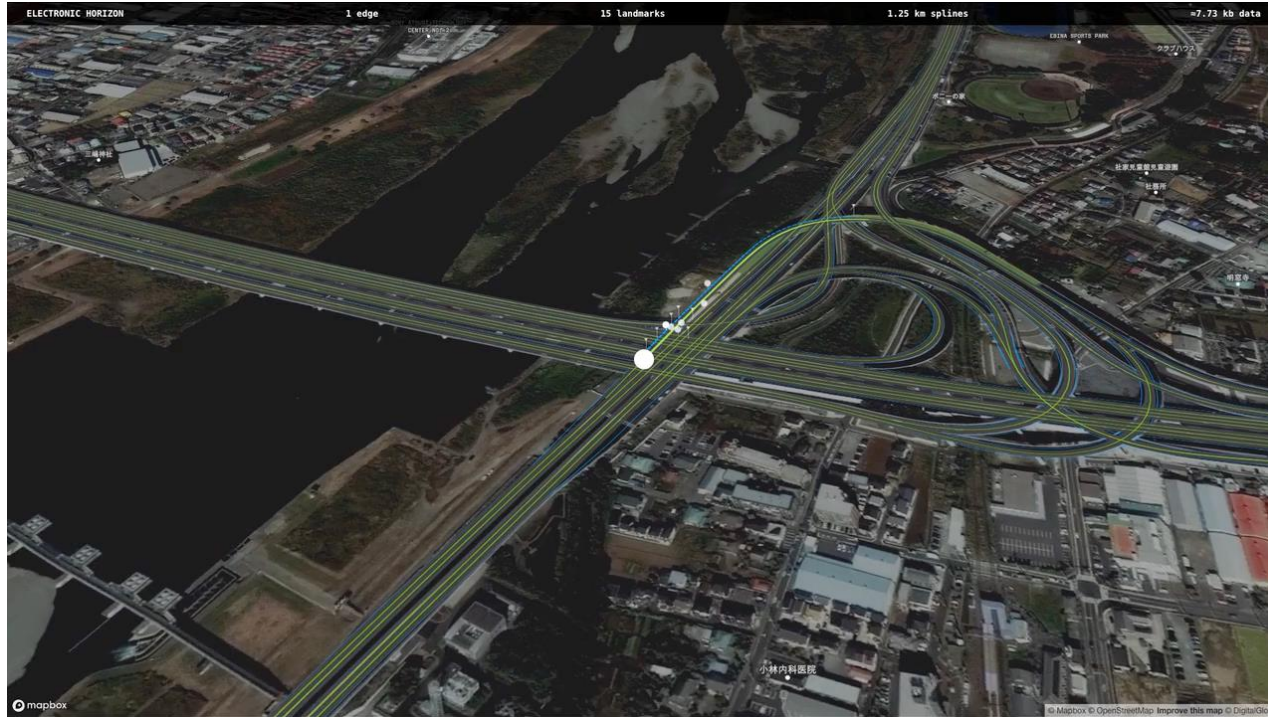
RB data projected onto Google Earth.

# REM 2017 Achievements



- ✓ Preparing harvesting for 2018 production programs (BMW, Nissan, VW)
- ✓ Preparing RB covering all Japan highways in cooperation with Zenrin and Nissan
- ✓ Cooperation with NavInfo and SAIC for bringing REM to China
- ✓ Deals ongoing with OEMs for Harvesting 2019 and beyond
- ✓ Deals ongoing with OEMs for RB usage for L2+ (new ADAS category)
- ✓ Aftermarket “Mobileye 8 Connect” REM supported and deals for 2018 deployment
- ✓ Mapping neighborhoods across the globe for supporting internal L4 development as a turn-key solution

# REM already being built in Japan



Mapping of Japan highways - with Zenrin/Mapbox/Nissan for L3 launch in 2019

# REM through EyeQ4-based Aftermarket product Mobileye 8 Connect™



## Deals that have been signed with REM deployment

### REM in the Aftermarket



Partner	City	# of Vehicles	Goal	Timing
KoMoD Research Project (Germany Ministry of Transport)	Dusseldorf, Germany	750	Prepare the city for smarter & safer driving	Q1
Gett	London	500	Map City of London	Q2
Buggy	New York	2,000	Map City of New York	Q3
Road Safety Authority DGT (Directorate-General of Traffic) – Spain	Undisclosed, Spain	~5,000	Make Spain Autonomous Ready™	Q2/3
Guard Insurance	Across the US	1,000-2,000 tow trucks		Q3

# REM enables ADAS 2.0 (L2+ / L3)



Front-facing camera + Roadbook enables a leap in ADAS L2 features (LKA/ACC).



Sensing alone (righthand image) cannot robustly detect the drivable path to enable safe hands-free control. The Roadbook data can bridge the gap as localization is based on a high degree of redundancy of landmarks and is therefore robust.



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# EyeQx Family: Terra OPs/W



## EyeQ3

4 x VMP+ 4 x CPU, a 40nm, series prod since 11/2014

**0.25 TOPs @ 3W**

## EyeQ4H

6 x VMP + 2 x PMA + 2 x PMC + 4 x CPU, 28nm,  
series prod from 3/2018 launches by 4 OEMs in  
2018, 12 OEMs in 2019 and onwards

**2.5 TOPs @ 6W**



Nvidia Parker:  
1.5TOPs / 15W

## EyeQ5H

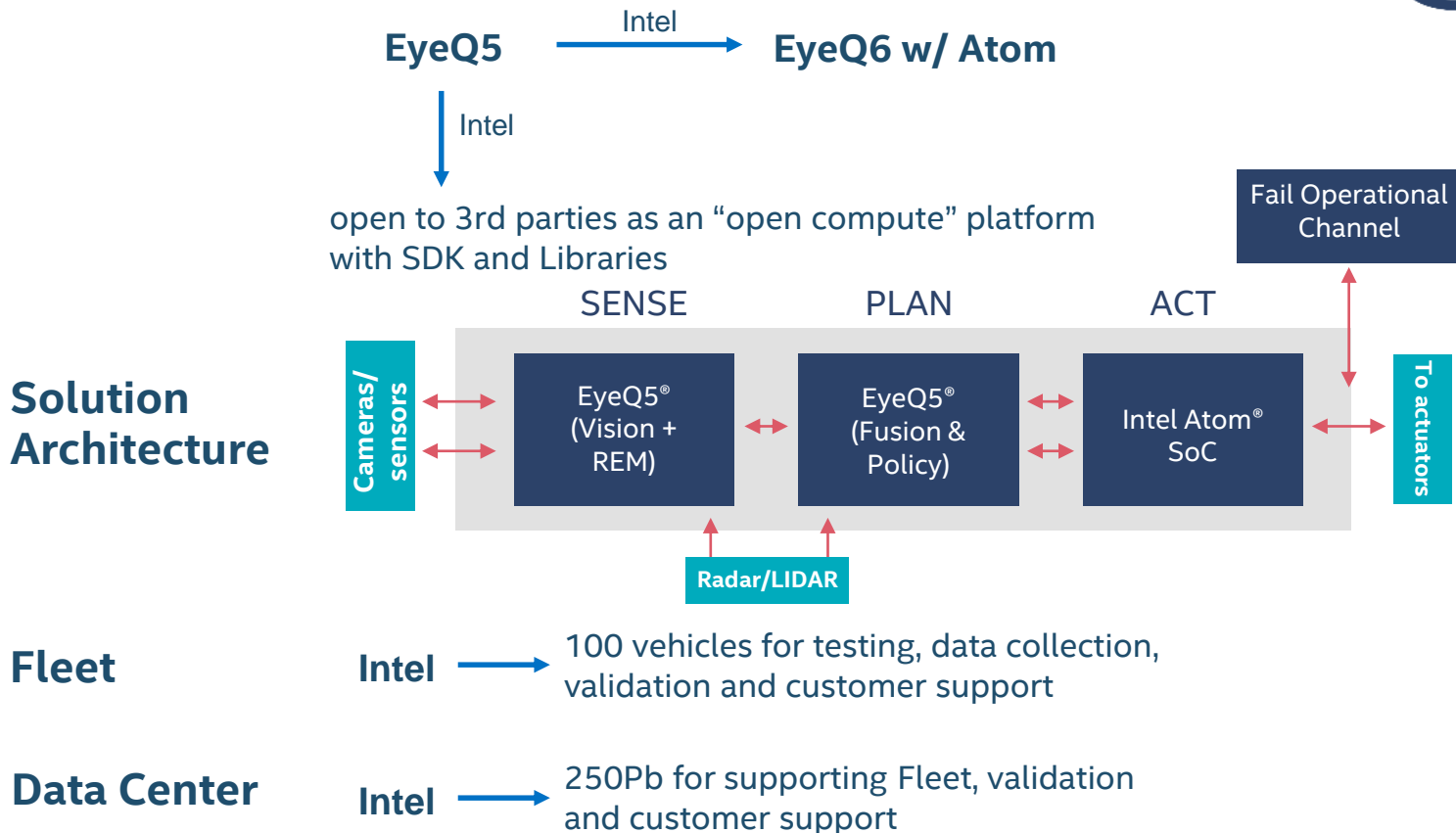
7nm, 1st silicon 8/2018, series prod from 3/2020  
design wins by 4 OEMs from 2020 and onwards.

**24 TOPs @ 10W**



Nvidia Xavier:  
30TOPs / 30W

# Harnessing The Power of Intel



# Partnerships



## L3 Production (series development) 2019+

- Audi, BMW, Fiat-Chrysler, Honda, NIO, Nissan, SAIC



## L4 Production (strategic partnerships) 2020+

- BMW, Fiat-Chrysler, SAIC, NIO
- **3 x OEMs** ongoing sourcing decisions



## L4 Turnkey solution

- CSLP platform with Delphi (Aptiv)
- Intel/Mobileye internal fleet of 100 vehicles ramping up throughout 2018

# Master Plan 2018



## L4 partnerships

- Turnkey solution: perception, driving policy, safety, MDC prototype (2 x EQ5+Atom) - platform derived from the 100-car fleet.
- Perception turnkey (EQ5) whereas Fusion, Driving Policy on open-EQ5 (software as joint collaboration or solely by partner OEM/Tier-1).

Intel → • Open-compute + libraries: open-EQ5, Atom, Xeon, FPGA.

## L2+ programs:

Front-Facing sensing + Roadbook (“ADAS 2.0”)

Intel → **REM** as a “data strategy”

Intel → **RSS** with industry and regulatory bodies



**THANK YOU**

Drive Safe!