



## Technology

# Forward Collision Warning



### Features:

- Unique single camera-based application
- Detects both moving and stationary vehicles
- Provides a warning up to 2.7 seconds before an imminent collision with a vehicle ahead
- Filters vehicles in adjacent lanes that are not a threat, both on straight and curved roads
- Compact single camera solution
- High availability, including night and rain conditions

Mobileye's Forward Collision Warning (FCW) system uses monocular image processing to detect the motion dynamics between the host vehicle and the vehicles in front of it. The FCW system predicts an impending rear-end collision and issues an FCW warning up to 2.7 seconds before impact by calculating the time to collision (TTC) with the vehicle ahead, taking into account the distance from it and the relative traveling speed. The FCW algorithm takes into account the lateral position of the target vehicle at the time of impact, thus filtering out unnecessary warnings.

The FCW application operates in daylight and at night, and under a variety of weather conditions. In cases of poor visibility, such as heavy rain or dense fog, the system issues a low-visibility notice, using its diagnostic functions.

The FCW alert to the driver can be auditory, visual, or both.

In addition to a vision-only FCW solution, as offered in the Mobileye AWS family of products for the consumer market, Mobileye provides FCW technology for active braking solutions, fusing Mobileye's vision technology with radar.

### Accident prevention with FCW

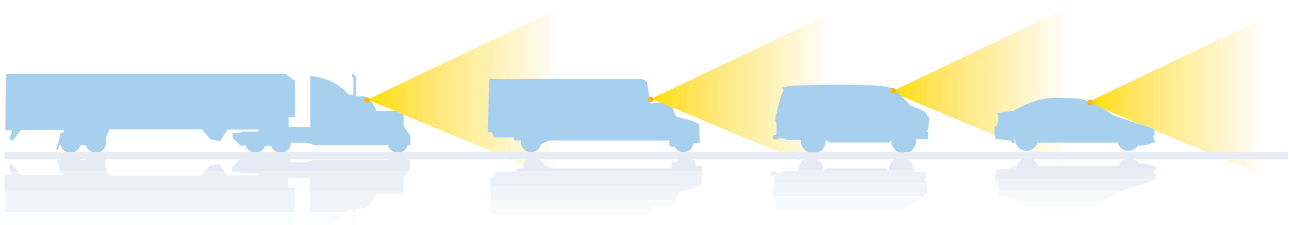
In almost 80 percent of all crashes, there was driver inattention in the 3 seconds before the accident!<sup>1</sup>

A University of Adelaide study showed that in 29% of cases the driver did not attempt to brake at all before the accident either because they were not aware of the danger at all, or had insufficient time to react.<sup>2</sup>

A study by Daimler Benz shows that an extra 0.5 second early warning can prevent 60% of rear-end accidents, and 1.5 seconds will prevent 90% of them.<sup>3</sup>

Mobileye Forward Collision Warning (FCW) provides an alert up to 2.7 seconds before collision with a vehicle ahead, giving the driver more time to react and prevent or mitigate an imminent accident.

According to US statistics: rear-end accidents account for about 28% of all road accidents.<sup>4</sup>





## Application Options

FCW is a stand-alone application that can be integrated with other Mobileye Driver Assistance applications (such as LDW, HMW, etc.)

FCW can be used in fusion with radar/other forward-looking vehicle sensors for driver assistance applications

## Online FCW reporting

Receiving many Forward Collision Warnings correlates with the general quality of driving, it can be highly beneficial to any fleet manager to be able to receive reports containing FCW information. The FCW data can be recorded and transmitted online via Mobileye's data reporting system.

## Processing platform

The FCW application runs at 10-15 FPS on the automotive-qualified Mobileye SeeQ® board, containing the Mobileye EyeQ™ ASIC vision system on a chip (VSoC), an image sensor, a program memory and a communication interface to the car network.

Mobileye EyeQ™ has an integrated dual channel CAN controller and a glue-less interface to CMOS image sensors.

### Benefits:

- Alerts driver of imminent rear-end accident situations
- Increases driver awareness to the danger of rear-end accidents and promotes safer driving habits
- Compact size, the application operates on the match-box sized Mobileye SeeQ® board
- Cost effective solution, relative to existing FCW technologies

*TTC with detected closest in path vehicle is smaller than critical threshold; FCW is not yet issued.*



*TTC, measured using the relative speed between the host vehicle and the CIPV, decreases under critical threshold, resulting in the issuing of an FCW signal.*



*FCW is still issued as long as the TTC value is below critical level.*



*FCW signal ceases after the driver responded by braking hard enough to increase the TTC value above the critical level.*



1) 100-Cars Naturalistic Driving Study (VTTI, NHTSA, April 2006)

2) <http://casr.adelaide.edu.au/speed/vol-1.html>

3) D.R. Ankrum, "Smart Vehicles, Smart Roads" Traffic Safety 92(3) (1992): 6-9

4) <http://www.its.dot.gov/ivi/3DC.html>

# Mobileye

Our Vision. Your Safety.

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