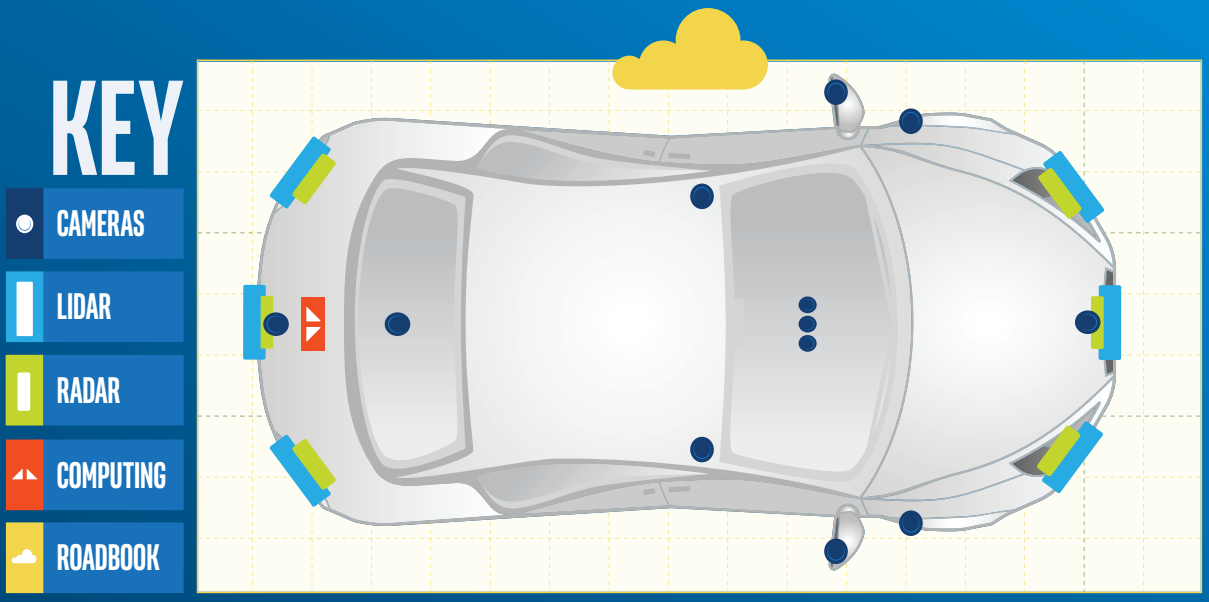
AUTONOMOUS VEHICLE PLATFORM

The sensors, hardware and software provided by Intel and Mobileye give autonomous vehicles their ability to recognize the environment around them. This technology creates the building blocks for autonomous vehicles (AV) and includes a suite of cameras, lidar, radar, and computing and mapping technologies.



Cameras

There are 12 cameras in a 360-degree configuration. Eight cameras support self-driving and four short-range cameras support near-field sensing for self-driving as well as self-parking. The camera is the highest resolution sensor (hundreds of millions of samples per second) and is the only sensor capable of detecting both shape (vehicles, pedestrians, etc.) and texture (road markings, traffic sign text, traffic light color, etc.). Advanced artificial intelligence and vision capabilities are able to build a full-sensing state from the cameras. This end-to-end capability is critical to achieve "true redundancy" in combination with other sensor types. *Watch this video on cameras >*

Lidar

There are six total "sector" lidars; three in front and three in rear. Lidar sensors are useful in detecting objects by measuring reflected laser light pulses. Lidar, in combination with radar, is used by the system to provide a fully independent source of shape detection. It works in addition to the camera system. Given our camera-centric approach, lidar only needs to be used for very specific tasks, primarily long-distance ranging and road contour. Limiting the workload for lidar results in much lower cost compared to lidar-centric systems; it also provides easier manufacturing and volume at scale.

Radar

Six radar units (a mix of short- and long-range) provide a 360-degree cocoon of coverage around the vehicle. Radar is a mature technology that uses reflected radio waves to detect objects and define their speed. Particularly good with metallic objects and effective in inclement weather, radar in combination with lidar provides a fully independent object-detection system, enabling true redundancy with the camera system. *Watch this video on radar >*

Computing – Intel® Atom and Mobileye EyeQ SoC

The Mobileye EyeQ system-on-chip employs proprietary computation cores (known as accelerators) that are optimized for a wide variety of deep neural networks, computer vision, signal processing and machine learning tasks. Developing software and hardware under the same roof, targeted at a specific end-use (ADAS and autonomous driving) results in significant advantages in computational performance, power consumption and cost versus the general purpose chips offered by competitors. The Mobileye fleet of autonomous vehicles is currently powered by four EyeQ4s. This is approximately 10 percent of the computational power we will ultimately deploy in production versions of the L4/L5 system.

The production version of the central Autonomous Vehicle System processor will utilize an Intel Atom-based chip in addition to two Mobileye EyeQ5 SOCs. More importantly, Intel expertise in developing powerful software development platforms is enabling Mobileye to off er an open version of the Mobileye EyeQ5 SOC for our customers with capability to collaborate with us (and deploy their own code) in the areas of sensor fusion and driving policy. *Watch this video on computing >*

Roadbook

Roadbook is the high-defi nition map that is used to provide true redundancy to the camera system for textural (i.e. non-shape) information, such as driving path geometry, and other static scene semantics, including lane markings, road boundaries and traffi c sign information. This HD map is unique because it is crowd-sourced through series production vehicles that are equipped with a front-facing cameras in support of Mobileye EyeQ SOC-enabled ADAS. These "non-autonomous" vehicles are the data "harvesters" to build the map, sending low-bandwidth (10kb per kilometer) data packets to the cloud, where the information is aggregated into a high-defi nition map that can be utilized by higher-level autonomous vehicles (L2+ and above). Due to crowd-sourcing, the map costs little to generate and is constantly updated to provide extensive coverage of drivable roads. *Watch this video on roadbook >*

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