TRANSPORT EYE

The World's Most-Accurate Long-Distance Stereo Camera for Automotive

Key Benefits

- **Longest detection** range currently supported by any automotive stereo camera – Reaching distances of up to 100m.
- **Highest accuracy** at various ranges, down to 1%, enabling precise object detection.
- Wider than standard **Field-of-View** (FoV) – Crucial for earlier detection of hazards even at close range.
- Detection of **any object** or obstacle on or near the road, avoiding the training process required for most single-camera systems.
- Very **compact design** – The smallest solution in the industry to possess long range capabilities. Taking up minimal space, the system fits conveniently behind a car's rearview mirror.
- Intelligent **fusion with visual data** enables broad classification algorithms, including recognition of traffic signs, lane markings and traffic lights, as well as efficient real-time mapping.

Visual Cameras in Automotive

The automotive market utilizes visual cameras extensively, serving multiple applications such as surround view monitoring, lane keeping, traffic sign recognition, rearview monitoring, e-mirrors and driver monitoring. As we approach autonomous vehicles, the number of such visual cameras will only increase as the safety requirements grow in complexity. In fact, volume demand for vaisual cameras will outstrip all other automotive sensor types.

The combination of multiple cameras in the automotive market has the potential to yield significant benefits for ADAS and autonomous driving applications. Specifically, a dual camera setup with an overlapping field of view (FoV) can provide detailed depth information that cannot be obtained otherwise. Using a stereoscopic visual camera, vehicle manufacturers and their suppliers can use a single device to integrate a wide range of driver assistance functions, which help improve safety and comfort and fulfill the ever-increasing safety standards set by legislators and consumer protection organizations.

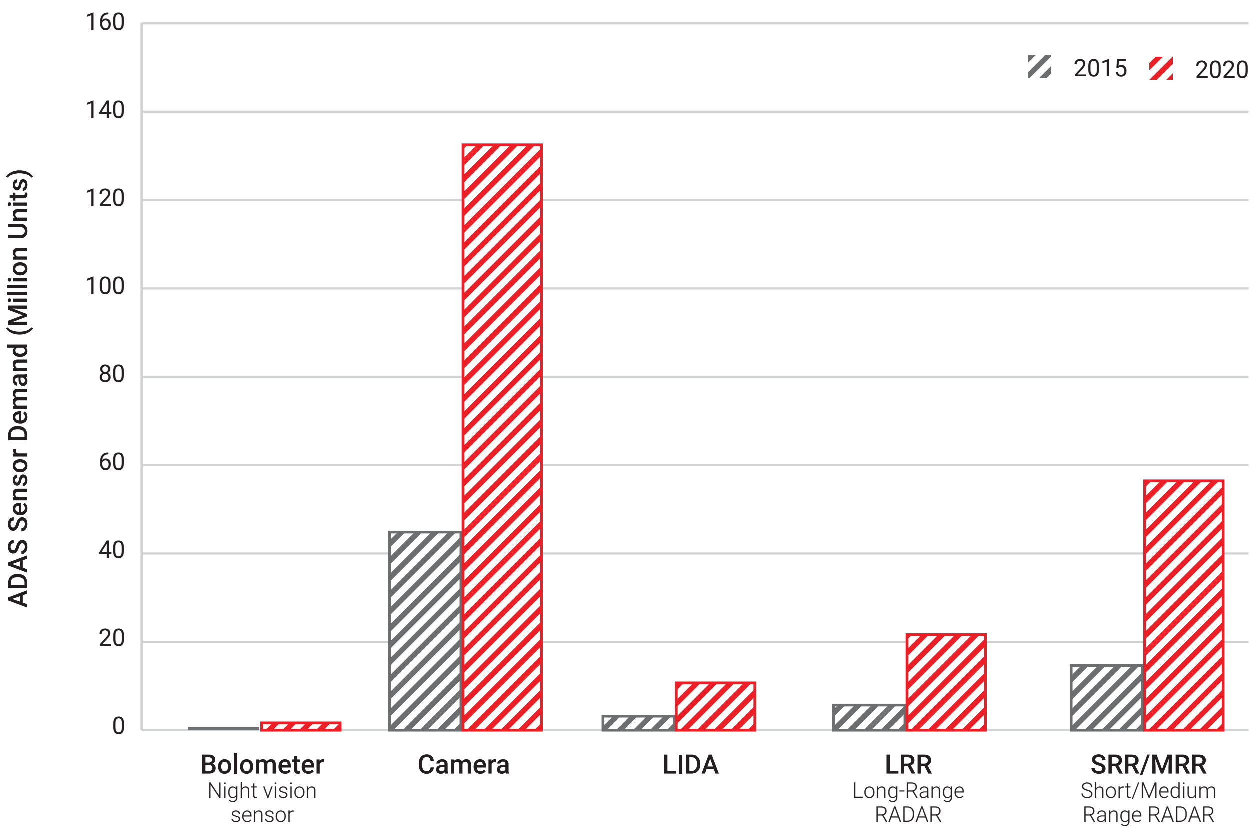


Image sensors witness highest growth in ADAS. Source: Strategy Analytics

TransportEye: Sensing The Road Ahead

TransportEye is an automotive front-facing stereoscopic camera system that provides the most accurate depth information in a small form factor that fits behind the rearview mirror. The camera system was co-developed by Hisense, China's largest CE vendor, and Corephotonics, the pioneer of dual camera technologies, and serves both private cars as well as commercial vehicles.

By combining accurate depth information with visual camera information, the system can support a wide range of features, including lane departure warning (LDW), lane keeping assist (LKA), forward collision warning (FCW), automatic emergency braking (AEB), automatic cruise control (ACC), traffic sign recognition (TSR), intelligent headlight control (IHC) and more. Mixing live front-facing video with accurate depth maps, in combination with deep learning techniques, will become mandatory for autonomous and semi-autonomous vehicles, and can efficiently support real-time mapping services.

The TransportEye system operates at up to a 100m range, further than any other automotive stereo camera system. With depth acquisition accuracy down to 1%, the system provides the most accurate distance information for any object in its field of view. Using a camera baseline of only 12cm, the system is remarkably compact and fits conveniently behind the car's windshield and the rearview mirror without blocking the driver's field of view. The system was designed to meet automotive industry reliability standards, including vibrations and extreme temperature variance, and has gone through rigorous road testing.

Most accurate detection and distance measuring for ANY object

Watch TransportEye in action

TRANSPORT EYE

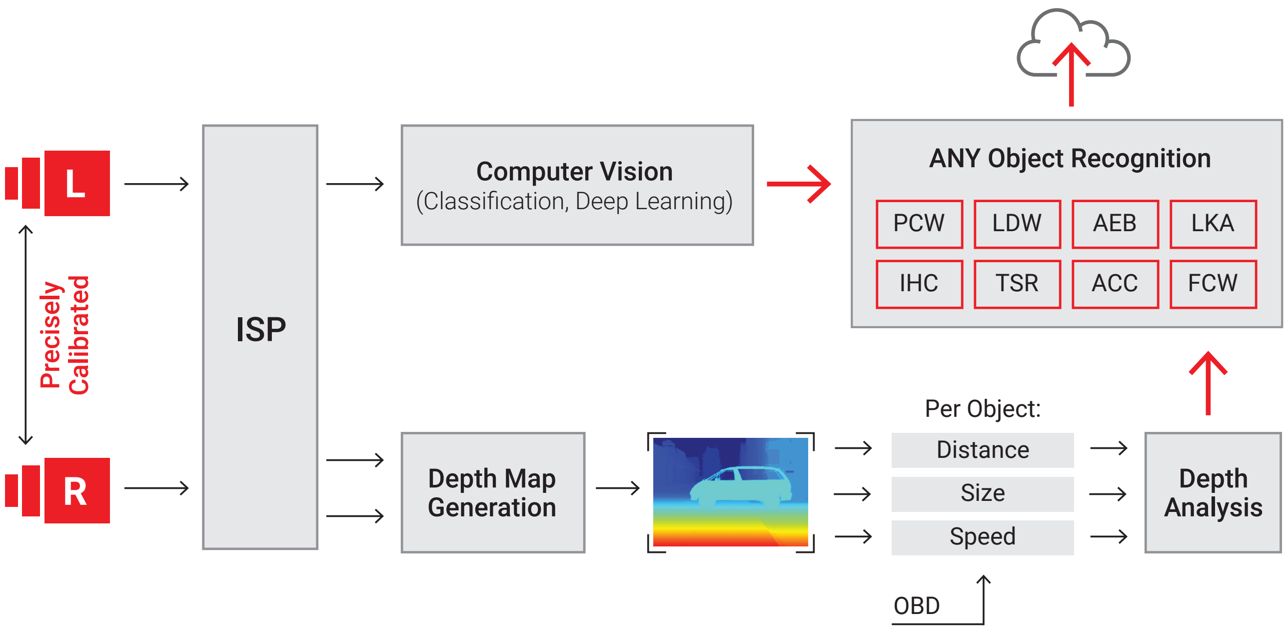
System Architecture

TransportEye is based on two identical cameras, each using a 1.3 megapixel automotive-grade image sensor with large 4.2 micron pixels, and a horizontal Field of View (FoV) of 52 degrees. Using this resolution and FoV, the camera can detect any object on the road in three dimensions at a distance of up to 100m, and is not limited to detecting cars and pedestrians only. Both image sensors inherently support HDR (high dynamic range) of up to 120dB, allowing the system to accurately process high contrast videos and cover the wavelength range that is visible to the human eye in the toughest scenes such as intense backlight.

The two cameras are carefully aligned using an advanced calibration process and unique algorithms, allowing extremely accurate depth acquisition at various ranges.

The two video streams captured on the image sensors are then efficiently manipulated by an image pipeline (an image signal processor, or ISP) that is tuned for machine vision applications rather than human vision needs.

Next, the two video streams are processed to create disparity maps, from which a detailed depth map is generated. Using proprietary depth algorithms, taking into account occlusions and scene understanding, this process runs on a frame-by-frame basis on an FPGA platform embedded in the TransportEye camera system. Given the rigorous calibration process, each object in the FoV is given accurate distance, size, and speed measures, which in turn trigger the car's main system on chip (SoC) to warn or avoid such objects.



For more information, visit:
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