



## Volvo Car Group

Corporate Communications  
PVH50  
SE-405 31 Göteborg, Sweden  
Telephone: +46 31 59 00 00  
Fax: +46 31 54 40 64  
[www.media.volvocars.com](http://www.media.volvocars.com)  
[twitter.com/volvocarsnews](https://twitter.com/volvocarsnews)

### **Pedestrian Detection in darkness**

*According to STRADA (Swedish TRaffic Accident Data Acquisition), 44 per cent of all the pedestrian fatalities occurred in darkness, at dusk or dawn. In the United States, the traffic fatality rate is 3–4 times higher in darkness (VTI).*

As the leader in automotive safety, Volvo Cars was the first in the industry with detection and auto brake technologies, from the first-generation brake support in 2006 to Pedestrian Detection with full auto brake in 2010 and the latest technology Pedestrian and Cyclist Detection in 2013.

Now, Volvo Cars has taken a step further by making the detection and auto brake technology work effectively also when driving in darkness. The technology includes detection and auto brake for other vehicles, pedestrians and cyclists.

“The camera technology in today’s cars works at dusk and dawn, but it is limited when driving at night. Now, we cover the whole span from dusk to dawn by a smarter and faster high-sensitive camera combined with advanced exposure control,” says Thomas Broberg.

The new functionality will be introduced in the all-new Volvo XC90 by the end of 2014.

### **Animal Detection**

*Accidents involving wild animals are a major international traffic problem. In Canada, about 40,000 such accidents leading to vehicle damage are reported every year. Sweden reported about 49,000 animal collisions in 2012. Of these 6,000 were collisions with moose.*

Collision mitigation for animals is a world first. The technology detects and automatically brakes for animals both in daylight and in the dark. Animal Detection will be integrated in the new car generation some time after the introduction of the all-new Volvo XC90 by the end of 2014.

“It is a huge challenge to detect what nature has done its best to conceal. Initially, we are focusing on large animals as they cause the most damage and the most severe injuries,” says Thomas Broberg.

Accidents with wild animals often take place at cruising speeds. The risk of severe injuries in a collision with a moose is over 70 per cent if the accident occurs at 100 km/h. If the collision speed is reduced by braking to below 70 km/h, the risk of severe injuries is significantly lower.

Animal Detection technology is designed to help the driver avoid the accident or reduce the speed of impact. The active and passive safety systems cooperate in order to help minimise the consequences.

### **Road edge and barrier detection with steer assist**

*Studies show that many accidents take place in uncritical traffic situations and good weather conditions due to driver distraction, drowsiness or illness.*

*Approximately 25 per cent of all accidents in Volvo Cars’ statistical accident database are accidents with an initial road departure. Two out of three of these occur on roads with speed limits of 70 km/h or more. In Sweden, road departures cause 53 per cent of all traffic fatalities and 42 per cent of all severe injuries. Half of all traffic fatalities in the United State are road departure accidents (NHTSA).*

Road edge and barrier detection with steer assist helps the driver avoid accidental road departures. The technology detects if the car is about to drive off the road and autonomously applies steering torque to bring the vehicle back on track. The technology will be introduced in the all-new Volvo XC90 by the end of 2014.

“The autonomous steering intervention is designed to help the driver avoid road departures, which often have very severe consequences. More than half of all traffic fatalities in Sweden are caused by single vehicle accidents,” says Thomas Broberg.

A forward-looking camera and radar cooperate to monitor the road edge and different kinds of road barriers. The technology acts immediately if the driver shows signs of unintentionally drifting too close to the road edge.

“Being able to monitor where the physical road ends is a world first. This means that the technology also works on roads without side markings,” says Thomas Broberg.

### **Adaptive Cruise Control with steer assist**

*A car with adaptive cruise control and collision warning cuts the risk of colliding with the vehicle in front on a motorway by up to 42 per cent (Euro-FOT study 2012). Slow-moving traffic is part of urban commuting. The average American spends more than 100 hours a year commuting to work, according to the U.S. Census Bureau's American Community Survey. This is more than the average two weeks of vacation time (80 hours) that many Americans have per year.*

Adaptive Cruise Control with steer assist helps the driver stay in the lane and follow the rhythm of the traffic. The new system, whereby the car automatically follows the vehicle ahead, will be introduced in the all-new Volvo XC90 by the end of 2014.

“Distraction and inattentiveness are the most common cause of accidents in modern traffic. This technology makes driving safer and more relaxed in monotonous stop-and-go traffic,” explains Thomas Broberg.

Adaptive Cruise Control with steer assist is an evolution of the current Adaptive Cruise Control and Lane Keeping Aid technology. The Adaptive Cruise Control enables safe, comfortable driving by automatically maintaining a set gap to the vehicle ahead, at the same time as the steering is controlled automatically.

The driver activates the ACC with steer assist by pushing a button. Using data from a camera and radar sensors, the car can follow the vehicle in front. The engine, brakes and steering respond automatically.

“Making the car automatically follow the vehicle ahead in the same lane is the first step towards cars driving autonomously. However, the driver can always override the system and take back control of the car at any time,” says Thomas Broberg.

### **Car 2 Car Communication**

*In the United States, 6 per cent of all accidents and 3 per cent of all fatalities are caused by slippery road conditions (NHTSA). Of all accidents in the Volvo Cars' database, 6–7 per cent occur in slippery road conditions.*

*According to the National Highway Traffic Safety Administration (NHTSA) in the United States, 10 per cent of all traffic fatalities at intersections are the result of red light violations. The Insurance Institute for Highway Safety (IIHS) reports that half of the people killed in red-light violation crashes are not the signal violators. They are drivers and pedestrians hit by the vehicle that drove through the red light.*

Enabling vehicles to communicate with each other and with the traffic environment opens up fantastic possibilities. Vital information can be shared and exchanged – creating a more comfortable and safer drive.

Volvo Cars has signed a memorandum of understanding with the members of the Car 2 Car Communication Consortium regarding the implementation of standardised technology for communication between cars from 2016 onwards. The aim is for inter-car communication to function between all cars, irrespective of make.

The technology is based on communication between transmitters in vehicles and the road infrastructure, such as road signs and traffic lights.

“There is considerable potential in this area as well as opportunities for many benefits in many spheres over and above road safety, such as a more uniform flow of traffic and additional comfort for road users,” says Thomas Broberg.

Examples of application areas for the new technology:

### Green Light Optimum Speed Advisory

Via a transmitter in the traffic light, information is generated regarding the optimum speed for a car to maintain in order to pass through a succession of green lights, thus avoiding unnecessary braking for red. At red lights, the driver can also receive information about how long it will be before the light turns green.

### Weather and road condition Information

Issues a warning about local bad weather such as heavy rain, snowfall or icy roads. It is also possible to transmit information about local icy or slippery road patches from one car to other vehicles.

### Emergency Vehicle Warning

Alerts the driver to the presence of nearby emergency vehicles, allowing him or her to create free passage well in advance and without being taken by surprise. This can be of benefit in the evening and at night in urban areas where emergency vehicles use their sirens more sparingly out of consideration for nearby residents and also if loud music is playing in the car.

### Emergency Brake Warning

Vehicles that brake hard on the road can create dangerous situations for other road users. Car 2 Car warns if a vehicle further ahead suddenly slows down.

### Slow or Broken Down Vehicle Warning

Slow or broken-down vehicles in the roadway can transmit a warning to other road users. Receiving information well in advance can cut the risk of unpleasant surprises in traffic and thus reduce accidents.

### Road Works Warning

Alerts the driver to road works. Construction vehicles and heavy equipment can transmit information to vehicles well in advance of the site. Drivers can thus receive information about changed speed limits and altered routes near the worksite. The system can also keep the driver informed about the remaining distance before the end of a long roadwork zone.

### Traffic Jam Ahead Warning

Alerts the driver to traffic stops or tailbacks. Since vehicles to the rear are alerted that there is a stop further ahead, there is less risk of accidents.

### In-Vehicle Signage

Car 2 Car provides information about regular and temporary speed limits. This information is provided by communication units along the road that can pass on information about parameters such as road signs and their location on the route.

### Motorcycle Approaching Indication

Motorcyclists are among the most vulnerable road users and in order to improve safety, Car 2 Car informs other road users if there is a motorcycle nearby.

### Red Light Violation Warning

Traffic lights that communicate with cars make it possible to alert a driver who has not noticed a red light, for instance by activating a prominent sound and light signal in the car. This technology also makes it possible to warn a driver who is going through a green light about another vehicle that is running a red light and thereby about to cross his/her path by mistake.

## **Autonomous Parking**

Autonomous Parking is a concept technology that relieves the driver of the time-consuming task of finding a vacant parking spot. The car finds and parks in a vacant space by itself, allowing the driver to leave the vehicle at the entrance of the parking lot.

Vehicle 2 Infrastructure technology, in other words transmitters in the road infrastructure, informs the driver when the service is available. The driver uses a mobile phone application to activate the Autonomous Parking and then leaves the car.

The vehicle uses sensors to localise and navigate to a free parking spot. The procedure is reversed when the driver comes back to pick up the car.

Combining autonomous driving with detection and auto brake for other objects makes it possible for the car to interact safely with other cars and pedestrians in the car park. Speed and braking are adapted for smooth integration in the parking environment.

“Our approach is based on autonomously driven cars being able to move safely in environments with non-autonomous vehicles and unprotected road users,” says Thomas Broberg.