

## Press Release

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# Pedestrian Detection with full auto brake - unique technology in the all-new Volvo S60

The all-new Volvo S60 is packed with high-tech systems that actively help the driver avoid collisions and the company's Pedestrian Detection with full auto brake is a world first. To the knowledge of Volvo Car Corporation's experts, there is no other car manufacturer that offers as complete a feature that can avoid a collision with a pedestrian. This radar- and camera-based system can detect pedestrians in front of the car, warn if anyone walks out into its path and automatically activate the car's full braking power if the driver fails to respond in time.

Pedestrian collisions occur every day in increasingly intense traffic environments. In Europe, 14 percent of all traffic fatalities are pedestrians. The corresponding figure for the USA is 11 percent and in China the proportion rises to 26 percent.

"Here at Volvo Cars we have always led the way when it comes to protecting the occupants in our cars. In recent years, we have adopted groundbreaking initiatives that help the driver avoid and mitigate collisions with other vehicles. Now we are taking a giant stride forward with technology that can contribute to increased safety for unprotected road users as well," says Thomas Broberg, Senior Safety Advisor at Volvo Cars. "We are truly proud of our success in making our technology so reliable that we can offer a complete system that can avoid collision with a pedestrian, by detecting, alerting and full braking, a world first, to our knowledge. With this technology we increase the braking force in our system for automatic braking from fifty percent to full stopping power."

### **Safer detection with spearhead technology**

Pedestrian Detection with full auto brake consists of a newly developed radar unit integrated into the car's grille, a camera fitted in the windscreen near the rear-view mirror and a central control unit. The radar's task is to detect any object in front of the car and to determine the distance to it. The camera determines what type of object it is. The function is programmed to also respond to vehicles in front that are at a standstill or that are moving in the same direction as the car fitted with the system.

Thanks to the new, dual-mode radar's wider field of vision, pedestrians stepping onto the roadway can also be detected early. As well, the camera has higher resolution than the previous-generation unit. This combination makes it possible to calculate a pedestrian's pattern of movement.

"The auto-brake system requires that the object be confirmed by both the radar and the camera. Thanks to the advanced sensor technology used, it is now possible to increase to full braking power," explains Broberg. "Detecting pedestrians with sufficiently high reliability has been a complex challenge. Our innovative technology is programmed to trace a pedestrian's pattern of movement and also to calculate whether he or she is likely to step into the road in front of the car. The system can detect pedestrians who are 80 cm tall and upwards, that is to say including children."

### **New technology permits full braking force**

When a collision becomes likely, the driver first receives an audible warning combined with a flashing light in the windscreen's head-up display. In order to generate an immediate, intuitive

reaction this warning resembles a brake light. At the same time, the car's brakes are pre-charged. If the driver does not react to the warning and a collision becomes imminent, full braking power is automatically applied.

This technology has the same limitations as the human eye, and just like us it "sees" less well in the dark and in poor weather.

Volvo Cars has worked for five years on the development of Pedestrian Detection with full auto brake. Test cars have been in operation around the world in an attempt to expose the system to as wide a variety of traffic behaviour, road condition and climate as possible.

"We've driven more than half a million test kilometres in real traffic to 'train' the system to recognise pedestrians' patterns of movement and their appearance in different countries and cultures. What is more, we use the information obtained from these tests to conduct advanced computer simulations," explains Broberg.

#### **Avoids impacts at speeds below 35 km/h**

Half of all pedestrian collisions occur at speeds below 25 km/h. Pedestrian Detection with Full Auto Brake can avoid a collision with a pedestrian at speeds up to 35 km/h if the driver does not react in time. At higher speeds, the focus is on reducing the car's speed as much as possible prior to the impact. The amount of speed that can be reduced is up to 35 km/h.

Statistics reveal that the car's speed has considerable importance for the outcome of the collision. A lower speed of impact can significantly reduce the risk of serious injury. For instance, if speed drops from 50 km/h to 25 km/h, it's possible that Pedestrian Detection with full auto brake can reduce the fatality risk by as much as 20 percent and in some cases up to 85 percent.

"The proportion of pedestrian fatalities is high today and our technology will play a major role in reducing it," says Broberg.

#### **Also brakes for other vehicles**

Up to 90 percent of all road crashes are caused by distraction. Half of all drivers hitting another vehicle from behind do not apply the brakes prior to the collision. Pedestrian Detection is a further development of the Collision Warning with Auto Brake technology that is currently available in Volvo vehicles. Therefore, the new S60 will also detect, alert and automatically brake if the car risks hitting another vehicle from behind.

The aim of the initial warning is to alert the driver so that he or she can brake or avoid the danger. If the driver does not react to the warning, the car automatically brakes with full force moments before the collision is unavoidable. With automatic braking, the collision can be avoided if the speed difference between the two vehicles is up to 35 km/h.

#### **Alerts tired drivers**

The all-new Volvo S60 can also be equipped with a range of additional systems that help the driver to drive more safely, such as:

- - Driver Alert Control (DAC). A unique technology to alert tired and distracted drivers. This function monitors the car's progress between the lane markers and warns the driver if their driving pattern appears to become random or uncontrolled.
- - Blind Spot Information System (BLIS) helps detect vehicles in the rear blind spot on both sides of the car. A warning lamp beside the respective door mirror illuminates to alert the driver to the other vehicle.
- - Active Bi-Xenon Lights are articulated headlights that follow the curve of the road for the best possible illumination when driving on dark, twisting roads.
- - Lane Departure Warning (LDW) alerts the driver if the car runs across the lane markers without the turn indicator being used.

#### **City Safety - prevents low-speed impacts**

The all-new Volvo S60 also features City Safety as standard equipment. This system can reduce or even entirely avoid low-speed rear-end impacts at speeds up to 30 kilometres an hour. Rear-end impacts are common in dense city traffic and when driving in traffic queues. Approximately 75 percent of all city collisions occur at speeds below 30 kilometres an hour. What is more, Volvo Cars' investigations reveal that in 50 percent of these cases, the driver does not brake prior to the collision.

With City Safety, the car automatically brakes if the driver fails to react in time when the vehicle in front slows down or stops. If the relative speed difference between the two vehicles is below 15 km/h, the collision can be avoided. If the speed difference is between 15 and 30 km/h, the speed of impact is reduced to minimise the effects of the collision.

#### **Rollover Protection System (ROPS) standard in the S60**

The new S60 is equipped with Roll Over Protection System (ROPS) as standard. Using advanced sensor technology, the seat belt pretensioners tighten and the Inflatable Curtains (IC) deploy when the car is involved in a rollover. Together with the safety cage, ROPS helps to reduce the risk of injuries for belted occupants in rollover situations.

#### **Collision safety including an improved Inflatable Curtain**

In a frontal collision situation, the well-balanced combination of high-strength steel of varying grades dissipates the impact energy and helps prevent intrusion into the passenger compartment. The front body structure of the all-new Volvo S60 is divided into four zones, each of which has a different task in a collision. The transverse engine installation creates more space for deformation and helps reduce the risk of intrusion into the passenger compartment in frontal collision situations.

The all-new S60 has safety belt pre-tensioners in all seats. The Pre-Prepared Restraints (PRS) regulate the airbags and the safety belt load limiters to optimise protection depending on the force of the impact.

Among its various other safety systems, the S60 also has an advanced Side Impact Protection System, seat-mounted side airbags, Inflatable Curtains and Whiplash Protection System - one of the market's most effective systems to help reduce the risk of neck injuries in rear impacts.

The Side Impact Protection System (SIPS) has been further improved in the all-new S60 to address a wider span of real life situations, such as side impacts on either side of the passenger compartment. This has been made possible by combining information from accelerometers in the vehicle and the unique use of a gyro to measure yaw rate and manage the activation of the IC, SIPS airbag and seatbelt pretensioners in certain situations.

"No previous Volvo model has ever had such advanced safety technology as the all-new Volvo S60 does. It is a worthy representative of our aim to build the world's safest vehicles - and it marks yet another step towards our vision of a crash free future and ambition of no fatalities or serious injuries in a new Volvo vehicle by the year 2020," says Broberg.

Volvo Cars of Canada Corp. is part of the Volvo Car Corporation of Göteborg, Sweden. The company provides marketing, sales, parts, service, technology and training support to the 41 Volvo automobile retailers across the country. The company's product range includes the stylish and sporty C30, the elegant C70 hardtop convertible, the compact S40 sedan, the S80 flagship sedan and the versatile V50 and V70 wagons. For customers looking for a Volvo vehicle with all-road capability, the company offers the versatile XC60 crossover - equipped with City Safety as standard equipment - as well as the XC70 and XC90.

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#### **Media Web site:**

<http://www.media.volvocars.com/ca/>

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